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The Price of Misassignment: The Role of Teaching Assignments in Teach For America Teachers' Exit From Low-Income Schools and the Teaching Profession

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*Teach For America (TFA) recruits high-achieving college graduates to teach for 2 years in the nation's low-income schools. This study is the first to examine these teachers' retention nationwide, asking whether, when, and why they voluntarily transfer from their low-income placement schools or leave teaching altogether. Based on a survey of three entire TFA cohorts (*n *= 2,029), this longitudinal, retrospective study uses discrete-time survival analysis. We found that teachers who have more challenging assignments—split grades, multiple subjects, or out-of-field classes—are at greater risk of leaving their schools or resigning from teaching than those with single-grade, single-subject, or in-field assignments. It is notable that in-field science teachers' risk of resigning was higher than that of their out-of-field counterparts with nonscience degrees. This study informs policymakers and school officials seeking to retain TFA and other promising teachers.*

Keywords: *teacher retention, teaching assignment, low-income schools, discrete-time survival analysis*

Low-income students fare poorly in U.S. schools. They score low on state tests, graduate from high school at depressed rates, and attend college in diminished proportions (Murnane, 2007; U.S. Department of Commerce, 2006). As they mature, the costs of their underperformance are borne by these students and society (Atwell, Lavin, Domina, & Levey, 2006; Finn, 2006; Levy & Murnane, 2004). High-quality teachers can make a tremendous difference in the achievement of low-income students (McCaffrey, Lockwood, Koretz, & Hamilton, 2003). Thus, attracting and retaining effective teachers for these students is vitally important (Education Trust, 2004) yet quite difficult (Dillon, 2007; Guin, 2004; Ingersoll, 2001). One factor that may affect a teacher's retention is her or his assignment—the grade level or course that she or he is expected to teach. However, the research examining the link between assignment and retention is scant. Are new teachers who are assigned more challenging teaching loads—subjects that are out of their field of preparation or more than one subject or grade—at greater

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risk of leaving low-income schools and the profession than those with less difficult assignments?

To begin answering this question, we followed a large sample of teachers who began their careers in a low-income rural or urban classroom as participants in Teach For America (TFA). TFA teachers, who are intensively recruited and carefully selected from among the nation's top colleges, are expected to work for at least 2 years in some of the nation's most challenging schools. Although TFA annually supplies less than 5% of the nation's new teachers, each new recruit is assigned to work in a hard-to-staff, low-income school. An increasing number of large, urban districts—such as Baltimore, New York City, Washington, D.C., Houston, New Orleans, and Philadelphia—routinely rely on TFA to supply many of their new teachers. Thus, although their national numbers are small, the local effect of TFA teachers in low-income settings is potentially great. Moreover, many reformers argue that TFA teachers are the very type of knowledgeable and resilient individuals who can lead the way in improving low-income, low-performing schools. As such, their career decisions warrant close attention.

Using discrete-time survival analysis to explore TFA teachers' turnover, we found that elementary teachers assigned to teach multiple-grade classes had, in most years of their early careers, a higher risk of leaving their initial, low-income school and transferring than did elementary teachers assigned to teach only one grade. Secondary teachers assigned to teach multiple subjects were at greater risk of resigning from the profession than those assigned to teach a single subject. Mathematics and social studies teachers who were assigned out of field and lacked a major in the subject they were assigned to teach were at greater risk of resigning from the profession than teachers with the relevant major in these subjects. It is notable that teachers assigned to teach science without a major in that subject were at lower risk for leaving teaching than science teachers with such a major.

Background and Context of the Research

Teacher retention, in general, and new teacher retention, in particular, have garnered much attention in recent years (Allensworth, Ponisciak, & Mazzeo, 2009; Boyd et al., 2009; Guarino, Santibañez, Daley, & Brewer, 2004; Johnson, Berg, & Donaldson, 2005; National Commission on Teaching and America's Future [NCTAF], 2003). Numerous studies demonstrate that attrition of new teachers is high (e.g., Hanushek, Kain, & Rivkin, 2004; Ingersoll, 2001; Luekens, Lyter, Fox, & Chandler, 2004), causing concern among educational leaders, policymakers, and analysts. Scholars report that approximately 40% of teachers leave the profession within 5 years of starting to teach (Ingersoll, 2002) and 50% leave within 6 years (Kirby, Berends, & Naftel, 1999). Patterns of teacher migration from school to school, especially movement away from schools serving lower income students and into schools with higher income students, are also well documented.

In many districts that enroll large numbers of low-income students, new teachers leave their schools at very high rates. Nationwide, 15.2% of teachers at high-poverty schools leave their schools annually, compared to 10.5% of their counterparts in low-poverty settings (Ingersoll, 2001). We learned from recent research in Chicago and New York City that, within districts, turnover rates are also proportionally much higher in low-performing, high-poverty schools than in other schools (Allensworth et al., 2009; Boyd et al., 2009). Allensworth and colleagues found that schools with chronically high rates of turnover in Chicago experience a loss of one-fourth to one-third of their teachers each year.

When promising teachers leave their high-poverty schools, students are likely to suffer. Departing teachers are typically replaced by novices, leaving classes taught by a stream of 1st-year teachers who are, on average, less effective than their more experienced counterparts (Murnane & Phillips, 1981; Rockoff, 2004). When teachers leave, schools also lose the benefits of professional development and other resources they have invested in departing teachers (NCTAF, 2003). Routinely high levels of teacher turnover impede a school's efforts to coordinate curriculum and communicate important information about students from one year to the next. Finally, the financial costs of teacher turnover are high. For example, the Boston Public Schools spent an estimated $3.3 million to replace 194 1st-, 2nd-, and 3rd-year teachers in 2004–2005 (Birkeland & Curtis, 2006).[1] Noting these costs, districts and states have sought to reduce new teacher turnover by instituting induction programs and other supports for novices (Smith & Ingersoll, 2004).

Thus, there is a great need to understand why excessive turnover occurs in low-income schools and what educational leaders might do to decrease it. Recent studies have revealed the importance of working conditions in teachers' decisions to leave their schools. Allensworth et al. (2009) report that the Illinois Educational Research Council found in 2007 that schools serving demographically similar groups of students experience different rates of turnover, suggesting that working conditions play an important role in teachers' decisions. Boyd et al.'s (2009) study in New York City led the authors to conclude that working conditions, especially administrative support, are very important in teacher retention. Similarly, Chicago researchers Allensworth et al. (2009) found that teachers cited working conditions and administrative support as key factors in their decisions to leave or stay in their schools. They noted that "teachers stay in schools where the conditions are well-suited for them to have the potential to be effective" (p. 2).

Such findings are important because working conditions are more responsive to changes in policy and administrative practice than other factors, such as student characteristics. Although researchers have considered the importance of working conditions within schools, little attention has been paid to the particular role that teacher assignment plays, even though teachers feel it is one of the most important aspects of working conditions (e.g., Elfers, Plecki, & Knapp, 2006). This study of TFA teachers who work in low-income schools explores whether teaching assignments are associated with these teachers' risk of leaving their schools or the profession. It is the first study to examine TFA turnover nationally and yields important findings about TFA teachers' career decisions. These findings have implications for how local administrators assign TFA teachers and suggest the importance of appropriate assignments for all teachers working in the challenging contexts of high-poverty, low-performing schools.

How Might Assignment Affect New Teacher Retention?

Research uniformly suggests that new teachers struggle to perform their jobs (Huberman, 1993; Lortie, 1975; Veenman, 1984). Teaching is complex (Rowan, 1994) and uncertain work (Lortie, 1975) and learning to teach is difficult. Regardless of the length or intensity of their preparation, most new teachers learn to teach on the job (Lortie, 1975). However, there is evidence that difficult working conditions make it especially hard for some new teachers to progress, whereas a supportive environment enables others to become skilled instructors (Allensworth et al., 2009; Johnson & The Project on the Next Generation of Teachers, 2004).

Although many aspects of working conditions may tax a teacher and lead her or him to transfer to another school where successful teaching is more likely to be possible, having an assignment that requires out-of-field or mixed-grade teaching could arguably accelerate a teacher's decision to move or leave. Research suggests that course assignments may influence new teachers' efficacy, which in turn affects their willingness to stay in a school and the profession. The concept of teacher efficacy evolved from Bandura's (1977) concept of self-efficacy, which Tschannen-Moran and Hoy (2007) recently summarized as "an assessment of one's capabilities to attain a desired level of performance in a given endeavor" (p. 945). Bandura (1977) found that individuals were more likely to expect to succeed when they had previously succeeded, when they received encouragement, when they viewed others succeeding, and when they were not under physiological stress. Bandura also found that self-efficacy influenced "how much effort people will experience and how long they will persist in the face of obstacles and aversive experiences" (p. 194).

In educational research, teachers' self-efficacy has been defined as their "beliefs about their capability to impact students' motivation and achievement" (Tschannen-Moran & Hoy, 2007, p. 944). When teachers are assigned to teach courses for which they feel prepared, they report higher levels of self-efficacy (Raudenbush, Rowan, & Cheong, 1992), making it more likely that they will remain in their schools. Conversely, when teachers are assigned to teach challenging assignments for which they do not feel prepared, they are more likely to consider leaving. In fact, researchers find that new teachers with lower self-efficacy scores are less likely to say that they will remain in teaching (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). Therefore, we might expect that new teachers who are assigned to teach one grade at the elementary level or one subject that matches their college major at the secondary level are likely to feel more prepared, and thus more able to succeed, than those who are assigned multiple grades or subjects or out of field.

Thus, the degree of challenge in a new teacher's assignment may influence her or his retention such that *a challenging assignment → low efficacy → voluntary turnover*. In this way, new teachers with more challenging assignments (i.e., out of field, multiple grade, or multiple subject) experience less success and are more likely to leave. Alternatively, new teachers with challenging assignments may not feel appreciably less successful than those with single- or in-field assignments and, therefore, may be no more likely to leave their schools or resign from the profession than those with less challenging assignments.

To date, few researchers have investigated the relationship between a teacher's assignment and her or his retention. The relevant studies suggest that teaching assignment is related to turnover. Nationwide, research based on the National Center for Educational Statistics' *School and Staffing Survey* has found that a better assignment is the number one reason that teachers transfer, with 40% of transferring teachers citing this factor (Luekens et al., 2004). Similarly, a comprehensive analysis of retention in Washington State revealed that teaching assignment was the most frequent reason that teachers cited for *staying* in their schools (Elfers et al., 2006). However, these and similar studies discussed above do not specify what it was about teachers' assignments that prompted them to transfer or remain.

A very small body of research examined differences in teachers' assignments and the effect of assignment on retention. Ingersoll (1999) found that out-of-field teachers—those assigned to teach subjects outside of their college major or minor—frequently suffer low morale and low job commitment, whereas Patterson, Roehrig, and Luff (2003) found that such teachers often transfer into assignments that better match their major or minor. Researchers at MetLife (2006) explored the relationship between teachers' sense of self-efficacy in their assignment and their future plans. They report that the odds that a teacher who feels unqualified to teach her classes will say that she intends to resign from teaching are 1.9 times the odds that a teacher who feels qualified to teach her classes will say that she plans to leave. Similarly, a 4-year, longitudinal study of 50 new teachers revealed that those who left teaching often cited their inability to succeed with students as their reason for leaving; those assigned to teach mixed-grade classes or out-of-field courses found instructional success especially difficult to achieve (Johnson & Birkeland, 2003). Finally, high school teachers, especially newer teachers, who teach a higher proportion of classes outside their certification area are at higher risk of quitting teaching than are those having fewer classes mismatched to their training (Mont & Rees, 1996).

Although some schools (e.g., Coalition of Essential Schools and many charter schools) build their academic program on teaching assignments that span grades and subjects, out-of-field assignments are generally viewed negatively. In fact, the No Child Left Behind Act explicitly forbids teachers from teaching out of field. Despite this prohibition, recent research suggests that out-of-field teaching continues to occur, especially in low-income schools (Peske & Haycock, 2006).

The Sample: Teach For America

To test whether new teachers' assignments are related to their retention, we surveyed three entire cohorts of Teach For America teachers.[2] Founded in 1990, TFA selects and places high-achieving individuals in low-income urban and rural classrooms after 5 weeks of preparation. Although they formally agree to teach for only 2 years, some TFA teachers remain longer (Skinner, 2005). Since 1990, TFA and programs like it have proliferated as alternatives to traditional, university-based pathways to teaching. TFA currently attracts large numbers of applicants from the nation's most selective colleges (Azimi, 2007).

Although they constitute a small part of the national teaching force, TFA teachers are an important sub-population of new teachers today. They possess the few specific characteristics—high test scores and diplomas from selective colleges—shown to make a difference in student achievement (Ehrenberg & Brewer, 1994, 1995). Furthermore, they instruct some of the nation's poorest students. Schools need good information about why some TFA teachers—and other new teachers who share similar characteristics—remain in low-income schools through their 2-year obligation and why others leave their initial placement school and the profession. This study is the first to examine the retention of TFA teachers longitudinally and on a national scale.

Research Design

In this study, we examined whether the retention of new teachers was related to their teaching assignment. More specific, we investigated the conditional probability ("risk") that new TFA teachers with more and less challenging assignments would voluntarily (a) leave their initial school, (b) transfer, or (c) resign from teaching altogether in every year following their entry into teaching, given that they had not experienced the event of interest up to that point.

Research on teacher retention is limited in several ways. Many studies of teacher retention have investigated the effect of predictors that are easily measurable but not often policy amenable. Much of the research has examined, for example, the effect of individual-level demographic predictors such as gender or race (e.g., Kirby et al., 1999). Research on the effect of institutional-level, policy-amenable predictors has tended to investigate district-level factors such as salary, district size, or district racial composition (e.g., Gritz & Theobald, 1996). Few quantitative studies have examined the relationship between school-level variables and teacher turnover despite the fact that qualitative research suggests that new teachers' career decisions are heavily influenced by their day-to-day experiences in classrooms (Johnson, 1990; Johnson & The Project on the Next Generation of Teachers, 2004; Lortie, 1975). Recent research by Boyd et al. (2009) discussed above reveals the advantages of studying teachers' working conditions with large samples of teachers.

Second, many quantitative studies of teacher turnover have drawn on administrative datasets that fail to distinguish between voluntary and involuntary turnover. Although a high turnover rate at urban schools may indicate that many teachers are choosing to leave, it may also indicate that they are being laid off or forced to transfer in large numbers. Because the policy response to these two scenarios would be quite different, researchers must be careful not to draw inaccurate conclusions about teachers' work preferences based on analyses of administrative datasets.

Third, much prior research on teachers' careers has been methodologically limited. Some of the most influential studies have incorporated only 1 or 2 years of data (e.g., Ingersoll, 2001, 2002). This research divides teachers into "leavers" from the profession, "movers" to a new school, and "stayers" who remain in their current school. The problem with this approach is that it designates as a stayer someone who remains in her or his school from year 1 to year 2, regardless of whether she or he moved previously. If we are concerned about the retention of teachers in low-income schools over time, we must examine retention *longitudinally*, beginning when a teacher enters the profession and is assigned to teach in a low-income school.

Even when prior research tracked teachers' careers over more than 2 years, it often suffered an additional methodological problem. Researchers have tended to ignore "censored" teachers who had not experienced the event of interest (e.g., had not left the profession) when data were collected. Instead, they focused only on those who had experienced the event (e.g., the leavers), asking when they left teaching. Alternatively, they discarded the "when" question and asked whether teachers left during the observed time period (Singer & Willett, 2003).

This study addresses each of these limitations. First, we investigated the relationship between a new TFA teacher's assignment, a potentially important school-level variable, and her or his retention. Second, we focused exclusively on teachers' voluntary career decisions. Teachers who reported that they transferred or resigned from teaching involuntarily—13.2% of all transfers and 2.4% of all resignations from the profession, in this sample—were not classified as having experienced the outcome in question.[3] Third, we tracked teacher retention over 4 to 6 years and defined as stayers only those who did not leave the low-income school where they were initially placed. Last, we used discrete-time survival analysis. This allowed us to incorporate information from teachers who had and teachers who had not experienced the event in question as well as answer the "when" question by modeling the risk that teachers would experience the event of interest, given that they had not experienced it up to that point.

Sample

The sample for our study is drawn from a census of all teachers enrolled in the 2000, 2001, and 2002 TFA cohorts.[4] At the time of our survey, these teachers would have accumulated 4, 5, or 6 years of teaching experience if they had taught continuously.[5] From 3,283 TFA enrollees in these cohorts, 2,029 (62%) individuals responded to our survey. Of these, 71.4% are female; 11.54% identified as Black/African American, 6.73% identified as Latino/Hispanic, and 77.53% identified as White/Caucasian; and 57.3% reported that they were related to a teacher. The TFA organization provided information about the census of 3,283 enrollees. Although TFA's records are incomplete, we compared the sample and the census and found few statistically significant differences.[6]

Procedures

We collected most of the data for this study during an online survey administered between January and March 2007 to the census of teachers. The survey requested information on teachers' individual characteristics (e.g., subject matter preparation and assignment; demographic information) and, where relevant, on the timing of their first departure from their initial school and/or the teaching profession. Into this dataset, we incorporated data from TFA placement records, which specify the districts in which individuals were placed.

Measures

We created our survey instrument by drawing on the *School and Staffing Survey*, earlier questionnaires designed by Liu (2004) and Kardos (2004), research into new teacher retention, and literature on survey question design (Dillman, 1978; Fowler, 1998, 2002; Payne, 1951) and reducing recall error (Sudman & Bradburn, 1982). Before administering this instrument, we piloted it with 30 TFA teachers drawn from cohorts who entered the profession immediately prior to 2000 or after 2002 (and, thus, were ineligible for this sample), and we tested specific survey questions and the online survey process with 812 teachers in another program who were demographically similar to TFA teachers.

Once we had collected the retrospective survey data, we constructed a "teacher-year" dataset to record important elements of the TFA teachers' experience in each year they taught. Because of the challenges of respondent recall in retrospective research, most of the measures whose values we collected were time invariant (Kelly, 2004; Taris, 2000).

Outcomes. In this study, there are three related outcomes that describe the time-varying outcome behavior of each teacher. These variables document the teacher's (a) first voluntary exit from the initial placement school by transfer or resignation from teaching (*VEXITSCHL*), (b) first voluntary transfer from the school (*VTRANSFER*), and (c) first voluntary resignation from the teaching profession (*VEXIT*). These outcomes are connected; an individual who transferred from her or his school (*VTRANSFER*) or left the teaching profession (*VEXIT*) by definition also left her or his initial placement school (*VEXITSCHL*). These measures are based on self-reported data. We recorded the dichotomous values of each of these outcomes, in each year of the profession, in a separate row of the dataset for each teacher, until the year in which she or he left teaching or was censored by the end of data collection (1 if event was experienced in this year, given that it had not been experienced in an earlier year; 0 otherwise).

Question Predictors. Our principal question predictors represent the effect of time. In initial analyses, we represented time by its most general specification: six dichotomous predictors (*T1–T6*), each of which represented one of the up to 6 years in which respondents could have taught (*T1* = 1 in the respondent's 1st year in teaching, 0 otherwise, etc.). Following the recommendations of Singer and Willett (2003), in subsequent models we replaced this general specification by more parsimonious representations described in Appendix A. For each outcome, the alternative time specifications take on a different form because the relationship between time and each outcome is different, as shown in Appendix B, Figure 1. (See Supplemental Appendix C in the online version of this journal for mean values of all predictor and control variables.)

In addition to time, we were interested in the effect of teachers' assignments on their conditional probability of turnover. The predictor of interest for our inquiry concerning the effect of teaching multiple grades on elementary teachers' retention is the two-way interaction between a time-varying dichotomous variable, *MULTIGRADE*, that captures multiple assignments in year *j* (1 if respondent taught multiple grades in year *j*, 0 otherwise) and a time-varying dichotomous variable, *ELEM_yr*, that indicates whether the respondent taught at the elementary level in that same year (1 = respondent taught at the elementary level in year *j*, 0 otherwise). The cumulative effect of teaching multiple grades at the elementary level, compared to only a single grade at that level, is the interaction effect (*MULTIGRADEXELEM*) plus the main effect representing a multiple-grade assignment (*MULTIGRADE*). Following the same format, for our examination of the effect of teaching multiple subjects on secondary teachers' retention, the predictor of interest is the interaction between *MULTISUB*, which records whether or not the respondent taught multiple subjects in year *j* (1 = respondent taught multiple subjects, 0 otherwise), and *MIDHS_yr*, which records whether or not the respondent taught at the secondary level in that year (1 = secondary level, 0 otherwise). Following the same pattern as above, the cumulative effect of teaching multiple subjects at the secondary level, compared to teaching a single subject at that level, is achieved by summing the parameters associated with *MULTISUBXMIDHS* and *MULTISUB*.

Multiple assignments were relatively common across the sample. In each year, 12% to 29% of all elementary teachers were assigned to teach more than one grade. Approximately one-third (30–36%) of all secondary teachers were assigned to teach more than one subject in each year. Special education and bilingual teachers are treated like all other teachers in this coding. For example, if a bilingual teacher reported teaching more than one grade in a given year, *MULTIGRADE* = 1 for this teacher for that year. Some might argue that special education and bilingual teachers are at greater risk for leaving their schools or resigning from the profession and, as such, these teachers' risk of turnover would drive any findings. However, a separate analysis indicated that (a) special education and bilingual teachers make up a small proportion of all teachers with multiple assignments (under 15% in any given year) and (b) teachers assigned to teach special education or bilingual education were in fact *less* likely to leave their schools or the profession than teachers without such teaching assignments.

For the out-of-field analysis, we were also interested in differences in retention at a particular grade level. Thus, the predictor of interest is a three-way interaction among a time-varying dichotomous variable that captures subject assignment in year *j*, for example, *math_yr* (1 = respondent taught mathematics in year *j*, 0 otherwise), a time-invariant dichotomous variable, for example, *MATHmaj*, indicating whether the respondent completed the college major corresponding to the subject assignment (1 = respondent majored in mathematics, 0 otherwise), and a time-varying dichotomous variable, for example, *MIDHS_yr*, indicating whether the respondent taught at the secondary level in year *j* (1 = respondent taught at secondary level in year *j*, 0 otherwise). Thus, we coded a respondent as teaching mathematics, for example, out of field if she or he taught any courses in mathematics but lacked a major in that subject. Here, the cumulative effect of teaching out of field at the secondary level is achieved by summing the three-way interaction (e.g., *MATHmajXmathXMIDHS*), the main effect of math major (*MATHmaj*), and the two constituent, two-way interactions (*MATHmajXmath* and *MATHmajXMIDHS*).

Out-of-field assignments were quite common. In each of the 6 years of data collection, anywhere from 57% to 74% of math teachers, 16% to 31% of social studies teachers, and 38% to 48% of science teachers lacked a major in the field they were teaching. Out-of-field assignments were most prevalent in the first 1 or 2 years of respondents' careers.

Control Predictors. In our discrete-time hazard models, we also controlled for selected design and substantive covariates. To account for the fact that the 2000–2002 TFA teachers entered teaching in three different cohorts, we included a system of three time-invariant, dichotomous variables distinguishing the cohorts. We also controlled for variables well known to make a difference to teacher turnover, including (a) gender, (b) race, (c) whether or not the respondent was related to a teacher, (d) the age at which a teacher entered teaching, (e) her or his college major, and (f) whether she or he was assigned to teach in an urban or rural region in the 1st year.

In addition, we recognized that the presence of a challenging assignment may not, in and of itself, affect turnover. Instead, a challenging assignment may be a proxy for poor working conditions. Administrators of disorganized, disorderly, and under-resourced schools may be more likely to ask teachers to take on multiple assignments and/or teach out of field. The chaos in the hallways and absence of resources may provoke teacher turnover more than a challenging assignment. In fact, most schools where TFA places teachers have poor working conditions, which is a large part of why the schools are hard to staff and, thus, require assistance from TFA. Therefore, to address the potential influence of school-level factors other than assignment and to test the robustness of our findings, we included school fixed effects in our models. In essence, the models with school fixed effects compare teachers with more and less complex assignments *within schools*, thus controlling for workplace conditions and other measured and unmeasured characteristics that vary across schools. Including school fixed effects required us to reduce our sample for those analyses from 2,029 to the 1,647 respondents who taught in schools with at least one other TFA member. To control for school fixed effects, we included in the model a dichotomous variable representing each school (1 = respondent taught in the school, 0 otherwise), minus a reference dummy. See Appendix A for the names and definitions of all variables.

Data Analysis

> *Research Question 1:* Are elementary school TFA teachers with multiple-grade assignments at greater risk of leaving their schools, transferring, or resigning from teaching than those with single-grade assignments?

We used discrete-time survival analysis to address the first research question by fitting logistic regression models in the teacher-year dataset (Singer & Willett, 1993; Willett & Singer, 1991). A typical model predicting voluntary exit from school is

$$p(VEXITSCHL_{ij} = 1) = \frac{1}{1 + e^{-[(\alpha_1 T1_{ij} + \alpha_2 T2_{ij} + \ldots + \alpha_6 T6_{ij}) + (\beta_1 MULTIGRADE_{ij} + \beta_2 ELEM_{ij} + \beta_3 MULTIXELEM_{ij} + \gamma_1 Z_i + \gamma_2 Z_{ij})]}} \quad (1)$$

where i represents the individual teacher in year j and the α parameters are a set of intercept parameters representing the "baseline" risk that a teacher whose values on all predictors are zero will exit her or his school for the first time in each year, given that she or he had remained in the school up to that year. Here, parameter ß3 represents the effect of teaching multiple grades at the elementary level on teachers' risk of exit from their initial placement school, and, when summed with the main effect of *MULTIGRADE*, parameter ß1 addresses Research Question 1. Parameter ß2 represents the effect of teaching single grades at the elementary level on this conditional probability. Parameters γ_1 and γ_2 are vectors of parameters that represent the effects of time-invariant (Z_i) and time-varying (Z_{ij}) controls, respectively. We repeated this analysis with voluntary transfer (*VTRANSFER*) and voluntary exit (*VEXIT*) as the outcomes and added school fixed effects to test the robustness of our findings.

> *Research Question 2:* Are secondary school TFA teachers with multiple-subject assignments at greater risk of leaving their schools, transferring, or resigning from teaching than those with single-subject assignments?

To answer this research question, we fitted discrete-time hazard models such as the model specified in equation (1), substituting *MULTISUB* for *MULTIGRADE* and *MIDHS_yr* for *ELEM_yr* and following the approach described above.

> *Research Question 3:* Are secondary school TFA teachers with out-of-field assignments at greater risk of leaving their schools, transferring, or resigning from teaching than those with in-field assignments?

To address this research question, we again fitted discrete-time hazard models. A typical specification of such a model is

$$p(VEXITSCHL_{ij} = 1) = \frac{1}{1 + e^{-[(\alpha_1 T1_{ij} + \alpha_2 T2_{ij} + \ldots + \alpha_6 T6_{ij}) + (\beta_1 math\_yr_{ij} + \beta_2 MATHmaj_i + \beta_3 MIDHS_{iJ} + \beta_4 mathXMATHmaj_{iJ} + \beta_5 mathXMIDHS_{iJ} + \beta_6 MATHmajXMIDHS_{iJ} + \beta_7 mathXMATHmajXMIDHS_{iJ} + \gamma_1 Z_i + \gamma_2 Z_{ij})]}} \quad (2)$$

Here, the sum of parameters ß2, ß4, ß6, and ß7 represents the effect of teaching mathematics at the secondary level with a math major, compared to teaching math at this level without a math major, on teachers' risk of exit from their initial placement school and thus addresses Research Question 3. All other parameters are as described in equation (1). We refit equation (2) with *VTRANSFER* and *VEXIT* as outcomes and again tested results by including school fixed effects.

Model-Fitting and Interpretation Strategies. For each outcome, we first fit models in which the completely general specification of time, in equation (1), was replaced by more parsimonious specifications. With each outcome, we tested to confirm that the more parsimonious representations were preferable. (See Supplemental Table 5 in the online version of this journal for results with models containing the general specification of time.) We then added the control variables. We subsequently added the main effects (e.g., *MULTIGRADE*, *ELEM_yr*) and the interaction effect (e.g., *MULTIGRADEXELEM*) of interest. We then interacted this interaction and its components with each time variable to determine whether the effect of a complex assignment varied over time. We added all three- or four-way interactions with time, and lesser constituent interactions in the hierarchy, to the model at once and then dropped those that were not statistically significant. Finally, we included school fixed effects to test the robustness of our prior findings.

In fitting models, we made judgments about whether or not to retain predictors using post hoc general linear hypothesis (GLH) tests based on differences in the –2 log likelihood goodness-of-fit statistics, comparing differences to a χ^2 distribution with the appropriate degrees of freedom. We also evaluated their effect in specific years based on post hoc GLH tests that determined whether individuals with less complex assignments (i.e., a single grade or subject or an in-field assignment) had a significantly higher risk of experiencing the outcome in a given year than those with more complex assignments in the time period specified.

Findings

We found that TFA teachers with more challenging assignments were at greater risk of leaving their teaching position than those with less challenging assignments in year 1 and particular other years. Elementary teachers with a multiple-grade assignment tended to transfer, whereas secondary teachers with a multiple-subject or out-of-field assignment tended to resign from the profession altogether. It is notable, however, that out-of-field science teachers were at lower risk of resigning from teaching than in-field science teachers. We begin by presenting fitted hazard and survival plots based on fitted models that include only the time predictors. These provide a baseline against which to compare subsequent results from our analysis of assignment as a predictor of turnover.

How Long Do TFA Teachers Remain in Their Initial Schools or the Profession?

In Table 1, we present baseline fitted models in which time and cohort predict the risk of leaving the initial school, transferring, and

TABLE 1

*Parameter Estimates (standard errors) and Goodness-of-Fit Statistics From Selected Discrete-Time Hazard Models Where the Risk That a Teacher Will Voluntarily Leave Her or His Initial Placement School, Transfer, or Resign From Teaching Is Predicted by Time and Cohort (*n *= 2,029)*

	Outcome		
Predictor	*VEXITSCHL*	*VTRANSFER*	*VEXIT*
Cohort covariates			
C2	0.139	0.037	0.128
	(0.089)	(0.120)	(0.086)
C3	0.118	–0.015	0.129
	(0.080)	(0.109)	(0.079)
Time predictors			
T1	–2.298**		–3.120**
	(0.094)		(0.154)
T4	–0.473**		
	(0.130)		
postT1	0.219		
	(0.140)		
T2to6	–0.125**		
	(0.045)		
TIMEC		1.840**	
		(0.203)	
TIMEC2		–0.724**	
		(0.122)	
TIMEC3		0.076**	
		(0.019)	
T5			0.334*
			(0.156)
lnTIME			–1.145**
			(0.118)
Constant		–2.874**	0.130
		(0.124)	(0.133)
Goodness-of-fit statistics			
–2LL	5608.151	3578.964	6076.0999

*$p < .05$. **$p < .01$.

resigning from the profession entirely. To simplify interpretation of the parameter estimates, in Figure 1 (see Appendix B for all figures), we present fitted hazard and survivor functions based on the baseline discrete-time hazard models with all control variables set to their sample grand means, unless otherwise specified.

In the upper panel, on the left, we present a fitted hazard function describing the conditional probability that, whatever their assignment, teachers in the sample will voluntarily exit from their initial, low-income schools during or at the end of each year, and on the right, the corresponding fitted survivor function. The left plot indicates that these teachers' estimated conditional probability of leaving their initial schools is relatively low initially, around .10, but then rises rapidly to around .50 in year 2, indicating that approximately 50% of teachers who were still in their initial placement schools left them in year 2. The teachers' risk of departure then declines with the passing years. The cumulative effect of these exits is illustrated in the fitted survivor function on the right. Approximately 50% of TFA teachers left their initial schools within a median lifetime of 1.86 years, with 44% of TFA teachers remaining in their initial placement schools after 2 years, when their commitment to TFA ended.

Respondents left their initial placement schools by transferring to a new school or by resigning from teaching altogether. In the middle panel of Figure 1, we present the fitted hazard and survivor functions that describe the occurrence of voluntary transfers. The fitted hazard function on the left indicates that the predicted conditional probability of transfer is low initially but peaks in year 3, at approximately 0.19. In other words, 19% of teachers who had not previously left their placement schools are estimated to transfer in this year. The fitted survivor function on the right indicates that 50% of respondents who had not yet left their initial placement schools are estimated to transfer within 5.10 years.

Finally, the bottom panel of Figure 1 presents the fitted hazard and survival functions describing the occurrence of voluntary resignation from teaching. The fitted hazard function on the left indicates that the conditional risk of resigning from the profession peaks at .35 in year 2 and then generally declines thereafter. Approximately 35% of teachers who remained in teaching at the beginning of year 2 were estimated to have resigned by the beginning of year 3. The fitted survivor function on the right depicts a steep decline in the probability of remaining in the profession in the first few years, reflecting the high risk of resignation in years 2 and 3. Nonetheless, a relatively high proportion—an estimated 61% of the sample—remained in the teaching profession more than 2 years and 50% stayed longer than 2.66 years.

Teach For America requires its corps members to teach in low-income schools for 2 years. Thus, it is important to ask to what extent our findings reflect the effects of TFA's 2-year obligation. Inspecting the three fitted hazard functions in Figure 1 (on the left in each panel), notice that respondents are at greatest risk of changing their schools or occupations in year 2 or 3. This timing likely reflects the TFA programmatic structure. Are TFA teachers treating this 2-year commitment as a short-term volunteer experience and leaving in droves after 2 years? Or do they view TFA as a means of quick entry into a career that they will cultivate longer term? The answer is mixed. Examining the three survivor functions on the right in each panel, it is clear that few people are estimated to remain in their initial placement schools or the profession beyond 5 or 6 years. For example, the top, right panel in Figure 1 shows that fewer than 10% of respondents taught in their initial, low-income placement schools more than 6 years. However, 44% of respondents stayed in their initial schools and 61% remained in the profession longer than the 2 years that TFA required of them. Thus, it appears that teaching ends up being a very short-term job for about half of these TFA teachers, but for some, it is the beginning of a career in the classroom. We now examine whether TFA teachers with more challenging assignments are more likely to leave their initial schools or teaching in general than those with less challenging assignments.

What Is the Relationship Between Challenging Assignments and Teacher Turnover?

Overall, teachers with more challenging assignments had a greater risk of leaving their schools and the profession in year 1 and certain other years. This is true based on models fit to data from the entire sample and models fit to data from the reduced sample with school fixed effects. In Tables 2 through 4, Model 1 is fit to the entire sample and does not control for school-level variables other than assignment. Model 3 controls for school fixed effects and is fit to the sample of teachers who worked in schools with at least one other TFA member. Model 2 is the same as Model 1 but is fit to the reduced sample used for Model 3.

Looking horizontally across these tables, one can see how the effect of a challenging assignment varies according to the inclusion or exclusion of school fixed effects and the sample. In general, the coefficients retain the same sign, especially between Models 2 and 3, and robust standard errors increase. The overall consequence of these differences is that the effect of a challenging assignment is generally smaller, although still significant, when school fixed effects are included. For example, multi-grade teachers' odds of leaving their schools are 3.29 times the odds of single-grade teachers in year 1

TABLE 2

Parameter Estimates (robust standard errors) and Goodness-of-Fit Statistics From Selected Discrete-Time Hazard Models Where the Risk That a Teacher Will Voluntarily Leave Her or His Placement School Is Predicted by Teaching Assignment, Cohort, Time, Gender, Race, the Presence of a Teacher in One's Family, Age of Entry Into Teaching, College Major, School Level, and Urbanicity

	Fixed effects		
	No	No	Yes
Predictor	1	2	3
Cohort covariates			
2001 cohort	0.128	0.221*	0.280†
	(0.091)	(0.102)	(0.152)
2002 cohort	0.158†	0.241**	0.221
	(0.083)	(0.093)	(0.139)
Time predictors			
Year 1	–2.247**	–2.450**	–3.774**
	(0.213)	(0.244)	(0.440)
After year 1	0.218	0.216	–1.089*
	(0.264)	(0.297)	(0.458)
Year 4	–0.612*	–0.594*	–0.617*
	(0.251)	(0.274)	(0.280)
Years 2–6	–0.027	–0.030	0.300**
	(0.081)	(0.091)	(0.103)
Substantive covariates			
Female	–0.151†	–0.063	–0.047
	(0.077)	(0.086)	(0.120)
Black	–0.446**	–0.393**	–0.021
	(0.110)	(0.125)	(0.201)
Latino	–0.233†	–0.328*	–0.342
	(0.133)	(0.143)	(0.211)
Asian	–0.072	–0.054	–0.015
	(0.130)	(0.149)	(0.209)
Family teaching legacy	–0.003	–0.023	0.077
	(0.068)	(0.077)	(0.113)
Age of entry	–0.057**	–0.057**	–0.064*
	(0.018)	(0.021)	(0.028)*
Science/tech major	0.368**	0.299*	0.408†
	(0.130)	(0.151)	(0.209)
Humanities major	–0.034	–0.125	–0.332†
	(0.108)	(0.126)	(0.175)
Math major	–0.191	–0.198	–0.461*
	(0.120)	(0.133)	(0.185)
Foreign language major	–0.238†	–0.276†	–0.581*
	(0.142)	(0.164)	(0.235)
Rural placement	0.081	0.101	0.212
	(0.082)	(0.091)	(0.150)
Substantive predictors			
Elementary placement	0.229	0.211	0.264
	(0.287)	(0.320)	(0.381)
Multi-grade assignment	0.178	0.082	0.345
	(0.333)	(0.368)	(0.421)

(continued)

TABLE 2 (continued)

	Fixed effects		
	No	No	Yes
Predictor	1	2	3
Multi-grade × Elementary	–0.607	–0.649	–1.184
	(0.589)	(0.708)	(0.879)
Year 1 × Elementary	–0.559	–0.414	–0.380
	(0.355)	(0.400)	(0.465)
Year 1 × Multi-grade	–0.035	0.051	–0.075
	(0.393)	(0.442)	(0.491)
Year 1 × Multi × Elementary	1.655*	1.526†	1.761†
	(0.672)	(0.809)	(0.990)
Year 4 × Elementary	0.491	0.654†	0.745†
	(0.326)	(0.361)	(0.380)
Year 4 × Multi-grade	0.245	0.243	0.271
	(0.365)	(0.401)	(0.420)
Year 4 × Multi × Elementary	–1.753**	–1.841*	–1.976*
	(0.652)	(0.726)	(0.793)
Years 2–6 × Elementary	–0.136	–0.129	–0.109
	(0.108)	(0.121)	(0.141)
Years 2–6 × Multi-grade	–0.127	–0.072	–0.140
	(0.124)	(0.138)	(0.153)
Years 2–6 × Multi × Elementary	0.349†	0.389	0.538†
	(0.212)	(0.259)	(0.322)
Goodness-of-fit statistics			
–2LL	5360.507	4266.332	3722.049
Δ –2LL(*df*)[a]	33.654 (11)	19.760 (11)	544.283 (473)
p value	.0004	.049	.013
Teacher-year observations	5044	4063	4063

a. Models 1 and 2 are compared to a baseline model absent all multiple assignment variables and fit to the relevant sample; Model 3 is compared to Model 2.

†$p < .10$. *$p < .05$. **$p < .01$.

when school fixed effects are not included (based on Model 1). By contrast, their odds of departing are 2.33 times those of their counterparts when school fixed effects are included (based on Model 3). Incidentally, one also sees consistent effects of gender, race, and age of entry on individuals' probability of turnover. Women have much lower odds of leaving teaching than do men, and respondents who began teaching at an older age are less likely to leave the profession than those who started teaching at a younger age. Asians have a higher probability of resigning from teaching than do Whites. It is notable that the effect of being female, Asian, or entering at an older age on probability of resigning from teaching is larger in absolute value once we control for school fixed effects. We now turn to discussing the relationship between assignment and turnover, controlling for school fixed effects.[7]

What Is the Relationship Between Multiple-Grade Assignments and Teacher Turnover?

Elementary teachers assigned to teach multiple grades were at greater risk of voluntarily leaving their school and voluntarily transferring than elementary teachers assigned to teach single grades, provided they had not previously experienced the event. Figure 2 presents fitted hazard functions depicting elementary teachers' conditional probability of leaving their initial, low-income placement schools (top panel) and

TABLE 3

Parameter Estimates (robust standard errors) and Goodness-of-Fit Statistics From Selected Discrete-Time Hazard Models in Which the Risk That a Teacher Will Voluntarily Transfer Is Predicted by Teaching Assignment, Cohort, Time, Gender, Race, the Presence of a Teacher in One's Family, Age of Entry Into Teaching, College Major, School Level, and Urbanicity

	Fixed effects		
	No	No	Yes
Predictor	1	2	3
Cohort covariates			
2002 cohort	0.044	0.084	0.134
	(0.123)	(0.143)	(0.218)
2003 cohort	–0.008	0.075	0.070
	(0.112)	(0.130)	(0.196)
Time predictors			
Time (continuous)	2.012**	2.530**	3.034**
	(0.403)	(0.459)**	(0.491)**
Time^2	–0.756**	–1.048**	–1.140**
	(0.232)	(0.261)**	(0.283)**
Time^3	0.076*	0.120**	0.126**
	(0.036)	(0.040)**	(0.044)**
Substantive covariates			
Female	0.256*	0.238†	0.401*
	(0.109)	(0.125)	(0.182)
Black	–0.182	–0.156	0.075
	(0.140)	(0.161)	(0.272)
Latino	–0.073	–0.234	–0.146
	(0.175)	(0.202)	(0.303)
Asian	–0.306†	–0.433*	–0.603†
	(0.185)	(0.218)	(0.320)
Age of entry to teaching	0.018	0.001	0.008
	(0.018)	(0.025)	(0.037)
Family teaching legacy	0.038	0.027	0.049
	(0.092)	(0.106)	(0.153)
Science/tech major	0.101	0.055	0.338
	(0.174)	(0.207)	(0.307)
Humanities major	–0.252†	–0.390*	–0.506*
	(0.139)	(0.167)	(0.254)
Foreign language major	–0.018	–0.099	–0.137
	(0.180)	(0.212)	(0.320)
Math major	–0.137	–0.097	–0.213
	(0.165)	(0.183)	(0.263)
Rural placement	–0.176	–0.018	0.097
	(0.118)	(0.135)	(0.218)
Substantive predictors			
Elementary school placement	–0.251	–0.131	0.100
	(0.273)	(0.317)	(0.379)
Multi-grade placement	0.022	0.032	0.188
	(0.286)	(0.329)	(0.380)
Multi-grade placement × Elementary school placement	1.413**	1.325**	1.115†
	(0.406)	(0.488)	(0.572)

(continued)

TABLE 3 (continued)

	Fixed effects		
	No	No	Yes
Predictor	1	2	3
Time × Elementary school placement	0.333	−0.020	−0.337
	(0.530)	(0.606)	(0.651)
Time × Multi-grade placement	0.158	−0.233	−0.278
	(0.573)	(0.654)	(0.698)
Time × Multi-grade placement × Elementary school placement	−3.129**	−1.955	−1.841
	(0.943)	(1.205)	(1.359)
$Time^2$ × Elementary school placement	−0.118	0.121	0.265
	(0.300)	(0.340)	(0.368)
$Time^3$ × Elementary school placement	0.007	−0.026	−0.043
	(0.046)	(0.052)	(0.057)
$Time^2$ × Multi-grade placement	−0.210	0.045	0.022
	(0.331)	(0.379)	(0.401)
$Time^2$ × Multi-grade placement × Elementary school placement	1.483**	0.616	0.708
	(0.561)	(0.809)	(0.916)
$Time^3$ × Multi-grade placement	0.044	0.006	0.015
	(0.051)	(0.058)	(0.062)
$Time^3$ × Multi-grade placement × Elementary school placement	−0.194*	−0.039	−0.068
	(0.087)	(0.142)	(0.160)
Constant	−2.930**	−2.696**	−4.156**
	(0.281)	(0.333)	(0.619)
Goodness-of-fit statistics			
−2LL	3445.870	2483.670	2235.609
Δ −2LL(*df*)[a]	35.6142 (12)	19.690 (12)	248.061 (322)
p value	.0004[a]	0.0732	0.999
Teacher-year observations	5042	3029	3029

a. Models 1 and 2 are compared to a baseline model absent all multiple assignment variables and fit to the relevant sample; Model 3 is compared to Model 2.
†$p < .10$. *$p < .05$. **$p < .01$.

their risk of transferring (bottom panel) based on Model 3 in Tables 2 and 3, respectively, with all covariates held at their sample mean and including school fixed effects. These hazard plots and those that follow depict the hazard probabilities for two prototypical individuals *within the same school*: one who always had a multiple assignment and one who always had a single assignment. We chose these two profiles to highlight the differences in their estimated risk of turning over in each year.

The fitted hazard function depicting elementary teachers' risk of voluntarily exiting from the school (top panel) shows that multiple-grade teachers' risk of leaving their school exceeds that of single-grade teachers in years 1, 3, 5, and 6. For example, controlling for school fixed effects and all else, in year 1, 7.6% of elementary school teachers teaching multiple grades are estimated to leave their initial placement schools. By contrast, only 3.4% of single-grade teachers are predicted to exit in this year. This sizable difference is significant both practically and statistically (p = .03). TFA teachers who leave their initial placement schools in year 1 deviate from the agreement they made with TFA to teach in their assigned low-income schools for 2 years. Some of these teachers may transfer to other TFA schools, but, consistent with prior research (e.g., Hanushek et al., 2004), some likely transfer to higher income schools or leave teaching altogether.

TABLE 4

Parameter Estimates (robust standard errors) and Goodness-of-Fit Statistics From Selected Discrete-Time Hazard Models Where the Risk That a Teacher Will Voluntarily Resign From Teaching Is Predicted by Teaching Assignment, Cohort, Time, Gender, Race, the Presence of a Teacher in One's Family, Age of Entry Into Teaching, College Major, School Level, and Urbanicity

	Multi-subject			Out-of-field math			Social studies			Science		
	Fixed effects											
	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Predictor	1	2	3	1	2	3	1	2	3	1	2	3
Cohort covariates												
2001 cohort	0.112	0.202*	0.319*	0.104	0.181†	0.306*	0.112	0.195†	0.304*	0.107	0.196†	0.303*
	(0.089)	(0.100)	(0.149)	(0.089)	(0.101)	(0.150)	(0.089)	(0.100)	(0.150)	(0.089)	(0.101)	(0.152)
2002 cohort	0.179*	0.210	0.307*	0.167*	0.187*	0.287*	0.169*	0.196*	0.291*	0.174*	0.201*	0.288*
	(0.082)	(0.092)	(0.138)	(0.082)	(0.092)	(0.138)	(0.082)	(0.092)	(0.139)	(0.082)	(0.092)	(0.140)
Time predictors												
Year 1	−3.164**	−3.248**	−3.342**	−3.309**	−3.364**	−3.474**	−3.280**	−3.343**	−3.459**	−3.247**	−3.315**	−3.453**
	(0.157)	(0.181)	(0.198)	(0.167)	(0.191)	(0.209)	(0.167)	(0.191)	(0.209)	(0.167)	(0.191)	(0.210)
Year 5	0.302†	0.250	0.255	0.372*	0.306†	0.315†	0.358*	0.295	0.311†	0.339*	0.276	0.299†
	(0.159)	(0.179)	(0.178)	(0.162)	(0.182)†	(0.181)	(0.161)	(0.181)	(0.181)	(0.162)	(0.182)	(0.180)
Natural log of year	−1.053**	−0.925**	−0.316*	−1.263**	−1.080**	−0.513**	−1.220**	−1.056**	−0.484**	−1.172**	−1.006**	−0.461**
	(0.120)	(0.132)	(0.142)	(0.144)	(0.158)	(0.169)	(0.145)	(0.159)	(0.171)	(0.145)	(0.160)	(0.171)
Substantive covariates												
Female	−0.320**	−0.264**	−0.317**	−0.320**	−0.259**	−0.309**	−0.317**	−0.260**	−0.303**	−0.326**	−0.269**	−0.311**
	(0.075)	(0.084)	(0.119)	(0.074)	(0.084)	(0.118)	(0.074)	(0.084)	(0.117)	(0.074)	(0.083)	(0.118)
Black	−0.248*	−0.228†	−0.080	−0.254*	−0.231†	−0.065	−0.252*	−0.240†	−0.073	−0.247*	−0.231†	−0.066
	(0.110)	(0.124)	(0.197)	(0.110)	(0.124)	(0.198)	(0.110)	(0.124)	(0.197)	(0.110)	(0.124)	(0.199)
Latino	−0.218	−0.185	−0.199	−0.224†	−0.192	−0.183	−0.237†	−0.207	−0.173	−0.211	−0.170	−0.151
	(0.135)	(0.147)	(0.206)	(0.135)	(0.147)	(0.207)	(0.135)	(0.147)	(0.207)	(0.135)	(0.147)	(0.206)
Asian	0.260*	0.194	0.580**	0.246*	0.154	0.507*	0.248*	0.174	0.517*	0.248*	0.169	0.510*
	(0.125)	(0.144)	(0.208)	(0.125)	(0.146)	(0.213)	(0.125)	(0.145)	(0.212)	(0.124)	(0.144)	(0.209)
Age of entry to teaching	−0.095**	−0.087**	−0.106**	−0.096**	−0.091**	−0.108**	−0.093**	−0.085**	−0.103**	−0.093**	−0.086**	−0.103**
	(0.020)	(0.022)	(0.032)	(0.020)	(0.022)	(0.032)	(0.020)	(0.022)	(0.032)	(0.020)	(0.022)	(0.031)
Family teaching legacy	−0.025	−0.071	0.048	−0.041	−0.084	0.028	−0.035	−0.081	0.036	−0.038	−0.084	0.019
	(0.067)	(0.075)	(0.110)	(0.067)	(0.076)	(0.110)	(0.067)	(0.076)	(0.110)	(0.067)	(0.076)	(0.110)

(continued)

TABLE 4 (continued)

	Multi-subject			Out-of-field math			Social studies			Science		
	Fixed effects											
	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Predictor	1	2	3	1	2	3	1	2	3	1	2	3
Science/tech major	0.266* (0.124)	0.284* (0.139)	0.304 (0.205)	0.237† (0.127)	0.263† (0.142)	0.281 (0.206)	0.146 (0.107)	0.192 (0.121)	0.309† (0.170)†			
Humanities major	0.232* (0.105)	0.190 (0.118)	0.096 (0.171)	0.244* (0.107)	0.194 (0.119)	0.088 (0.173)				0.264* (0.108)	0.222† (0.122)†	0.174 (0.179)
Foreign language major	−0.125 (0.143)	−0.120 (0.164)	−0.337 (0.243)	−0.111 (0.144)	−0.113 (0.164)	−0.333 (0.245)	−0.156 (0.139)	−0.138 (0.160)	−0.294 (0.235)	−0.101 (0.144)	−0.097 (0.165)	−0.294 (0.243)
Rural placement	0.247** (0.081)	0.232** (0.090)	0.199 (0.145)	0.220** (0.081)	0.214* (0.090)	0.183 (0.145)	0.219** (0.081)	0.206* (0.090)	0.180 (0.145)	0.218** (0.081)	0.207* (0.090)	0.177 (0.145)
Substantive predictors												
Secondary school placement	0.001 (0.187)	0.063 (0.216)	0.079 (0.268)	−0.136 (0.098)	−0.054 (0.109)	−0.056 (0.147)	−0.064 (0.140)	0.023 (0.159)	0.130 (0.212)	−0.105 (0.099)	−0.052 (0.111)	−0.121 (0.149)
Multi-subject placement	0.076 (0.186)	0.094 (0.215)	0.099 (0.263)									
Multi-subject × Secondary	0.181 (0.208)	0.093 (0.239)	0.155 (0.294)									
Math major	−0.044 (0.121)	−0.139 (0.134)	−0.451* (0.195)	0.867 (0.686)	1.600 (1.093)	0.459 (1.958)	−0.111 (0.164)	−0.241 (0.183)	−0.560* (0.272)	0.066 (0.174)	−0.044 (0.194)	−0.330 (0.290)
Social studies major							0.209 (0.147)	0.210 (0.167)	0.374 (0.227)			
Science major										−0.180 (0.407)	−0.200 (0.442)	−0.469 (0.564)
Subject[a] placement				−0.300* (0.119)	−0.230† (0.133)	−0.301† (0.154)	−0.276 (0.177)	−0.224 (0.202)	−0.249 (0.235)	−0.177 (0.122)	−0.126 (0.136)	−0.256 (0.156)
Subject major × subject placement				−1.233 (1.019)	−1.242 (1.352)	−0.775 (2.042)	0.062 (0.201)	0.051 (0.230)	−0.001 (0.262)	0.136 (0.516)	0.044 (0.604)	0.166 (0.667)

(continued)

TABLE 4 (continued)

	Multi-subject			Out-of-field math			Social studies			Science		
	Fixed effects											
	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Predictor	1	2	3	1	2	3	1	2	3	1	2	3
Subject major × Secondary school placement				–1.061 (0.751)	–2.081† (1.144)	–0.836 (2.014)	0.771** (0.257)	0.466 (0.291)	0.621† (0.346)	0.157 (0.522)	–0.180 (0.581)	–0.036 (0.705)
Subject placement × Secondary school placement				0.369* (0.165)	0.253 (0.186)	0.280 (0.219)	–0.045 (0.183)	–0.090 (0.207)	–0.208 (0.273)	0.240 (0.176)	0.138 (0.197)	0.353 (0.235)
Subject major × Subject placement × Secondary school placement				1.274 (1.089)	1.464 (1.417)	0.512 (2.133)	–0.649* (0.308)	–0.363 (0.347)	–0.564 (0.414)	0.222 (0.639)	0.810 (0.741)	0.926 (0.856)
Constant	–0.037 (0.265)	–0.127 (0.302)	–1.119* (0.457)	0.401† (0.236)	0.237 (0.263)	–0.709 (0.424)†	0.403† (0.233)	0.231 (0.261)	–0.936* (0.421)	0.246 (0.238)	0.109 (0.264)	–0.815† (0.433)
Goodness-of-fit statistics												
–2LL(*df*)	5792.362	4574.938	4067.4031	5761.8908	4547.732	4050.666	5760.4855	4551.565	4045.209	5765.533	4547.534	4040.930
Δ –2LL(*df*)[b]	7.474 (2)	3.310 (2)	507.535 (457)	38.434 (6)	31.275 (6)	497.066 (457)	41.274 (6)	29.148 (6)	506.356 (457)	34.942 (6)	31.643 (6)	506.604 (457)
p value	.02382	.1911	.0527	.0001	.0001	0.0950	.0001	.0001	0.0549	.0000	.0000	.0540
Teacher-year observations	6340	4931	4931	6312	4910	4910	6312	4910	4910	6312	4910	4910

a. For this variable and those that follow, insert the pertinent subject (e.g., mathematics) for "subject."
b. Models 1 and 2 are compared to a baseline model absent all multiple assignment variables and fit to the relevant sample; Model 3 is compared to Model 2.
†$p < .10$. *$p < .05$. **$p < .01$.

What accounts for multiple-grade elementary teachers' elevated risk of leaving their schools in year 1? The bottom panel in Figure 2 indicates that a heightened risk of transfer in this year contributes heavily to this outcome; 10.7% of multiple-grade teachers are predicted to transfer in year 1. By contrast, only 3.2% of single-grade teachers within the same schools are estimated to do so in this year. In other words, the estimated odds that a multiple-grade teacher would transfer in year 1 are 3.68 the odds that a single-grade teacher would move ($p = .0019$).

In years 2 and 3, multiple-grade teachers who remain in their initial schools have lower predicted probabilities of transfer than single-grade teachers who are still in their original schools. It could be that individuals who teach multiple grades in years 2 or 3 requested such an assignment and, therefore, are at lower risk of transferring from their schools. It is far less likely that respondents had similar influence in their year 1 assignment, making that assignment a more credible predictor of subsequent career decisions.

In summary, multiple-grade elementary teachers' risk of leaving their schools and transferring is higher than that of single-grade teachers in year 1 and in particular other years.

What Is the Relationship Between Multiple-Subject Assignments and Teacher Turnover?

As with multiple-grade assignments, teachers assigned to teach multiple subjects at the secondary level were generally at greater risk for turnover than their counterparts teaching single subjects. However, unlike elementary teachers, secondary teachers with multiple assignments tended to resign from the profession entirely rather than transfer to a different school.

Figure 3 (top, left panel) presents the fitted hazard function describing the effect of a single- or multiple-subject assignment on secondary teachers' risk of voluntarily resigning from teaching, given that they had not resigned previously. This plot is based on the pertinent final model (Model 3, Multi-subject analysis) in Table 4, with all covariates held at their sample mean and including school fixed effects. As the plot indicates, in all time periods teachers with multiple assignments are predicted to have a higher conditional probability of voluntarily resigning from the profession than their counterparts with single assignments, controlling for all else ($p = .06$). For example, controlling for school fixed effects, in year 1, 3.0% of multiple-subject teachers are estimated to leave the profession; 2.4% of single-subject teachers, by contrast, are predicted to resign. In year 2, the estimated conditional probability that teachers with multiple assignments will resign is 41.4%; for teachers with single assignments, it is 35.4%.

Multiple-subject teachers' elevated estimated risk for resigning from teaching in each year compounds over time. Fifty percent of teachers with multiple-subject assignments are estimated to leave the profession within 2.31 years, compared to 2.64 years for those with single-subject assignments. Although one-third of a year difference in median career may seem like a small increment of time, research has shown that new teachers improve rapidly (Rockoff, 2004). At this early stage in teachers' careers, this difference in time may reflect real differences in teachers' skill and students' achievement.

What Is the Relationship Between Teaching Out of Field and Teachers' Risk of Resignation?

Individuals who teach multiple subjects are likely to teach at least part of their day out of field, which, following the National Center for Educational Statistics' lead (Seastrom, Gruber, Henke, McGrath, & Cohen, 2004), we define as lacking a college major in the subject(s) they instruct. We find that teachers assigned out of field to teach mathematics or social studies are at greater risk of resigning from the profession than those teaching in-field. It is interesting that this was not true for teachers assigned out of field to teach science.

In Figure 3, the fitted hazard function at the top on the right depicts the conditional probability that out-of-field and in-field math teachers would resign from the profession, given that they had not previously done so. This plot and subsequent ones representing social studies and science teachers are based on Model 3 for each out-of-field subject analysis reported in Table 4, with all covariates held at their sample mean and including school fixed effects. Across all time periods, out-of-field mathematics teachers were at greater risk of resigning from the teaching profession than were in-field mathematics teachers who held a major in mathematics, computer science, or engineering. For example, in year 2, the estimated risk of resignation for out-of-field mathematics teachers, defined here as those with a humanities, science, or foreign language major, is 38.0%, compared to 22.8% for in-field teachers.

These differences accumulated such that an estimated 76.2% of mathematics teachers who were in-field in each year remained in the profession beyond year 2, as compared to an estimated 60.3% of the out-of-field mathematics teachers. This gap persisted. Half of all out-of-field teachers resigned from the profession within 2.51 years. By contrast, the average career of in-field mathematics teachers is more than 1.5 years longer, at 4.08 years.

Social studies teachers followed a similar pattern. The bottom left plot of Figure 3 contains a fitted hazard function that describes the risk that in-field and out-of-field social studies teachers will resign from the profession in each year, given that they had not previously done so. In their first 6 years of teaching, social studies teachers with a major in history or social science had a lower risk of resigning than did those without such a major, given that they had not left before and controlling for all covariates and school fixed effects. For instance, in year 2, 45.1% of out-of-field social studies teachers (defined here as those with a science, foreign language, or English major) were predicted to resign, compared to 35.6% of in-field social studies teachers. This gap is explained in large part by the elevated probability that out-of-field social studies teachers who majored in the sciences would exit. In year 2, 53.4% of out-of-field social studies teachers with a science major left teaching.

Over time, these differences accumulated. Controlling for all else, 53.0% of individuals who taught social studies out of field each year were predicted to remain in the profession beyond year 2. In contrast, 62.9% of individuals who taught in-field in each year were predicted to continue to teach beyond this point. This disparity is reflected in a difference of about ½ year in the average career length of these two groups of teachers. Fifty percent of out-of-field social studies teachers resigned from the profession within 2.14 years, compared to 2.66 years for in-field social studies teachers. As suggested above, the gap with out-of-field science majors is even larger. Half of all social studies teachers with a science major resigned from teaching within 1.89 years.

Thus, for both mathematics and social studies teachers, an in-field assignment in each year is associated with a higher conditional probability of remaining in the profession in that year. As shown in the hazard function in the bottom, right plot of Figure 3, science teachers with a major in science are at *greater* risk than those without a major in physics, chemistry, natural, or life sciences (Seastrom et al., 2004) of resigning from teaching in each year, provided they had not yet left and controlling for all else. In year 1, 4.7% of science teachers with a science major are predicted to leave, compared to 2.6% of science teachers with a humanities, math, or foreign language major. In year 2, 52.9% of in-field science teachers are predicted to leave, compared to 38.4% of their out-of-field counterparts. Fifty percent of science teachers who taught in-field resigned from teaching in 1.90 years, compared to 2.49 years for those teaching science out of field. Compared to their in-field counterparts, out-of-field mathematics and social studies teachers were at *greater* risk of resigning from the profession, but out-of-field science teachers had a *lower* risk of doing so.

Discussion

These findings generally confirm our initial hypothesis that new teachers with more challenging assignments would be at greater risk for leaving their schools and the profession, at least in year 1, than those with less challenging assignments. We found that multiple-grade elementary teachers were at greater risk than single-grade elementary teachers of leaving their schools in year 1 and particular other years. Multiple-subject secondary teachers were at greater risk than their single-subject counterparts of resigning from the profession in all years. Finally, we found that out-of-field mathematics and social studies teachers' risk of resignation was higher than that of in-field teachers of these subjects. However, contrary to our hypothesis, science teachers without a science major were at lower risk of resigning from the profession than science teachers with a major.

Across the sub-analyses, individuals' year 1 assignment was consistently related to their turnover. This was true even when, by including school fixed effects, we restricted our analysis to teachers within the same schools. This connection between year 1 assignment and turnover suggests that assignment affects new teacher attrition and migration. Respondents who leave in year 1 fail to fulfill their 2-year obligation to TFA. People who break this commitment may be especially challenged by the circumstances in which they teach. Moreover, these teachers have the least influence over their assignment in year 1. In this year, estimates of the relationship between assignment and turnover are least biased by individuals' choice of which classes they instruct.

In years 2 through 6, multiple assignment was in many—but not all—cases related to turnover. These mixed results are not surprising. After year 1, a teacher likely has more control over the classes assigned to her or him. If respondents teaching multiple assignments have a higher probability of turnover in these years, it could be that they agree to teach a multiple assignment in a particular year, knowing that they would leave their schools or teaching at the end of that year. If we find that multiple-assignment teachers are more likely to stay, it could be that these teachers have achieved some degree of competence in the classroom and seek the new challenge posed by teaching a second grade or subject. In short, we would expect more mixed results as new teachers become experienced, gain more say in their teaching assignments, and desire more variety within their teaching load.

The one result that explicitly runs counter to our hypothesis is the finding that science teachers without a science major are at lower risk for resigning than those with a science major. However, other research informs our interpretation of these results. Many studies have found that science majors are more likely to resign from teaching than humanities majors (e.g., Kirby et al., 1999; Murnane, Singer, Willett, Kemple, & Olsen, 1991), in part due to the higher salaries they can command in the science, technology, and engineering industries. The fact that in-field science teachers, that is, those who have a major in science, resign at elevated rates may simply reflect that they have greater access to more attractive, alternative occupations than teachers who are assigned to teach science with an out-of-field major such as English literature or political science. The fact that out-of-field social studies teachers who possessed a science major were especially likely to leave teaching lends credence to this interpretation.

Threats to Validity

It is possible that something other than assignment, such as employment opportunities outside of teaching, may well drive the elevated risk of turnover experienced by teachers with multiple or out-of-field assignments in our sample. Our research design does not support causal conclusions, and several other factors may explain the relationship we observed.

Our design allowed us to rule out two threats to internal validity. As discussed above, we have been able to eliminate one common threat by focusing on only voluntary exit and transfer. We also have been able to minimize a second threat, that pre-entry differences in teachers, rather than assignment or other workplace variables, cause differential turnover. We have accomplished this by studying teachers in one program who met the same selection criteria and completed the same pre-service preparation program.

A third threat is posed by the possibility that a challenging assignment may be a proxy for poor working conditions. Although most schools where TFA places teachers feature poor working conditions by definition, without a mechanism by which to control for school working conditions, the assignment variable may absorb these school-level variations. To guard against this, we fit additional discrete-time hazard models that included school fixed effects. Our estimates of the effects of assignment were smaller but still significant when we controlled for school fixed effects, which gives us greater confidence that differences in teachers' assignments play a role in their turnover.

Even with the inclusion of school effects, threats to internal validity remain. Working conditions may vary *within* schools and, as such, comparing teachers with more and less challenging assignments within schools does not allow us to isolate the effect of assignments. For example, one teacher may teach on a hallway with teachers who have strong classroom management skills, thus allowing her an orderly environment in which to instruct. By contrast, another teacher in the same school but a different hallway may teach next door to teachers with poor management skills. This teacher may have a more difficult time teaching due to disruptions outside her classroom door. Thus, the relative orderliness of the immediate hallway environment might drive teachers' career decisions more than the level of challenge in their teaching assignments. Similarly, principals may systematically assign more manageable teaching assignments to teachers whom they want to retain and more difficult ones to those whom they do not wish to continue. In short, this design does not rule out the possibility that working conditions within schools may differ for teachers in ways that affect their probability of turnover.

The main threat to external validity is the fact that TFA teachers differ markedly from generic new teachers, which limits the generalizability of these findings. TFA teachers are graduates of selective colleges, sign up for an explicit 2-year, cohort-based program, and receive very little preparation. In many ways, they differ from most other new teachers. Although our design limits the generalizability of findings, it does not diminish the value of studying this population. Our attention here is on new teachers in high-poverty, low-achieving schools, where the potential effect of TFA teachers is great. As more fast-track programs, such as the New York City Teaching Fellows Program, recruit participants similar to those in TFA, the more important it becomes to understand such teachers' experience and subsequent career decisions. The findings also underscore an important area for future research on a broader sample of teachers.

Implications

These results suggest that administrators should keep in mind that assigning a more challenging course load to a 1st-year teacher may put her or him at greater risk of leaving the school. Administrators who want to retain new teachers should probably make an effort to assign them a single grade at the elementary level or a single subject well matched to the teacher's college major at the secondary level. If we assume that new teachers with challenging teaching loads leave in part because they are not faring well with students, administrators who are committed to student success should be doubly motivated to make manageable and appropriate in-field assignments. If program requirements or hiring timelines prevent this, administrators should pay special attention to teachers who have challenging assignments and offer support early if these teachers struggle.

Overall, this study highlights an important area for further research. Although teacher hiring has been examined (e.g., Liu & Johnson, 2006), teacher assignments have not been studied in any depth even though they appear to influence teachers' career decisions. Qualitative investigations of how administrators assign teachers to courses and classes are needed. Such studies should examine assignment practices in large and small districts, in urban, suburban, and rural locales, and in bargaining and nonbargaining states. This would allow researchers to better understand whether and how practices differ by district size, urbanicity, and collective bargaining context. Such studies should track new teachers with different kinds of preparation and more- and less-challenging assignments to understand how they experience such assignments and whether those assignments factor into their career decisions.

Quantitative studies should examine in greater detail the prevalence, incidence, and effect of multiple and out-of-field assignments. How common are these, given the requirements of the No Child Left Behind law that schools must eliminate out-of-field placements? Who is more likely to teach a multiple assignment? What are the consequences of multiple assignments for student achievement? When out-of-field teachers leave the profession, is it due more to a taxing assignment or to an enticing opportunity outside education?

Attracting and retaining good teachers for low-income children must be part of any effort to fracture the persistent link between poverty and low academic performance in the United States. This study aimed to advance these efforts by investigating whether teaching assignment is related to the retention of new Teach For America teachers. By teaching a single grade or subject for which they are well prepared, these teachers may meet and even exceed their 2-year obligation to teach in low-income schools, thus contributing to the vital effort to provide low-income students a better education.

Notes

1. This estimate includes the costs of recruiting, hiring, and offering professional development to replacement teachers and processing the job terminations of those who left.

2. Donaldson developed and conducted the survey and performed the statistical analyses for this study. The authors conceived of the study and wrote this article collaboratively.

3. Involuntary exits are coded "0" in the year a respondent involuntarily exited and are treated as missing data in subsequent years.

4. Most studies of teachers' careers indicate that attrition from the teaching profession declines substantially after the 5th year (Kirby et al., 1999; Murnane et al., 1991; Stinebrickner, 2001), which suggested that we should follow teachers for at least 5 years. However, because ours is a retrospective study, we wanted to focus on relatively recent TFA cohorts to reduce recall errors (Taris, 2000) and take advantage of TFA's more reliable contact information for members of the more recent cohorts.

5. We included three cohorts in our data analyses to improve statistical power. A priori power analysis suggested that the resulting sample size should provide sufficient statistical power to detect small effects (Cohen, 1977).

6. Each contained similar proportions of women, Latinos, Asians, American Indians, members of each cohort, and teachers assigned to elementary, middle, and high schools. The two statistically significant differences between sample and census were in the percentage of those who identified as only Black/African American (14.53% of the census vs. 10.43% of the sample) and those who identified as only White (67.59% of the census vs. 73.73% of the sample). However, only 90.6% of individuals in the census provided information about their race. By contrast, 97.4% of respondents reported their race on our survey. Thus, it is possible that the reported racial composition of the census is not a good standard against which to measure the representativeness of our sample. Nonetheless, our sample may not be representative of Blacks and Whites.

7. We analyzed the data separately by cohorts to see whether one cohort, in particular cohort 3 (2002), was driving the findings. We found no evidence that this was the case.

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