RESPONDING TO TEACHER ATTRAITION

An Analysis of Risk Factors in the North Carolina Teaching Fellows Program

Alesha Daughtrey

Abstract

This study is a first attempt to quantify attrition rates for participants of the North Carolina Teaching Fellows Program and to identify risk factors for attrition. This study finds that Fellows are more likely than other teacher candidates to enter and remain in the classroom. Access to a professional mentor is associated with large and significant reductions in attrition risk for Fellows. Factors such as teaching in a high needs school and teaching in districts geographically proximate to Fellows’ home districts were also associated with a smaller, but significant, decrease in attrition risk. These results suggest mentoring and other instructional supports, as well as attention to placement in first teaching positions, are critical to improving retention of Fellows—particularly in high-needs schools.

Introduction

Public schools in every state, including North Carolina, struggle with problems of inadequate teacher supply. North Carolina needs more than 10,000 new teachers each year due to enrollment growth, class size reduction initiatives, retirements, and high teacher attrition rates.1 Attrition is a particular problem for novice teachers. Sixty percent of all teacher candidates choose not to enter the classroom at all after completing their professional training.2 By the fifth year of teaching, about half of novice teachers have left the profession.3 Shortages of well-qualified teachers could put school quality at risk and push schools afoul of federal and state requirements to place properly credentialed and effective teachers in every classroom. If most “leavers” depart from high-needs schools with large concentrations of economically disadvantaged or minority students, attrition might also contribute to educa-

‡ Alesha Daughtrey received her Master of Public Policy in 2009 from the Sanford School of Public Policy, Duke University and her Bachelor’s degree in English (with secondary teaching licensure) from the University of North Carolina at Greensboro in 1997. Daughtrey currently leads research initiatives at the Center for Teaching Quality, a national nonprofit focused on policy, research, and teacher leadership to improve student learning and advance the teaching profession.
tional inequities within districts. This study is a first attempt to quantify attrition rates for participants in the North Carolina Teaching Fellows Program and to identify risk factors for attrition.

**Background**

The North Carolina Teaching Fellows Program (NCTFP) was established by the state’s General Assembly in 1986 to recruit talented high school students into the teaching profession and provide them with intensive preparation for school-based leadership and success in the classroom. In exchange, Fellows must repay their scholarships with four years of full-time teaching service in the North Carolina public schools. This arrangement is designed to provide the state with a more stable and well-prepared supply of public school teachers. The NCTFP, then, could be an effective response to teacher supply challenges—if Fellows are more resistant to attrition risks than other novice teachers.

*The problem of teacher attrition and turnover*

Schools’ struggles to find well-qualified teachers have popularly been described as a “teacher shortage,” but this phrase reflects an inaccurate depiction of the staffing problems experienced by public schools. In fact, preparation programs nationwide train more than enough teachers annually to fill current positions. Through the 1980s and 1990s, traditional certification programs multiplied, with an accompanying jump of about 50 percent in the number of teachers trained. As of 2000, there were six million trained teachers in the United States—about double the number needed to fill positions nationwide. The teacher shortage problem, then, is based not just on the low numbers of teachers prepared to enter classrooms, but in large part on the high number of teachers leaving them. North Carolina’s teacher attrition rate has averaged 12.8 percent over recent years. Although this rate is well below the national rate of 16.8 percent, it is still problematic for a state in one of the fastest-growing parts of the country.

*Highest attrition rates in early and late career teachers*

Changes in teacher labor markets have contributed to the teacher shortage. Well-educated women and minorities once had few employment opportunities aside from teaching. However, as more prestigious and high-paying careers have opened to these groups, many of these teachers have opted away from the profession.

Typically, teacher attrition patterns follow a U-shaped distribution, with most departures coming either early or late in teachers’ careers. Almost a quarter of North Carolina’s public school teachers have 20 or more years of experience, presaging a “teacher bust” as these individuals reach eligibility for
retirement. Yet retirements are still outpaced by all other reasons for leaving the profession by five to one. Indeed, attrition is most common for early career teachers. Finding ways to retain the best-prepared and most effective novices could be a critical component of solving the challenges of teacher supply, especially in high-needs schools and districts or hard-to-staff positions.

Causes of attrition among novice teachers

Reducing high novice attrition rates may be one means of assuring a greater supply of well-prepared teachers in high-needs schools, but doing so requires an understanding of why novices leave. Several studies in other states have indicated that in general, teachers prefer to teach in schools with fewer high-needs students (i.e., students who are low-performing, have special needs, or are low-income or minority). North Carolina does not gather data from exiting teachers about whether issues related to school composition or other school-based factors impacted their career decisions. However, novices may have to wait several years before becoming eligible for a preferred school or position; or may even be displaced to a less-desirable school by more senior teachers because transfers among schools and teaching assignments within schools are commonly granted on the basis of seniority. Some novices, then, might choose to leave teaching altogether rather than remaining in an especially difficult position.

Teacher labor markets also tend to be highly localized, with most teachers preferring to teach in schools and districts close to where they grew up. Even when teachers choose to locate farther from home geographically, the pull of home manifests itself in other ways; they predominantly choose areas that are similar to the areas in which they grew up. School-level supports may be among the most important factors in retaining novice teachers. Novices often feel overwhelmed by and underprepared for the demands of real classrooms, especially in high-needs schools. Prior research suggests that high-needs schools exhibit higher transiency and attrition rates for teachers of all experience levels. Where novices are provided with access to induction programs or mentors to ease their transition into the profession, they are far more likely to remain beyond their first year and to generate achievement gains among their students. North Carolina novices are supposed to receive an Initial Licensure Program (ILP) mentor to guide them through their first three years in the classroom, but since each district oversees its own ILP, quality and availability of mentors may vary widely. National surveys of teachers also show that poor leadership and insufficient support from school administrators are central reasons why many teachers leave their schools.

Low teacher salaries are often cited as the cause for departure from the profession. However, poor school conditions and insufficient teacher support
seem more important in teachers’ decisions to leave high-needs schools than their compensation.\textsuperscript{29} Even so, teacher pay in North Carolina remains about four percent under the national average and well below that of state employees in other fields with equivalent experience and education levels, despite recent modest increases in teacher salary schedules.\textsuperscript{29, 30}

**Financial and educational costs of teacher attrition**

Attrition is a particular problem for high-needs schools. These schools often have difficulty attracting qualified candidates to begin with, since they are perceived as having the least support and the most problems with student behavior and violence.\textsuperscript{31} Once hired, teachers are twice as likely to leave high-poverty schools as compared to low-poverty schools and equally likely to leave schools with relatively high proportions of minority students.\textsuperscript{32, 33} The less-experienced teachers, which these schools are typically forced to hire as replacements, generate lower value-added gains for their students.\textsuperscript{34, 35} Thus, teacher attrition can undercut educational quality, particularly in schools that most need well-qualified, effective teachers.

Beyond the intangible costs in educational quality and equity, attrition is also a costly problem from a financial perspective. Hiring and retraining expenses are estimated at a national total of between $2.6 billion\textsuperscript{36} and $7.3 billion\textsuperscript{37} annually. Since high-needs schools have more severe attrition problems, these costs fall disproportionately on the districts that can least afford them. Given the scope of the problems triggered by attrition in the profession, minimizing teacher attrition could be a cost-effective way for public schools to resolve both a human resources and an educational quality challenge.

**The role of the North Carolina Teaching Fellows Program**

The North Carolina Teaching Fellows Program was primarily designed to increase the number of well-trained teachers entering the classroom, but elements of the program also correspond with research-based best practices for reducing attrition. State-allocated resources provide Fellows with more intensive clinical preparation for the real world of teaching than their peers in the state’s traditional or alternate-route certification programs. Fellows also receive additional support, mentoring, and professional development through all four years of undergraduate study.\textsuperscript{38} The intensity of Fellows’ preparation and the program’s emphasis on classroom experience should theoretically render participants more immune than their peers to the real-world stresses of novice teaching.

Fellows are not guaranteed specific teaching placements or assignments that might further cushion any “entry shocks” to the demands of the profession. However, because of the NCTFP’s rigorous academic requirements and selection process, it is considered a prestigious program and its graduates are
highly sought-after by districts statewide. Thus, NCTFP’s alumni are likely to
be a special group of novices, with a greater deal of control over where and
what they teach than most early-career teachers.

Finally, Fellows have a strong financial disincentive to leave prior to
completing a fourth year of teaching, since they must otherwise pay back their
scholarship loan. This factor should provide additional motivation to remain
in the teaching profession, at least for as long as their service payback period
lasts.

Data and methods
Data sources and key variables

The primary data source used was the North Carolina Teaching Fellows
Program master file, which provides information on Fellows’ demographic
and personal characteristics, as well as data about their academic prepared-
ness and participation in professional development opportunities. Information
about the schools and districts in which particular Fellows taught during
their service payback period comes from a second NCTFP data file on Fel-
lovers’ teaching career records. All NCTFP data are based on self-reports given
as part of the students’ applications to the program, or on written responses to
annual audit surveys of Fellows’ academic status (during college) and teaching
status (during their payback periods). Data on the test scores and demographic
composition of schools where Fellows either taught or attended, as well as
current statistics on statewide teacher attrition, were publicly available from
various reports produced annually by the North Carolina Department of Pub-
lic Instruction.

Methods

Non-licensure rates for each cohort (1987-2004) were calculated and
compared to test for variation over time in the NCTFP’s success in fully pre-
paring Fellows to enter the classroom. In order to focus attrition analyses on
only those Fellows who completed their professional preparation for teaching,
attrition was defined as having occurred only among Fellows who success-
fully completed their undergraduate education, received teaching licensure,
and went on to complete—fully or partially—a teaching service or monetary
payback to the NCTFP. Thus, Fellows who failed to complete all program or
degree requirements while in college, who were deceased before completing
their payback periods, or for whom full personal, high school or college data
were not available were not included in the analyses. The study also excluded
cohorts graduating after 2000 because they did not have time to complete their
service payback by 2004 (the last year of available data). To avoid any distor-
tions in the program data due to NCTFP start-up issues, the first three cohorts
were also dropped. This yielded a smaller sample of 3,440 Fellows, or about 51
percent of the full sample.

Constructing a life table for a pooled group of all ten cohorts provides a general picture of the timing of attrition problems within the NCTFP and controls for any distorting variations in attrition rates among the cohorts. Life tables are assembled for each cohort separately to indicate any changes or trends in the timing of attrition that have occurred across cohorts.

To test whether particular personal and school characteristics may be correlated with attrition, the Cox proportional hazards regression model was used,

\[ H_j(t) = h_0(t) \exp(x_j\beta) \]

where \( H_j(t) \) is the likelihood that a given Fellow \( j \) will terminate her service payback \( (H) \) at time \( t \). This probability is based on the fact that she has not failed (that is, continued active participation in service payback) up to that point \( (h_0(t)) \), and on a vector of independent variables \( x \), that are likely to affect the Fellow’s decision to leave. These variables include the proportion of low-income students in the school in which she teaches; the proportion of minority students in the school; the school’s test scores; her own test scores; her GPAs in both high school and college; her college or university; her ethnicity; the socioeconomic status of her own family of origin; and the presence of a mentor during her initial years in the classroom.

To discover the extent to which known risk factors for novice attrition were associated with actual attrition among Fellows, a series of dummy variables indicating presence of these factors were added to the dataset. These included variables for high concentrations of students who exhibited low performance on state standardized tests, who received free or reduced lunch (used as a proxy for socioeconomic status), or who were non-white minorities. A dummy variable for proximity to home indicated whether students taught in their home county or adjoining ones. Finally, to test whether Fellows’ decisions to leave the classroom might operate differently over time, a logistic regression function using the same variables as in the Cox model was also estimated.

**Limitations of the data**

The lack of school-level and classroom-level information about Fellows’ teaching experiences does not allow for controls for variation in teaching experiences within individual schools. The omission of controls for classroom-level effects may bias estimates, although the direction of this potential bias is unclear. Data about the quality of ILP mentors assigned is also not available.

Importantly, because of omitted variables, none of the results of the models can demonstrate a causal relationship between Fellows’ attrition and the characteristics of Fellows or the schools in which they teach and learn. Fellows’ career decisions, like those of other novice teachers, are influenced by a
number of other variables omitted in this data (e.g., fluctuations in the overall economy, perceived career opportunities in other fields, withdrawals from the labor force, childbearing, or other changes to family structure). However, associative links between attrition and specific characteristics of Fellows or their schools can still be useful to the NCTFP and other teacher preparation programs, in terms of identifying the best leverage points for reducing attrition among graduates.

Results
Preparing Fellows to enter the classroom: Non-certification trends

Comparison of non-certification rates for the entering Fellows cohorts of 1987 through 2004 show that among 6,704 graduated Fellows, 1,080 of them—or 16.1 percent—did not successfully complete their teaching licensure. However, about 10 percent of these “non-certified” Fellows (111 in total) did go on to complete at least one year of service payback to the NCTFP. This fact suggests that these Fellows may have entered the classroom without having completed all licensure requirements (such as passing Praxis certification exams) or with licensure applications still pending with the state, and did become licensed soon thereafter. The timing of licensure for some Fellows may therefore have biased these non-certification numbers upward.

Figure 1: NCTFP non-certification rates, by cohort (1987-2004)

Source: Author’s tabulation of NCTFP data
As shown in Figure 1, non-certification rates for Fellows have declined over time, from a high of nearly 23 percent to just over 13 percent for the most recently graduated cohort. Each of the past six cohorts has had a non-certification rate under the mean rate for the program. Since the very highest non-certification rates occurred in the early years of the program, it is possible that start-up issues for the program contributed substantially to non-certification rates, providing further justification for the exclusion of these cohorts from the models.

Attrition trends

Life table analysis (see Table 1) illustrates attrition patterns among Fellows over their four years of teaching experience. The point at which Fellows have graduated, been licensed, and are preparing to enter the classroom is considered Year 0 in this analysis. Approximately 73 percent of licensed Fellows complete four years of teaching service payback. While an overall attrition rate of 27 percent might seem high, it is important to note that the greatest attrition occurs in Year 0, before Fellows have even entered the classroom. National estimates of teacher attrition prior to entering the classroom are approximately 60 percent, with which the NCTFP Year 0 attrition rate of 11.5 percent compares very favorably.

Table 1: Life table analysis for overall attrition among Fellows (1990-2000 pooled cohorts)

<table>
<thead>
<tr>
<th>Year of teaching experience</th>
<th>Number of Fellows starting the year</th>
<th>Proportion of Fellows starting the year</th>
<th>Number of departing Fellows</th>
<th>Proportion of Fellows who depart</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3440</td>
<td>1</td>
<td>395</td>
<td>0.115</td>
</tr>
<tr>
<td>1</td>
<td>3045</td>
<td>0.885</td>
<td>124</td>
<td>0.041</td>
</tr>
<tr>
<td>2</td>
<td>2921</td>
<td>0.849</td>
<td>166</td>
<td>0.057</td>
</tr>
<tr>
<td>3</td>
<td>2755</td>
<td>0.801</td>
<td>234</td>
<td>0.085</td>
</tr>
<tr>
<td>4</td>
<td>2521</td>
<td>0.733</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: Author’s tabulation of NCTFP data

The average overall attrition rate across cohorts drops considerably, to 16.1 percent, if we consider only those Fellows who leave after having entered the classroom – i.e., only attrition in Years 1 through 3 – as the state of North Carolina does in calculating its attrition rates. (See Figure 2.)
Figure 2: NCTFP attrition rates after entrance to the classroom, by cohort (1987-2000)

Source: Author’s tabulation of NCTFP data

Figure 2 also shows some variation in attrition rates across cohorts. A certain amount of variability can be expected purely as a matter of chance. It is also important to note that the data for more recent cohorts (1998 and later) are right-censored due to the structure of the program. Fellows have seven years after graduation to complete their four years of service payback, so these recent cohorts are still inside the seven-year window and may complete service paybacks at a later date. Attrition rates for these cohorts are thus likely to be biased upward.

Attrition rates among Fellows also vary by the year of teaching experience, as shown previously in Table 1 and again in Figure 3 below. As previously discussed, attrition is highest in Year 0, before Fellows’ entry into teaching, then drops during Years 1 and 2 before rising again in Year 3. This pattern of upticks in Year 3 departs from what the literature suggests should be a relatively steady decline in attrition across all years, as the novice Fellows acclimate to their careers in the classroom and near completion of service paybacks to discharge their debts to the state.
Figure 3: NCTFP attrition rates, by year in which departure occurred (1990-2000 cohorts)

Source: Author's tabulation of NCTFP data

Factors associated with Fellows’ decisions to leave the classroom

A number of personal and school characteristics are demonstrated to impact attrition among novice teachers in general. The Cox proportional hazard regression model is used here to test whether and to what degree these factors may influence a Fellow’s decision to leave the profession. Table 2 shows results from the full model. These results are discussed in greater detail below.

Table 2: Change in the hazard ratio of attrition among Fellows

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient estimate</th>
<th>Standard error</th>
<th>Hazard ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographic/family variables:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whether Fellow is female</td>
<td>-.084</td>
<td>(.049)</td>
<td>.920</td>
</tr>
<tr>
<td>Whether Fellow is white (reference category)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whether African-American</td>
<td>.107</td>
<td>(.378)</td>
<td>1.113</td>
</tr>
<tr>
<td>Whether another ethnic minority</td>
<td>.230</td>
<td>(.325)</td>
<td>1.259</td>
</tr>
<tr>
<td>Income level in family of origin (proxy for Fellows’ SES)</td>
<td>.016</td>
<td>(.018)</td>
<td>1.016</td>
</tr>
<tr>
<td>Mother’s education level</td>
<td>0</td>
<td>(.011)</td>
<td>.998</td>
</tr>
<tr>
<td>Father’s education level</td>
<td>.003</td>
<td>(.011)</td>
<td>1.003</td>
</tr>
<tr>
<td>Whether there is a teacher in the Fellow’s family</td>
<td>-.060</td>
<td>(.047)</td>
<td>.937</td>
</tr>
<tr>
<td>Variable</td>
<td>Coefficient estimate</td>
<td>Standard error</td>
<td>Hazard ratio</td>
</tr>
<tr>
<td>----------</td>
<td>----------------------</td>
<td>----------------</td>
<td>--------------</td>
</tr>
<tr>
<td><strong>Achievement variables:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school class rank</td>
<td>0</td>
<td>(.002)</td>
<td>1.000</td>
</tr>
<tr>
<td>High school GPA</td>
<td>-.041</td>
<td>(.076)</td>
<td>.960</td>
</tr>
<tr>
<td>SAT composite score</td>
<td>0</td>
<td>(0)</td>
<td>1.000</td>
</tr>
<tr>
<td>College GPAs:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st semester</td>
<td>.002</td>
<td>(.054)</td>
<td>1.002</td>
</tr>
<tr>
<td>2nd semester</td>
<td>.069</td>
<td>(.055)</td>
<td>1.071</td>
</tr>
<tr>
<td>Cumulative</td>
<td>-.192*</td>
<td>(.084)</td>
<td>.826</td>
</tr>
<tr>
<td><strong>Motivational variables:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reason for being a teacher</td>
<td>-.003</td>
<td>(.006)</td>
<td>.997</td>
</tr>
<tr>
<td>Whether planning to teach before NCTFP scholarship</td>
<td>.057</td>
<td>(.082)</td>
<td>1.059</td>
</tr>
<tr>
<td>Whether had other scholarships</td>
<td>-.017</td>
<td>(.043)</td>
<td>.983</td>
</tr>
<tr>
<td><strong>Professional variables:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whether previously employed</td>
<td>-.004</td>
<td>(.063)</td>
<td>.996</td>
</tr>
<tr>
<td>Whether had a mentor</td>
<td>-3.226**</td>
<td>(.136)</td>
<td>.040</td>
</tr>
<tr>
<td><strong>Characteristics of school taught in:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whether a high-poverty school</td>
<td>-.082</td>
<td>(.060)</td>
<td>.921</td>
</tr>
<tr>
<td>Whether low-achieving school</td>
<td>-.188**</td>
<td>(.063)</td>
<td>.829</td>
</tr>
<tr>
<td>Whether a high-minority school</td>
<td>-.313**</td>
<td>(.053)</td>
<td>.732</td>
</tr>
<tr>
<td><strong>Whether school taught in matches the Fellow’s high school in terms of:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concentration of poverty</td>
<td>.042</td>
<td>(.048)</td>
<td>1.043</td>
</tr>
<tr>
<td>Mean student achievement level</td>
<td>.008</td>
<td>(.052)</td>
<td>1.008</td>
</tr>
<tr>
<td>Concentration of minorities</td>
<td>-.001</td>
<td>(.048)</td>
<td>.732</td>
</tr>
<tr>
<td>School proximate to home district</td>
<td>-.243**</td>
<td>(.048)</td>
<td>.785</td>
</tr>
</tbody>
</table>

*Significant at the p <0.05 level; **Significant at the p < 0.01 level

Hazard ratios on the far right of Table 2 indicate the extent to which each covariate in the model affects the risk of attrition. Ratios equal to one indicate a covariate that has no impact on the risk of attrition, ratios greater than one indicate increased risk, and ratios less than one indicate decreased attrition risk. For example, reading across the top row of Table 2, we find that Fellows who are female are 8.4% less likely than males to suffer attrition in any given year, a fairly modest and insignificant percentage. The hazard ratio indicates that female Fellows have 92% of the attrition risk of their male counterparts.
Presence of mentors

The variable exhibiting the highest correlation with Fellows’ attrition is whether they were mentored. Fellows who reported having an ILP mentor assigned to them had 97 percent less risk of attrition than Fellows who did not receive a mentor. Although substantial effects for mentoring might be expected in light of prior research on novices generally, this is still a large effect. The presence of a mentor also appears to be functioning independently of all other variables; estimates change in magnitude but not in sign or significance when the mentor variable is isolated.

Effects of high-needs schools

Contrary to what would be expected from prior research on teacher attrition, teaching in high-needs schools appears to be associated with decreased risk of attrition for Fellows. High concentrations of economically disadvantaged students did not significantly impact attrition risk. Teaching in low-performing schools is associated with a 17 percent decrease in attrition hazard and teaching in high-minority schools with a 27 percent decrease, both of which are significant at the \(p<.01\) level.

Preferences for proximity to home or familiar environments

A possible explanation for Fellows’ resilience in high-needs environments is that they may have attended similar schools themselves as high school students. They may therefore have a preference to match characteristics of the schools in which they teach with those of their hometown schools. However, controlling for whether Fellows attended high-needs schools themselves did not significantly affect their rates of attrition.

While Fellows do not seem to have a specific preference for matching characteristics of their teaching environments with those they experienced as students, they do exhibit a preference for returning to their hometowns. Fellows who taught in the same county where they had attended high school, or in an adjoining county, showed a 22 percent decrease in attrition hazard. This finding was robust to controls for returning to the same high school they had attended as students, and for whether they taught in school environments similar to that of their own high schools. In this respect, Fellows’ preferences for home reflect the preferences of novice teachers overall.

Other factors related to attrition risk

In general, individual and family characteristics of Fellows were not associated with their attrition hazard. Interestingly, a Fellow’s own socioeconomic status and race showed no significant correlation with hazard of attrition when teaching in schools with high concentrations of economically disadvantaged and minority students. This finding reinforces the likelihood that
Fellows are not matching their preferences for teaching environments with those of their home high schools, which are likely to serve students of similar backgrounds as the Fellows.

Prior research suggests that teachers’ own cognitive abilities or academic achievements do not correspond with their level of success in the classroom, except at the secondary level, but there is currently no information on how these factors might affect their persistence in the profession. Fellows’ academic profiles appear not to correlate significantly with any change in hazard of attrition, except for their cumulative college GPAs. Each .10 point increase in GPA was associated with a 18 percent decrease in attrition risk, when controlling for Fellows’ prior academic performance.

Changes in effects over time

Results of logistic models were roughly equivalent to those for the Cox model presented in Table 2. The few detectable differences in magnitude were extremely modest and not significant. Thus, the correlations between the above factors and Fellows’ attrition decisions appear not to differ in any meaningful way from year to year over the span of their service payback period.

Discussion

No data are available to indicate definitively why so many Fellows would not have fulfilled the certification requirement of the NCTFP. The most likely explanation—apart from issues related to timing of licensure—is that some Fellows realized during their training that the teaching profession was not a good career fit for them. It is hard to argue that any teacher preparation program should seek to place unwilling or under-motivated teachers in classrooms. Thus, this could be viewed as “good attrition” that may in fact improve efforts to train and place committed, effective teachers in public school classrooms.

The patterns of rising and falling attrition rates across cohorts also suggest Fellows’ responsiveness to changing economic conditions. Recall that there is a four-year lag between a cohort’s entrance into the NCTFP and its entry into the workforce. Reduced attrition among Fellows appears to follow a slightly countercyclical pattern, with more Fellows opting to complete service payback when the economy is less robust and the security of a teaching position is attractive in comparison with other opportunities for recent graduates. Conversely, in good economic times, Fellows’ attrition might increase because they perceive more, and better paid, opportunities in other fields. This explanation would account for relatively lower attrition among Fellows in the 1990-1991 cohorts, who entered the workforce when the economy was still in recovery from the recession of the early 1990s, and the relatively higher attrition among cohorts a few years later, graduating in the midst of the technol-
ogy boom. However, until the most recent cohorts have had time to complete their service requirements, it will be difficult to know whether this pattern is borne out by the data.

The fact that Fellows’ attrition risk does not decline in a linear fashion between Year 0 and Year 4 of service payback appears counterintuitive. One possible explanation is that the year-by-year accrual of service payback, coupled with the fact that initial teaching licenses must be renewed after the third year, offers a perverse incentive. If Fellows can pay down the bulk of their debts through teaching during their initial licensure period, they could then opt to make a cash payoff of the much-reduced balance—without going to the additional trouble of renewing their teaching licenses and with the possibility of higher earnings in another field.

Another reasonable explanation is that starting salaries for first-year teachers—currently around $30,000—are similar to or higher than those of other first-year professionals. However, because teachers’ salaries rise more slowly in the first few years and do not peak until teachers are mid-career, the marginal financial benefit for remaining in the profession erodes fairly quickly. The fact that Fellows have higher than average achievement may make them attractive candidates for entry-level positions outside education, and therefore more susceptible than other novice teachers to leave the teaching profession for financial reasons.

It is likely that effects observed for presence of an ILP mentor in these models are not attributable to mentoring alone. Mentoring programs, though mandated by the state of North Carolina for novice teachers, are implemented at the local level. District administrators, and sometimes even school-level administrators, are responsible for identifying and training master teachers to become mentors, matching them with novice teachers and ensuring the success of those relationships. The quality and efficacy of mentoring programs and relationships is therefore highly dependent on a variety of district- and school-level factors. Districts and schools with strong leadership, an emphasis on cooperation and collaboration among staff, and experienced teachers who are eager to assist new colleagues (formally or informally) are more likely to be able to find appropriate mentor/mentee matches for Fellows and other novices.

Furthermore, the same qualities that foster strong mentoring programs may also be associated with working conditions that are conducive to retaining novice teachers, even in the absence of any mentoring programs. Thus, estimates of hazard reduction as a result of access to mentors are probably overstated. Data on school or district leadership styles, working conditions in the schools in which Fellows teach, and how well formal and informal professional supports function are not included in the currently available data, and thus cannot be controlled for here. Still, given the significance and magnitude
of these effects, it is reasonable to conclude that mentoring relationships are a highly important factor in the retention of Fellows and other novice teachers. These results provide evidence in favor of providing all novice teachers with ready and regular access to mentors of consistent and high quality.

The reversal of usual attrition risk factors for novice Fellows teaching in high-needs schools is somewhat puzzling. It is possible that Fellows might have primarily low-needs students in their classrooms, even if they are teaching in schools with predominantly high-needs students. However, at least in the middle and upper grades, it is common practice to assign more advanced (and therefore often lower-needs) classes to the most senior teachers. Therefore Fellows, as novice teachers, are more likely to receive higher proportions of high-needs students than the average for their schools. This would tend, if anything, to bias hazard estimates negatively. Actual attrition risk based on these factors might thus be even lower than indicated here, if we were able to examine classroom rather than school composition.

It is also possible that Fellows differ from most other teachers and novices, either in their motivations as teachers or in their preparation for (and thus satisfaction with) more challenging teaching positions. Because the NCTFP requires a commitment to teaching in the public schools, Fellows are well aware that they are not likely to teach predominantly advantaged students. The NCTFP emphasizes in-school preparation for Fellows, starting with classroom observations and school visits in their first year of college, so they are likely to be better-acclimated than most other novice teachers for the realities of challenging public school environments. As a result, Fellows may have more pedagogical and classroom management tools that are appropriate to high-needs schools than other novice teachers.

Individuals drawn to the NCTFP may also have a preference for teaching in high-needs schools, hoping to make a difference in the educational outcomes of the least-advantaged students. Unfortunately, this hypothesis cannot be tested with available data. Nonetheless, these findings suggest that careful attention to motivations for entering teaching during recruitment of candidates, as well as thorough preparation for teaching in high-needs schools, may be likely to serve any teacher preparation program well in terms of reducing attrition among its graduates.

**Implications for Policy and Practice**

*Strengthening support systems for novices: a key to teacher retention*

This study finds that the primary factors associated with successfully retaining novice teachers are those related to positive and supportive working conditions within schools, including the presence of formal mentors. Fellows’ relatively low rates of attrition in comparison to other novice teachers also suggest that the level of additional preparation that Fellows receive—whether
as part of experiences in schools during their four years of college or in extra professional development and enrichment programs—may render them more resilient as they face the pressures of full-time teaching and thereby could improve their retention. The results presented here are in line with those of previous studies examining novice teachers, suggesting that policies and practices that enhance school-level support systems for Fellows and other novices could substantially reduce attrition in the first few years of their careers.\textsuperscript{40, 41}

\textit{Managing preferences to teach close to home}

Like other novices, Fellows exhibit a significant preference for teaching close to home. Such preferences among teachers may pose challenges for placing novice teachers in districts with a particularly high demand for new teachers. Targeting Fellows’ teaching service placements for high-demand districts may therefore require unique strategies. In particular, program administrators should consider: 1) advocating for pay incentives to shift Fellows’ preferences towards teaching in high-demand districts; 2) intensifying recruitment for the Fellows program in the districts or geographic areas with the greatest projected demand for new teachers; or 3) ensuring, at a minimum, an even geographic distribution of students selected for the Fellows program.

\textit{Predicting retention for individual Fellows}

This study finds that among the numerous characteristics of Fellows and their families of origin examined, only one is associated with significant changes in attrition hazard: cumulative college GPA. Based on prior research among novice teachers, it seems fair to surmise that GPA is functioning as an indicator of increased cognitive ability or preparedness in the subject area (especially at the secondary level), either of which might increase retention of Fellows. However, no other element of Fellows’ academic records, in high school or early in college, is similarly associated with attrition. This suggests that such characteristics might not prove useful for identifying and targeting those Fellows most likely to complete teaching service payback.

\textbf{Conclusion}

The above findings regarding the importance of mentoring and proximity to home for Fellows are very much in line with what is known about novice teacher retention generally; any teacher preparation program would be well served by attending to these concerns. More interesting and unusual is that Fellows seem to be significantly more resilient in high-needs, hard-to-staff schools than other teachers, particularly early-career teachers. In this regard, the implications for other preparation programs are less clear. However, research on urban teacher residency (UTR) programs in Boston, Chicago and elsewhere suggests that their graduates are also more immune to these risk
factors for attrition than other novices. These programs share NCTFP’s ties to a specific geographic region (in the case of UTRs, specific metropolitan areas) and an intensively clinical focus that is paired with one to two years of high-quality coursework on content, methods, and classroom management. It seems possible that these elements constitute best practices for preparing not only high-quality but “attrition-resistant” teachers. Additional study of these issues would be helpful to identify which program elements are most important to reduce attrition, but these preliminary findings provide a promising avenue for future policies and practices to combat novice attrition.

Endnotes
10 NCDPI, “North Carolina Public Schools Statistical Profile 2007.”
14 Barnett Berry and Eric Hirsch. “Recruiting and Retaining Teachers for Hard-to-Staff Schools.”
18 Benjamin Scafidi, David L. Sjoquist, and Todd R. Stinebrickner, “Race, Poverty, and Teacher Mobility.”
23 The National Commission on Teaching and America’s Future. “Unraveling the ‘Teacher Shortage’ Problem: Teacher Retention Is the Key.”
28 American Federation of Teachers, “Meeting the Challenge: Recruiting and Retaining Teachers in Hard-to-Staff Schools.”
35 Helen F. Ladd, Charles Clotfelter, and Jacob Vigdor, “So School Accountability Systems Make It More Difficult for Low Performing Schools to Attract and Retain High Quality
38 Gladys Graves, interview by author, 29 July 2008.
41 The National Commission on Teaching and America’s Future.