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The Effects of Mentor Quality, Exposure, and Type on Junior Officer Retention in the United States Army

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ABSTRACT

Despite the prevalence of mentor relationships in the workplace, little is known about their impact on labor market outcomes, including job retention. Using plausibly exogenous assignment of protégés to mentors in the U.S. Army, we find positive retention effects for protégés assigned to high-performing immediate and senior supervisors. These positive effects are strongest for those with high SAT scores. We find virtually no evidence of type-matched mentoring effects on retention, except when mentors are also high-performing. For protégés serving under high-performing mentors, matching on high SAT score and home division positively impacts protégé retention.

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1. Introduction

More than two-thirds of Fortune 500 firms sponsor formal mentorship programs.¹ Some of the most often-cited reasons for adopting mentorship programs include: employee retention, human capital formation, and leader development.² Despite the considerable resources and time organizations invest in mentorship programs, there is surprisingly little empirical evidence indicating these programs actually improve the labor market outcomes cited as rationales for their adoption.

Using rich administrative data from the U.S. Army, we explore the impact of supervisory mentors – both immediate and more senior – on junior officer retention. Importantly, we explore whether “high-performing” mentors provide a differential impact on retention, where we define a high-performing mentor as a good officer who is acting in a mentor role, not an officer who is inherently “good at mentoring.”^{3,4} The nature of officer assignments allows us to study not just the presence of a high-performing mentor on retention, but also the duration of a protégé’s

¹ Gutner (2009).

² Schooley (2010). Raabe and Beehr (2003) cite ten studies that focus on the organizational outcome of reduced turnover.

³ We define a good officer or high-performing officer as one who received an early promotion to the rank of major. For both the junior and senior mentors in our study, this early promotion occurred outside of the time frame of the mentor-protégé relationships we study. Early promotion to major is highly selective; typically less than 10 percent of an officer cohort is promoted early.

⁴ We argue that the quality of a mentor-protégé relationship is match-specific, similar to job matching theories. (Jovanovic 1979) Although some mentorship studies in the organizational behavior literature attempt to classify good and bad mentors based on observed behaviors (Levinson *et al.* 1978; Ragins *et al.* 2000), a large literature summarized by Raabe and Beehr (2003) suggests that mentor “quality” is specific to the relationship. Even if classification of “good” and “bad” mentors was deemed meaningful, implementing such a classification is not possible given our data.

association with a high-performing mentor.⁵ The granularity of our data additionally allows us to investigate how several forms of type-matched mentorships affect retention.

One fairly robust finding within the extant literature on mentor effects is that mentorships increase protégé retention in a variety of settings. Early research on the impact of mentor relationships on executives found that those who had a mentor were slightly less likely to leave the firm (Roche 1979). Laband and Lentz (1998) examine mentorship relationships in the context of promotion to partner in law firms, finding positive correlations between having a mentor and making partner. Evaluating a formal mentorship program at Sun Microsystems, Holincheck (2006) finds higher two-year retention rates for participants.⁶ In a study of newly-hired nurses in California hospitals, Mills and Mullins (2008) find nurses assigned a mentor had higher one-year retention rates.

It is not surprising that the literature finds positive relationships between having a mentor and retention. Most informal mentor-protégé relationships are formed voluntarily, so mentors may select high-potential protégés that are expected to continue with the firm. It is equally likely that protégés inclined to stay with the firm choose high-performing mentors. Under formal mentoring programs, protégés are typically matched with mentors based on the goals, skills, and background of the protégé, so selection confounds the interpretation of these effects.⁷

⁵ Variation in the duration of a protégé's (platoon leader's) association with first-line (company commander) and senior (battalion commander) mentors occurs because military officers do not assume these leadership positions simultaneously as a team, but rather rotate into and out of these positions on an individual basis.

⁶ Subsequent analysis of Sun mentorship programs over a longer time period by Dickinson *et al.* (2009) found that the magnitude of retention increases for protégés varied negatively with the business cycle, reflecting diminished outside employment opportunities during recessions.

⁷ Raabe and Beehr (2003), p. 278.

Unfortunately, disentangling pure mentorship effects from mentor- and protégé-quality effects where mentor relationships are endogenously selected is impossible.

A few studies explore mentorship effects on retention using research designs that remove selection biases. Lyle (2007) studies freshmen at West Point who are exogenously assigned a sophomore mentor. He finds that freshmen assigned a mentor with high leadership potential are more likely to stay in the Army after their initial service obligation. Rockoff (2008) uses the implementation of a mentorship training program for newly-hired teachers in New York City public schools to study program effects on retention, finding that protégés whose mentors have school-specific knowledge (they had previously taught at the same school as the protégé) are more likely to retain at the same school.⁸ More recent random assignment experiments offering high school and college students coaching and mentoring find increases in persistence and completion rates. (Bettinger and Baker 2014 and Rodriguez-Planas 2012)

Several theoretical and empirical studies explore the impacts of type-based mentoring, in which the mentor and protégé share some demographic characteristic. For example, protégés might be more inclined to believe an organization is a better fit if they have a mentor with the same demographic characteristic.⁹ Neumark and Gardecki (1998) and Hilmer and Hilmer (2007) use job placement and research productivity as outcomes to measure the differential impact of male versus female dissertation advisers for female Ph.D. students in economics. They find minimal differences in these outcomes by the advisor's gender; however, their study is subject to selection bias as Ph.D. students chose their adviser. Blau *et al.* (2010) find positive and

⁸ Papay *et al.* (2012) find increases in retention for teachers completing a “residency” mentor within the Boston Teaching Residency program, although it is not clear that mentor assignment is random.

⁹ For examples of theoretical models, see Athey *et al.* (2000) and Chung (2000).

significant impacts on research productivity for female assistant professors of economics who were randomly assigned a female mentor. Carrell *et al.* (2010) find that females at the U.S. Air Force Academy randomly assigned to female professors in introductory math and science courses were more likely to both do well in those courses and to subsequently choose an academic major in those fields.¹⁰ Hoffman and Oreopoulos (2009) find small positive impacts of same-sex instructors on academic achievement and course completion for a sample of first-year undergraduates. Recent investigations of the impact of race-matched student-instructor effects for undergraduates find large, positive gains in achievement and continuation for underrepresented minorities (Fairlie *et al.* 2014; Lusher *et al.* 2015). Although we are unable to explore gender-matched supervisory mentorships,¹¹ our data allows us to study mentor-protégé relationships matched by race, achievement (SAT score), home state and division, and undergraduate institution.

Definitions of precisely what constitutes a mentoring relationship vary widely within the literature, but three behaviors are commonly cited: career development, social support, and role modeling. Defined as such, a mentor could be a supervisor at work, a coach, or a role model.¹² In this paper we focus on the impact of mentors who are in supervisory roles within the Army, specifically the immediate (first-line) and senior supervisors of young lieutenants. Although such

¹⁰ Bettinger and Long (2005) find female undergraduates whose instructor in initial Mathematics and Statistics courses are both more likely to enroll in follow-on courses and major in those subjects, but these results were not found for physics and biology courses.

¹¹ During the time-period of our data, Congress stipulated that the Army differentiate assignments by gender based on combat exposure, and thus we cannot guarantee the random assignment of mentor quality for females.

¹² An early descriptive work on mentors, Levinson *et al.* (1978), supports a broad definition of who constitutes a mentor. In opposition, Kram (1983, 1985) presents a view of mentoring as one in which senior, experienced organizational members provide work-related developmental functions and psychosocial support functions to junior members.

supervisory mentorships differ from traditional notions of mentorship,¹³ particularly within formal mentorship programs wherein mentors may be at least two levels above the protégé within the organizational hierarchy, there is considerable support for the importance of supervisory mentorships in the literature. An early descriptive study of mentors found that nearly 50 percent of surveyed executives listed an immediate supervisor as a mentor.¹⁴ More recently, Ragins *et al.* (2000) find more than 50 percent of employees in a national survey report their direct supervisor as their mentor. Raabe and Beehr (2003) argue supervisors often perform mentor behaviors such as career development, social support, and role modeling for their subordinates, and are rightly viewed as mentors. Thus, viewing work supervisors as mentors finds broad support in the contemporary literature.¹⁵

In the Army, supervisory mentorships play a pivotal role in developing officers. Since the labor market for officers is almost exclusively internal, the nation's future security depends in large part on the Army's ability to develop young officers into senior officers capable of effectively leading military units on increasingly complex missions. Moreover, the Army expends considerable resources developing institution-specific human capital, so retention of young officers is critical.¹⁶ Like many private sector firms, the Army is particularly interested in retaining high-potential officers. As documented in Wardynski *et al.* (2010) and noted

¹³ See Kram (1983, 1985). Raabe and Beehr (2003) argue that the more recent literature on the impact of mentor relationships on organizational outcomes such as job satisfaction and retention encompasses a much broader definition of who constitutes a mentor.

¹⁴ Roche (1979), p. 19.

¹⁵ Scandura and Schriesheim (1994) and Tepper (1995) both argue that supervisors clearly perform mentoring functions and are rightfully considered mentors.

¹⁶ Wardynski *et al.* 2010 demonstrate the decline in junior officer retention within the Army over the past 30 years.

anecdotally in Kane (2013), the Army tends to lose a higher share of its high-potential officers, especially as measured by pre-service performance on the SAT.

Identifying causal effects requires a setting where other potential determinants of job retention are unrelated to the characteristics of a protégé's mentors. The Army has a unique structure which provides that setting, as it makes assignments based on institutional needs at any particular time. Based on changes in open positions across time and military units, two young officers with the same military occupation and reporting to the same Army post merely days apart are frequently assigned to different units (and hence mentors). These protégé-mentor relationships do not form voluntarily, and all young officers are assigned a mentor. Using an identification strategy demonstrated by Lyle and Smith (2014) in a study of mentorship effects on officer performance, we confirm that protégé-mentor relationships form without regard for observable characteristics of either protégés or the officers who mentor them.¹⁷

Our results indicate that having a high-performing junior mentor increases retention rates by 2.52 percentage points and by 2.33 percentage points for having a high-performing senior mentor.¹⁸ Having both high-performing junior and senior mentors has an additive effect of 4.60 percentage points. These findings are amplified when we condition our sample of protégés based on SAT score. High SAT protégés who have both high-performing junior and senior mentors have 7.11 percentage point higher retention rates.¹⁹

¹⁷ Lyle and Smith (2014) find evidence that having a high-performing mentor improves early promotion prospects by 29 percent. In our data, the retention decision pre-dates the promotion window, so we are not worried that mentorship effects leading to higher likelihood of early promotion are influencing our results.

¹⁸ To provide context for the magnitude of this increase in retention, retention rates to eight years of service for young officers without a high-performing mentor are approximately 49-50 percent.

¹⁹ Our operational definition of a "high" SAT score is a composite SAT score in the top 50 percent of the cohort distribution of SAT scores. Similarly, we define a "low" SAT score as a composite score in the bottom 50 percent of the distribution.

In our investigation of type-matched mentoring effects, we find no evidence that a mentor sharing the same characteristic as the protégé impacts retention except in the case of protégés and mentors from the same Census division (increase in retention by 3.57 percentage points).²⁰ We do, however, find that for those who have high SAT scores, having a mentor of the same type who is also high-performing significantly increases retention rates by 8.16 percentage points for junior mentors and 3.82 percentage points for senior mentors. We do not find similar effects for minorities.

Overall, our paper adds to the growing literature on mentor effects by identifying a causal effect of high-performing mentors, both at the junior and senior levels, on the retention of their protégés. Further, we are able to test type-matched mentoring for minority and high SAT officers. Finally, we find a differential effect of having a high-performing mentor on retention of high-achievement protégés, an important result for both the Army and any organization with a focus on retaining high-potential employees.

2. Military Mentors, Retention, and Mentorship Assignment

Each year the Army commissions roughly 4,000 new officers as second lieutenants.²¹ The Army invests a great deal in its young officers, providing most with a college education, significant leadership training, and both a first-line supervisor (junior mentor) and a senior supervisor (senior mentor). In exchange for these investments in human capital, the young officer agrees to an eight-year military service obligation. Depending on the source of

²⁰ The nine Census divisions are: New England, Middle Atlantic, East North Central, West North Central, South Atlantic, East South Central, West South Central, Mountain, and Pacific. See Appendix 1 for a listing of states by Census division.

²¹ The rank structure within the U.S. Army, from commissioning to 20+ years of service, is as follows: second lieutenant, first lieutenant, captain, major, lieutenant colonel, and colonel. Protégés in our data serve as platoon leaders as either second or first lieutenants, so we will hereafter describe the rank of protégés as lieutenants.

commission, the officer must serve about half of the obligation on active duty and can serve the remainder in a reserve status.^{22,23}

The Army organizes its formations around ten divisions. Each division typically has three or more brigades, and each brigade has approximately five battalions. Commanders of these battalions serve as senior mentors to the young officers in our study. Within each battalion, there are typically four companies, each commanded by a different officer. These company commanders serve as first-line (junior) mentors to the protégés. Lieutenants serving as platoon leaders are the protégés and typically interact with their junior mentor on a daily basis and with their senior mentor on a weekly basis. Figure 1 depicts this mentorship relationship. Both junior and senior mentors provide a formal rating of their protégés in an annual officer evaluation report.

Each year the Army reviews the evaluation reports for the cohort of officers eligible for promotion to major (typically between 8 and 10 years of service) and selects a small proportion (typically between 5-10 percent) for promotion prior to the rest of their cohort (commissioning year group). This distinction of early promotion often leads to increased likelihood of assignment to competitively selected command positions (battalion commander, brigade commander) and also increases the likelihood of attaining a general officer rank. Our operational definition of a high performer is one who is promoted early to the rank of major.

²² Required active duty commitments depend on the resources invested in an officer: those who attend the United States Military Academy have a 5-year active duty obligation, while those who go through ROTC or who are commissioned after a shorter training period have 3 or 4 years of obligation.

²³ Prior to commissioning into the active duty Army, officers receive assignments to one of sixteen military occupations such as engineers, infantry, or transportation and a duty assignment at one of the dozens of Army installations throughout the world. See Appendix 1 for a complete list of military occupations.

Our identification strategy turns on the assumption that the Army assigns young officers to units, and hence their commanders/mentors, without considering the quality of either protégé or mentor. Junior mentors in our data are company commanders who have yet to appear before the critical promotion board when they serve as immediate supervisors to our protégés. Therefore, there is minimal concern that specific protégés are placed with high-performing junior mentors, as these mentors do not even have the designation as high-performing at the time of assignment. The senior mentors (battalion commanders) have gone through the board and have already been designated as high-performing or not. However, the assignment convention – described in the introduction and characterized in official doctrine as “needs of the Army” – supports our claim that the Army assigns young officers (protégés) to units and their associated mentors without regard to mentor performance. This assignment mechanism ensures that junior mentors and senior mentors are assigned to units based on these same institutional needs, without regard for the performance potential of the protégés who they will command immediately or in the future. To further bolster this claim, we provide additional empirical evidence in the next two sections.

3. Data

The administrative data for our study come from the Office of Economic and Manpower Analysis at West Point, NY. Protégés in our data are male lieutenants commissioned into the active duty Army between 1994 and 2005 who served as platoon leaders at any time between fiscal years 1998 and 2008.²⁴ We link protégés to their junior and seniors mentor through annual

²⁴ We restrict our sample of protégés to male officers in one of the 14 military occupations other than Aviation and Medical Services as these branches have longer initial service obligations.

Army officer evaluation reports. On average, young officers serve in platoon leader positions as protégés for just under 14 months.

Table 1 contains summary statistics for all junior and senior mentors in the Army during our sample time period. Using the Army’s personnel database, we selected all variables potentially related to the characteristics of a mentor that could affect the protégé’s decision to stay in the Army: race, SAT score, admissions selectivity of undergraduate institution,²⁵ and source of commission. We provide summary statistics for the universe of possible company and battalion commanders at the time of our study in column 1 of each panel. Column 2 contains summary statistics for the sample of actual commanders who serve as junior and senior mentors in our sample in panels A and B, respectively.²⁶ As a first step in demonstrating that Army human resource managers are not assigning junior and senior mentors based on available demographic data, we can compare columns 1 and 2 in each panel. Comparisons reveal very similar underlying distributions, suggesting that the sample of mentors in our study reflects the larger underlying population of potential mentors.

Note that approximately 10 percent of junior mentors are deemed “high-performing,” whereas nearly 30 percent of senior mentors receive this designation. Recall that junior mentors have not gone through the promotion board process at the time of mentoring, so the 10 percent represents the share of officers who will eventually appear before a promotion board and be

²⁵ Admissions selectivity is characterized by a college’s Peterson ranking, taken from Peterson’s annual Undergraduate Databases. Appendix 1 provides a complete description of this measure.

²⁶ A small proportion of the sample has missing information for control variables such as race, commissioning source, undergraduate institution, and disposition of mentor promotion to major. Incomplete and missing information on command dates and the identity of an officer’s rater on officer evaluation reports made it impossible to link a small number of protégés to their mentors. Officers for whom these variables are missing look similar to officers in our sample on available observable characteristics. We outline the sample selection in detail in Appendix 1.

selected early for promotion; meanwhile, senior mentors have already gone through the promotion board. This three-fold increase between junior and senior mentors reflects the increased likelihood of receiving high-ranking positions in which to serve as mentors by virtue of being designated as a high-performing officer at the major promotion board.²⁷

Shifting to protégés, the object of our study, Table 2 contains summary statistics for the young officers who the Army assigns to junior and senior mentors through the process described above. Panel A describes protégés, with column 1 containing the population of all protégés and column 2 containing protégés who could be linked successfully to their mentors using evaluation report data. As with the mentors, our sample is representative of the underlying population of potential protégés.²⁸ Panel B divides the protégés by whether they ever had a high-performing junior mentor, and panel C contains the same statistics for having a high-performing senior mentor. Comparisons of columns 1 and 2 in both panels B and C show nearly identical summary statistics across all of the potential determinants of retention behavior that are available in Army administrative data. The similarity across samples is yet another piece of evidence reinforcing our claim that the Army assigns protégés to mentors without regard for other observable potential determinants of protégé retention.

4. Empirical Framework

Our empirical methodology is similar to Lyle and Smith (2014), where we estimate a linear probability model with the following structure:

$$Y_i = \alpha + \delta \cdot M_i + \beta \cdot X_i + \theta_{1994-2005} + \lambda_{Branch} + \eta_{SOC} + \varepsilon_i. \quad (1)$$

²⁷ Additionally, officers promoted early to the rank of major have higher subsequent retention rates and officers serving as battalion commanders at any given time are drawn from more than one officer cohort.

²⁸ Sample selection is described in more detail in Appendix 1. Here again, missing variables for our protégés appears to be missing at random.

The left-hand side variable, Y_i , is a binary variable that equals 1 if a young officer (protégé) remains in the Army through eight years of service.²⁹ The estimate of δ , on the variable of interest, M_i , represents the effect of: ever having a high-performing mentor; the amount of time with a high-performing mentor; or ever having a mentor of the same type. X_i represents control variables that account for race, marital status, SAT score quartiles, college admissions selectivity, unit type, and cumulative deployment time at three years of service. Each of these variables is a potential determinant of retention behavior. $\theta_{1994-2005}$ represents a set of year group controls to account for any cohort-specific effects, to include idiosyncrasies of the promotion boards over time that may affect mentors differentially. λ_{Branch} includes controls for military occupations, to account for any differences in management of protégés by occupation. Finally, η_{SOC} are a set of controls for the source of officer commission. A protégé's commissioning year, commission source, and military occupation are included as controls in all of our specifications.

Our identification strategy provides a great deal of confidence that we can interpret our reduced form estimates of δ as causal. Our discussion of the assignment mechanism, as well as the summary statistics discussed in Tables 1 and 2, provide initial evidence for this claim. To further support our argument that protégés are not assigned to high-performing mentors based on characteristics that are related to their retention likelihood, we provide additional evidence in Appendix Table 1. The specification in column 1 in each panel is a regression of mentor quality (1 equals a protégé who is assigned to a high-performing mentor) on controls for commissioning year, commission source, and military occupation. These basic structural controls account for

²⁹ The eight year mark is convenient because after eight years on active duty, the officer protégés in our sample have completed their initial service obligation and are choosing to stay in the Army.

about 1 to 5 percent of the variation in mentor quality, depending on the definition of mentor quality as defined in the panel headings. Column 2 contains estimates from a regression of mentor quality on both structural and observable demographic controls. Human resource managers could theoretically use these observable controls to assign mentors, and these observables could also be correlated with determinants of an officer's retention decision. These additional observable controls explain less than one percent of the total variation in mentor quality, as seen by the change in the R^2 , which bolsters our identifying assumption that the Army assigns protégés to mentors without regard for protégé or mentor characteristics potentially correlated with protégé retention.

To further strengthen our causality claim, we include all available data that the Army could use to make protégé-mentor assignments in the full retention specifications reported in Tables 3-6. In keeping with the approach described in Altonji *et al.* (2005) and Oster (2014), we will also evaluate the stability of our estimate of δ along with changes in R^2 as we sequentially add additional controls in Table 3.

5. Empirical Results

Table 3 presents results from estimating our main retention specifications.³⁰ There are three panels that differ by a protégé's exposure to high-performing mentors at varying levels. Panel A reports estimates for protégés who ever served under a high-performing junior mentor, panel B reports estimates for protégés who ever served under a high-performing senior mentor, and panel C contains estimates for those protégés who ever served under both. About 15 percent

³⁰ Appendix Table 2 confirms these results by estimating the retention specifications using a probit model. Probit marginal effects are almost identical to the linear probability model coefficients reported in Table 3.

of our sample had a high-performing junior mentor, 43 percent had a high-performing senior mentor, and 7 percent had both.

The three specifications in each panel reflect a gradual inclusion of control variables as noted below each estimate. The first three columns within each panel contain estimates from a regression where M_i is a dichotomous variable and a 1 reflects a protégé who had a high-performing mentor. The stability across estimates as we add additional controls provides further evidence for our identification assumption, suggesting that there are likely few unobservable variables that are both correlated with mentor quality and retention behavior of young officers.³¹ Estimates in column 4 are from a separate regression where M_i is a measure of mentorship duration: months spent serving under a high-performing mentor. Finally, column 5 allows the impact of mentorship duration to vary nonlinearly and includes indicators for time served under a high-performing mentor (6-12 months and greater than 12 months are the included categories).

Our estimates in the first row of panel A indicate that young officers who ever serve under a high-performing junior mentor are around 2.52 percentage points (5.1 percent) more likely to remain in the Army through eight years of service relative to a young officer who never has a high-performing junior mentor. Conditional on ever serving under a high-performing junior mentor, the average duration of this mentor relationship is approximately 10.5 months. Column 4 shows that an additional year spent with a high-performing junior mentor increases the

³¹ We also run a test to consider coefficient stability as outlined in Oster (2014), which accounts for how much of the unobservable variation is explained by the observable characteristics using conservative estimates of the max R^2 of 1, 0.5, and 0.08. For each of these max R^2 thresholds, we get greater bounded coefficients than reported for having a junior mentor who is high performing or having a junior and senior mentor that is high performing. When having a senior mentor that is high-performing, however, our bounded coefficients are lower and negative (-0.061 and -0.0159) when using extremely conservative max R^2 s of 1 and 0.5 but positive (0.022) when using a max R^2 of 0.08 (roughly $1.3 * R^2$).

likelihood the protégé remains on active duty through 8 years of service by nearly 2.2 percentage points (0.0018×12 months). Results reported in Column 5 suggest that there is not much additional impact of spending over a year, versus 6-12 months, with a high-performing junior mentor.

Interestingly, as reported in Panel B, the effect of having a high-performing senior mentor is similar to that of a junior mentor. Protégés who ever have a high-performing senior mentor are 2.33 percentage points (4.8 percent) more likely to remain through 8 years of service. Months spent with a high-performing senior mentor also have a similar effect: an additional year with such a senior mentor increases the likelihood of remaining through 8 years of service by slightly more than 2 percentage points. Column 5 results indicate that spending more than 12 months with a high-performing senior mentor increases protégé retention by nearly 3 percentage points.³²

Panel C focuses on protégés who have experienced both high-performing junior and senior mentors. Recall that only about 7 percent of protégés have this level of access to high-performing mentors. Nevertheless, the effects of having access to both is 4.6 percentage points, nearly equal to the effect of a junior mentor (2.52) plus the effect of a senior mentor (2.33). In addition to being interesting in its own right, this result also provides additional evidence for our identification assumption: There appears to be no effort on the Army's part to assign protégés to junior mentors who share similar traits with senior mentors, as these results would be the same.

To better understand which types of officers are most likely influenced by high-performing mentors, Table 4 conditions our sample of young officer protégés by race (whites

³² Conditional on ever serving under a high-performing senior mentor, the average duration of this mentor relationship is approximately 12 months.

and non-whites) and by pre-service achievement (bottom- and top-halves of SAT distribution). We again run our regressions for protégés having a high-performing junior mentor, senior mentor, or both. Column 1 includes our main results from Table 3, while column 4 estimates the same specification but drops officers with a missing SAT score.³³

Non-white protégés (column 3) exhibit retention increases slightly smaller than whites (column 2) when having either a high-performing junior or senior mentor, but the results are not statistically significant. When splitting the sample by protégé SAT score, protégés in the top half of the SAT distribution exhibit a differential retention effect from serving under a high-performing senior mentor (panels B and C of column 6). Protégés with SAT scores in the top half are 7.11 percentage points (17%) more likely to stay in the Army when they have both a high-performing junior and senior mentor. The same is not true for protégés in the lower half. In fact, even for those with both a high-performing junior and senior mentor, there is less than a 1.2 percentage point increase and it is not statistically significant. This result suggests that for young officers with high SAT scores (a group that has lower retention rates), pairing with a high-performing mentor is especially important.

As discussed in the introduction, type-based mentoring has received considerable attention in the literature. Individuals who have mentors who are “like them” and who they see as successful in the organization may be more likely to stay and perform well because they see it is possible for someone “like them” to succeed. Table 5 contains estimates from specifications similar to equation 1 where the variable of interest, M_i , is a dummy variable for whether the protégé had the same demographic characteristic as the mentor, by race (columns 1 and 2), by position in the SAT score distribution (columns 3 and 4), by home state (column 5), by home

³³ In our main results, we include indicators if a protégé has a missing SAT score.

Census division (column 6), and by graduation from the United States Military Academy (column 7). For example, column 2 of Panel A shows the effect of a non-white protégé having a non-white junior mentor on the likelihood of staying in the Army.³⁴ The effect is positive, although not statistically significant. All of the estimated retention impacts in Panel A are small, and only one (matching by home Census division) is statistically significant. We find no robust evidence that having a mentor, either junior or senior, who has similar race, SAT scores, home state or division, or same college influences protégé retention.

As a final consideration, in Table 6 we investigate whether there is a differential effect of type-matched mentoring on protégé retention when the mentor is designated as a high-performer. Specifically, M_i is a dummy variable for whether the protégé had both the same demographic characteristic as the mentor (same groups as Table 5) *and* is high-performing. While we find statistical significance for a few groups, we first focus our attention on columns 1 and 4 where a meaningful number of people have high-performing mentors of the same characteristic. In column 1 of all three panels we focus on white protégés and we find similar results to our main sample in Table 3, which is not surprising since around 80% of both protégés and mentors are white. In column 4 we find that having a junior mentor in the top half of the SAT distribution who is also high-performing leads to a large and significant increase in retention of 8.16 percentage points (19.25 percent) for protégés who are also in the top half of the SAT

³⁴ For minorities, matching of a non-white protégé with a non-white mentor may fail to capture a true type-matching effect, so we conditioned our sample to look at actual type-matching by race, e.g. an African-American protégé whose mentor(s) is (are) also African-American. We find small negative effects (statistically insignificant) on retention for African-American protégés whose mentors were also African-American. Hispanics with same-race junior or senior mentors are more likely to retain, although only the senior mentor effect is statistically significant. More generally, conditioning on type-matching by minority race results in small numbers of protégé-mentor matches, with a resultant increase in the standard errors on point estimates.

distribution. This result suggests that protégés who have a mentor of similar achievement who is subsequently designated by the Army as a high performer are more likely to stay in the Army.

We find a smaller effect for senior mentors and an additive effect when someone with a high SAT score has both junior and senior mentors with high achievement and high performance.

In column 2, we find a negative effect of having a high-performing non-white mentor for non-whites, and this result is statistically significant for senior mentors. This result is counter to the theoretical literature (Athey *et al.* 2000 and Chung 2000) that having a same-race mentor will improve some outcome of interest (performance, promotion, career choice) for minorities, as well as the substantial empirical literature on the impact of same-sex and same-race teachers on K-12 academic achievement (Dee 2004 and Dee 2007).³⁵ Some experimental and survey research on the effect of type-matching on promotion for women, however, finds negative effects (Duguid 2011). Explanations for this behavior include: fear that a highly-qualified protégé of the same minority group might be viewed as more competent or accepted (the Queen Bee syndrome); concern that advocating for a subordinate of the same minority group might reinforce negative stereotypes of that group; or concern that advocating for a subordinate of the same minority group might be perceived as favoritism (Duguid *et al.* 2010).³⁶ We caution against putting too much focus on this result given the small sample of non-whites with a non-white mentor who is high-performing and because we include blacks, Hispanics, Asians, and other

³⁵ Klopfenstein (2005) finds that an increasing proportion of black math teachers in high school geometry courses positively impacts the likelihood black students enroll in follow-on “rigorous” math courses, but this type-matching effect only holds for opposite-sex student-teacher matches.

³⁶ Empirical evidence from outside the workplace finds minorities are “less forgiving” toward other minorities. A 2003 analysis of more than 20,000 written warnings and speeding tickets issued by Boston police found that minority officers were less lenient – issuing fewer warnings to drivers of all races – while also issuing a much higher proportion of tickets to non-white vs. white drivers than their white counterparts. These findings held across vastly different racial compositions of neighborhoods patrolled by officers. (Latour and Dedman 2003)

racers in this category. When we run this result for just blacks (not shown), we get a statistically insignificant negative result, with an ever smaller percentage of the population receiving this treatment. Sample sizes are too small to run similar tests with Hispanics.

Column 3 shows no significant retention effects for those in the lower half of the SAT distribution. Those with junior or senior mentors from the same home state or Census division who are also high-performing are more likely to retain in the Army, although the results are only statistically significant for those from the same division. The large negative retention impact for protégés who are type-matched with both their junior and senior mentors on home state (panel C, column 5) is likely an artifact of the extremely small sample – two people. Finally, protégés from the United States Military Academy with a mentor who is also an Academy graduate and is high-performing are significantly more likely to retain.

Taken together, these results are consistent with a richer characterization of successful mentors than our one-dimensional description of a “high-performing” mentor. These results hold when splitting the sample by race and achievement (SAT score). Generally, we find no effects of type-matched mentoring. In fact, the only evidence for a type-matched mentorship impact on retention occurs when protégé and mentor share high SAT scores, home division, or have the United States Military Academy as their commissioning source *and* have a mentor designated as high-performing.

To account for the fact that individuals with the same mentors share similar experiences, we further cluster our standard errors at the mentor level. To do this, we create unique combinations of junior mentors, senior mentors, and junior and senior mentors for each of our estimation strategies. Appendix 1 contains a complete description of our construction of these unique mentor clusters. In Appendix Table 3, we include results with robust standard errors

(originally reported in Table 3), as well as clustered standard errors. As is apparent, the clustered errors are only slightly larger than the previous reported standard errors and do not change the significance of any of the results.

While we find significant positive effects of mentorship on retention for young officers when they are first learning about the profession of arms (and their match quality with an Army career), we next estimate mentor effects for a group of longer-serving officers who might also be positively affected by the mentorship of their supervisor. For this analysis, we designate as protégés the population of captains (junior mentors) in the previous sample and the mentors to be the battalion commanders (senior mentors previously). The captains in this sample interact with their battalion commander supervisor frequently and are rated (evaluated) annually by this same individual. We again measure the effect of having a high-performing supervisor on retention in the Army, although we look at the effect on retention at 12 years of service, rather than eight.³⁷

In Appendix Table 4, we report summary statistics for these captains we now designate as protégés. Panel A includes all captains who were in the previous analysis, with summary statistics reported separately by whether they served under a high-performing mentor (battalion commander). In Panel B, we drop those captains for whom we are missing retention to 12 years of service. We also condition our sample of captains to include only those who had four to eight years of Army service when they appeared in our original sample and served as junior mentors. In Panel C, we further restrict the sample to only male captains. Across all three samples, individual characteristics are very similar, although those with high-performing mentors are more likely to have been promoted early to major and be in divisional units. The similarity of

³⁷ Recall that to be in the original junior mentor sample, captains had to remain in the Army long enough to be considered for early promotion to major.

the sample again suggests that, as was the case for junior protégés, these captains are not paired with their mentor based on individual characteristics. In unreported results, we also run a similar covariate regression as done in Appendix Table 1. The p-value on the F-statistic measuring the joint significance of the non-structural control variables was 0.30 for the sample of captains and 0.32 when we restrict to only male captains, suggesting that observable characteristics (race, SAT, school competitiveness, and unit type) do not predict whether a protégé was assigned a high-performing mentor.

Table 7, Panel A reports the effect of having a high-performing mentor on captain retention, analogous to our results in Table 3. In column 1, we include only our structural controls: commissioning source, commissioning year, and military occupation. In column 2, we add in demographic, undergraduate college selectivity, and unit controls. In column 3, we include a dummy for whether the captain (the protégé in this sample) was subsequently promoted early to the rank of major. We do the same in columns 4 through 6, but we restrict the protégé sample to men only, as we did in the previous analysis. All these results together consistently show that having a high-performing mentor – even for more experienced employees – improves retention by around 2.2 to 2.5 percentage points (2.5 to 2.8 percent).

Panel B restricts the sample by race and SAT categories, as done in Table 4. Once again, there is a differential effect of high-performing mentors on protégés with high SAT scores: a statistically significant 4.65 percentage point increase in retention compared to a one percentage point increase for low SAT protégés. In unreported results, we also run the regressions for mentors of the same type and mentors of the same type who are also high-performing. Except for whites with high-performing white mentors, we do not find any statistically significant retention effects for specifications that focus on type-matched protégé-mentor relationships, with

or without regard for whether the mentor is high-performing. These results again show that assigning an individual to a high-performing mentor, regardless of initial tenure in the Army, increases retention rates.

7. Implications and Conclusions

Mentors impact their protégés through a wide range of behaviors, from human capital development to provision of career advice to aligning individual values with organizational values. Mentor-protégé relationships also differ in duration, frequency of contact, and most important, efficacy. Defining who is a mentor and precisely what constitutes mentorship is challenging, as is identifying the mechanisms through which mentors impact their protégés. We have defined mentors the way the Army does: officers who are in supervisory roles to the protégé. We further define a “good mentor” as an officer the Army designated as an exceptional performer based on its decision to grant the officer early promotion to the rank of major.

Our paper establishes that protégés are not assigned to their mentor(s) based on characteristics which could be related to the performance potential of the protégé. We employ an identification strategy similar to one used by Lyle and Smith (2014) in investigating the impact of high-performing mentors on the likelihood protégés subsequently earn early promotion. They find that protégés serving under a high-performing mentor are nearly 30 percent more likely to be promoted early, that these mentor effects are increasing in the duration of the relationship, and are strongest for high-achievement (high SAT score) protégés. Their findings are broadly consistent with several alternative (and not mutually exclusive) pathways through which mentorship effects may be operating: human capital development, signaling, access to the mentor’s network, preferential treatment, role modeling, and value shaping.

Our paper differs in several important dimensions. First, while that paper focuses on performance outcomes which are hard to measure clearly, we focus on a choice made by the protégé – the decision to stay in the Army. Second, the retention decision we observe occurs before any early promotion decisions are made, thus it cannot be that the protégé is riding on the coattails of the mentor(s). Finally, we break the mentorship effects into those by high-performing junior and senior mentors, a measure not previously explored.

We find that serving under a high-performing mentor substantially increases retention: protégés who had a high-performing junior mentor were 5.1 percent more likely to remain in the Army at 8 years of service; protégés with a high-performing senior mentor were 4.8 percent more likely to remain; and for protégés with both high-performing junior and senior mentors, the increase in retention was nearly additive (+9.29 percent). High-performing senior mentors had a differential impact on retention of high SAT protégés, increasing retention by 7.9 percent. For high SAT protégés with both high-performing junior and senior mentors, the increase in retention was even more pronounced, nearly 17 percent.

Unlike some of the recent literature on type-matched mentoring by race in college continuation and course performance (Fairlie *et al.* (2014); Lusher *et al.* 2015), we find no evidence of type-matched mentoring by race impacting officer retention. This is important for the Army as it strives to increase racial diversity in its officer corps, as meeting this goal may not necessitate race-based mentor assignments. In fact, we find no evidence of type-matched mentoring based on any characteristic other than home division of residence. When we control for type-matched mentoring and serving under a high-performing mentor, we find robust evidence that retention for high SAT protégés increases substantially when they serve under high SAT mentors who the Army has designated as high performers: eight-year retention gains are

19.25 percent for junior mentors; 9.6 percent for senior mentors; and a more than additive 32.04 percent for both junior and senior mentors.

Increased retention related to high-performing mentors may be occurring through a number of different pathways, including institution-specific human capital formation, role model effects, and networking. High-performing mentors may be more effective in developing institution-specific human capital in their protégés. With greater Army-specific capital, a protégé's value from staying in the Army is higher, reducing the likelihood that they leave. Additionally, mentors designated as high-performing by the Army have demonstrated their ability and desire to succeed in the organization. These mentors may be more likely to be positive role models and inspire their protégé to remain in the Army. Finally, protégés with high-performing mentors may believe that they can ride on the coattails of their mentor or be in the same network as their mentor, thus increasing the *perceived* likelihood that they will be promoted earlier themselves or will be placed in high demand jobs. Our findings that high-performing mentors have the most pronounced retention impact for high SAT protégés (who likely have the most attractive outside options) and that retention effects are increasing with the duration of the mentor relationship are consistent with each of these pathways.

Although it is important to interpret our findings within the unique context of the Army's officer corps, private firms are not exempt from similar issues. High-achieving college graduates face pressure to advance their careers through internal promotion, accepting outside employment offers, or furthering their education. Pairing employees with high-performing supervisors is a fruitful way to incentivize retention for individuals with high potential.

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Appendix 1

Sample Qualification Rules

Between 1994 and 2005, the United States Military Academy (USMA) produced roughly 17 percent of officers commissioned into the active duty Army. The Reserve Officer Training Corps (ROTC) offered programs at more than 270 colleges and universities and produced roughly 56 percent. Some ROTC cadets receive no scholarship support from the Army and are referred to as ROTC non-scholars. All other ROTC cadets receive scholarships covering from 2 to 4 years, with 4-year scholarships being the most competitive. The remaining 27 percent of active duty officers commissioned into the Army during this time include: Officer Candidate School (OCS), roughly 11.5 percent; direct commissions, roughly 7 percent; or other sources, 8.5 percent. Officers commissioned through OCS are disproportionately former enlisted personnel with 10 or more years of active duty service, so they are typically older and have lower educational attainment than officers from other commissioning sources. Officers receiving direct commissions are health care professionals, lawyers, and chaplains; they enter the Army with advanced rank (first lieutenant or captain) and are subject to different active duty service

obligations and promotion timetables. As a result, we drop all OCS, direct commission and other source of commission officers from our sample of protégés.

Within the combat arms branches, women are restricted from serving in certain occupations and positions. As a result, we restrict our sample of protégés to include only male officers.

Officers in the Army initially serve in one of sixteen occupational branches: Air Defense Artillery, Adjutant General, Armor, Aviation, Chemical Corps, Engineers, Field Artillery, Finance, Infantry, Military Intelligence, Military Police, Medical Services, Ordnance, Quartermaster, Signal Corps, and Transportation Corps. We exclude officers in the Aviation and Medical Services branches from our analysis as they have longer initial active duty service obligations.

We further condition our sample on officers who have complete information on both time serving as a platoon leader and junior and senior mentor quality. Column 1 of Table 2 reports summary statistics for the 19,774 male officers who were commissioned from USMA or ROTC. For roughly 25 percent of our column 1 officers, we: have incomplete information on an individual's unit (198 observations); are unable to link platoon leader protégés to their company commander (junior) and battalion commander (senior) mentor (1,043 observations); are missing the race of the mentors (33); or we are missing mentors' high-performance indicator (early promotion to major) (3,740). For 1,842 of these observations, the performance indicator is missing because the junior mentor did not remain in the army long enough to be considered for early promotion to major. Our final sample consists of 14,760 lieutenants who served as platoon leaders and could be linked to their company and battalion commanders. As columns 1 and 2 of

Table 2 demonstrate, our selected sample of lieutenant protégés is comparable to the pool of lieutenants from which it is drawn on all observables.

Control Variable Descriptions

Married: We coded Lieutenants (protégés) as married if they were ever married during their first three years in service.

SAT: We include SAT quartiles in the regressions as controls. As shown in Tables 1 and 2, a large percentage of officers have missing SAT scores. While SAT scores are recorded for all individuals attending the United States Military Academy and most with ROTC 3-4 year scholarships, they are not always recorded for other sources of commission, 2 year ROTC scholars and ROTC non-scholars. Officers who reported ACT scores have this score converted to an SAT score using a concordance table. (Schneider and Dorans 1999)

Undergraduate Admissions Selectivity: We use *Peterson's Annual Guides to Undergraduate Study: Four-Year Colleges* from 1983-1984 to 2004-2005 to control for the admissions selectivity of the college from which an officer graduated. Those mentors commissioned prior to 1984 are assigned the 1983-1984 Peterson ranking. The admissions selectivity categories are defined as follows: Noncompetitive (virtually all accepted), Minimally Difficult (95% or more accepted), Moderately Difficult (85% or fewer applicants accepted), Very Difficult (60% or fewer applicants accepted), and Most Difficult (30% or fewer applicants accepted). USMA graduates are in the Most Difficult category.

Source of Commission: In each regression we include controls for those who graduate from USMA, those with a 3-4 year ROTC scholarship, those with a 2 year ROTC scholarship, and those with no scholarship but who participated in the ROTC commissioning program (ROTC non-scholars).

Deployment Time: Months deployed is calculated at 3 years of service and measures the cumulative time officers have served in a combat zone since receiving their commission.

Commissioning Year: Since the Army manages officers by cohort, we include controls for the year in which a lieutenant was commissioned. Lieutenants in our sample were commissioned in the calendar years 1994 through 2005, and served as platoon leaders at some time between fiscal years 1998 and 2008.

Military Occupation: We include branch controls as listed in the Sample Qualification section.

Unit: Our unit controls are based on 5-digit Troop Program Sequence Numbers (TPSNs), from which we construct indicators for divisional units (e.g. First Armored Division, Fourth Infantry Division) and non-divisional combat units (e.g. 173rd Airborne Brigade, 3rd Armored Cavalry Regiment).³⁸ Lieutenants who are about to become platoon leaders are assigned to a particular post, and then assigned to a unit at that post. Within that unit, they are assigned to a brigade, battalion, and company, and then placed in charge of a particular platoon.

Home State: Army administrative data lists an officer's home of record state, typically the state in which they pay income taxes as a resident. We classified anyone not from one of the 50 states (or DC) into their own category. The U.S. Census Bureau classifies states (and DC) into nine Census divisions as follows:

Northeast

1. New England: Maine, Vermont, New Hampshire, Massachusetts, Connecticut, Rhode Island
2. Middle Atlantic: New York, Pennsylvania, and New Jersey.

South

³⁸ For further information on Troop Program Sequence Numbers, see Army Regulation 25-70 (2000).

3. South Atlantic: Maryland, Delaware, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida District of Columbia
4. East South Central: Kentucky, Alabama, Mississippi, Tennessee
5. West South Central: Arkansas, Louisiana, Texas, and Oklahoma.

Midwest

6. East North Central: Ohio, Michigan, Indiana, Illinois, Wisconsin
7. West North Central: Minnesota, Iowa, Missouri, Kansas, Nebraska, South Dakota, and North Dakota.

West

8. Mountain: Montana, Wyoming, Colorado, New Mexico, Arizona, Utah, Idaho, Nevada
9. Pacific: California, Oregon, Washington, Alaska, and Hawaii.

Correcting Standard Errors for Clustering by Mentor

Protégés could share the same set of junior and senior mentors, so we may be concerned about correlated shocks across protégés which robust standard errors would not correct. In Appendix Table 3 we report results where we cluster standard errors at the junior (panel A), senior (panel B), and junior and senior (panel C) levels. For example: if two protégés each had the same two junior mentors (regardless of duration spent with each), they would be in the same cluster; if a protégé only had one junior mentor, then he/she would only be in a cluster with those who also only had that same junior mentor; and so on. The same would be true for senior mentors. We depict this relationship in Figure A1. For panel C, we create clusters for unique junior and senior combinations. Again, we ignore duration spent with each mentor, but cluster based on common mentor groups. We depict this relationship in Figure A2.

Figure A1: Clustering Groups for Junior or Senior Mentors

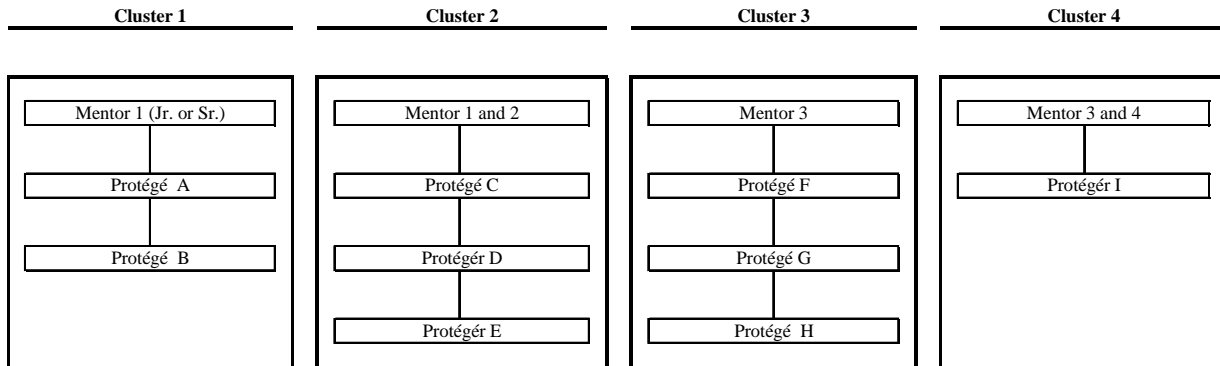


Figure A2: Clustering Groups for Junior and Senior Mentors

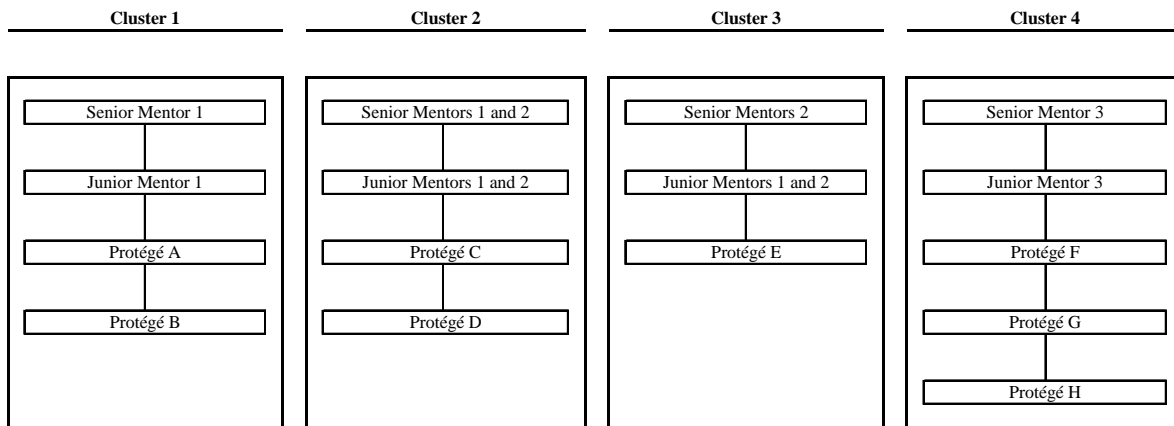


Figure 1. Mentor Structure within the Army

Senior Mentor
Oversees: 400 Enlisted Personnel & 16 Officers

Junior Mentor
Oversees: 100 Enlisted Personnel & 3 Officers

Protégé
Oversees: 30 Enlisted Personnel

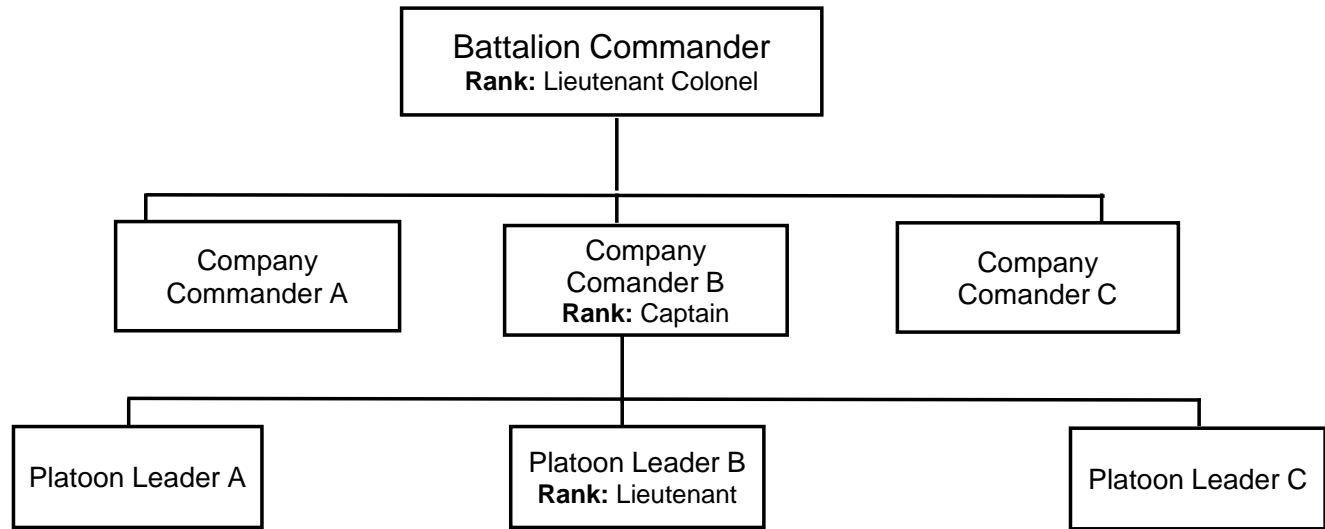


Table 1: Summary Statistics on Mentors

	Panel A: Junior Mentors		Panel B: Senior Mentors	
	(1) All Possible	(2) Sample	(1) All Possible	(2) Sample
Officer Performance				
High-Performing (Early Promotion)	9.7%	10.2%	27.7%	31.2%
Race				
White	78.3%	78.2%	84.4%	84.2%
Non-White	21.7%	21.8%	15.6%	15.8%
Previous Achievement Score (SAT)				
SAT	1121.0 (175.8)	1115.5 (177.6)	1135.8 (209.3)	1151.6 (794.0)
Missing SAT	38.9%	33.3%	70.7%	67.7%
College Admissions Selectivity				
Non-Competitive	4.4%	4.4%	5.0%	4.6%
Minimal	8.4%	9.0%	9.2%	9.3%
Moderate	53.7%	53.9%	50.4%	49.9%
Very/Most Difficult	30.4%	30.3%	31.3%	34.1%
Missing	3.0%	2.4%	4.1%	2.2%
Commissioning Source				
United States Military Academy	20.6%	20.6%	21.0%	24.3%
ROTC scholar	36.9%	34.9%	36.5%	35.6%
ROTC non-scholar	30.0%	32.0%	31.0%	30.6%
Other Source of Commission	12.5%	12.6%	11.5%	9.5%
N	14,369	7,868	3,874	2,455

NOTE. – Panel A, col. 1 reports summary statistics for the population of all captains who served as company commanders at any time during 1998-2008. Column 2 of Panel A reports summary statistics for our selected sample of captains – company commanders who served as a junior mentor to at least one of the lieutenant protégés in our study. Panel B, col. 1 reports summary statistics for the population of all lieutenant colonels who served as battalion commanders at any time during 1998-2008. Column 2 of Panel B reports summary statistics for our selected sample of lieutenant colonels – battalion commanders who served as a senior mentor to at least one of the lieutenant protégés in our study. We define a high-performing officer as one who was promoted early to the rank of major. SAT scores were not systematically collected across all commissioning sources prior to the 1990s, which explains the incidence of missing SAT scores the mentors in our sample. College admissions selectivity measures are taken from Peterson’s Undergraduate Databases, 1983-84 through 2007-2008. Sources of commission include: United States Military Academy (USMA), Reserve Officer Training Corps (ROTC), and other commission sources such as Officer Candidate School. Refer to Appendix 1 for a complete discussion of variable descriptions. Standard deviations of continuous variables are in parentheses.

Table 2: Summary Statistics for Protégés

	Panel A: Protégés		Panel B: Protégés with High-Performing Junior Mentor		Panel C: Protégés with High-Performing Senior Mentor	
	(1) Possible	(2) Sample	(1) No	(2) Yes	(1) No	(2) Yes
Retention						
Retention at 8 YOS	49.9%	49.9%	49.4%	52.7%	48.5%	51.7%
Race						
White	77.9%	78.3%	78.0%	80.4%	77.4%	79.5%
Non-White	22.1%	21.7%	22.0%	19.6%	22.6%	20.5%
Marital Status						
Ever Married at 3 Years of Service	44.4%	44.5%	44.7%	43.4%	44.9%	43.9%
Previous Achievement Score (SAT)						
SAT	1168.3 (158.9)	1168.1 (159.6)	1166.4 (160.3)	1177.3 (155.1)	1167.3 (159.1)	1169.1 (160.2)
Missing SAT	27.8%	27.3%	27.5%	26.3%	28.8%	25.4%
College Admissions Selectivity						
Non-Competitive	3.0%	2.9%	3.0%	2.5%	3.2%	2.5%
Minimal	5.0%	4.8%	4.9%	4.1%	4.9%	4.7%
Moderate	51.6%	51.5%	51.6%	51.2%	52.1%	50.7%
Very/Most Difficult	38.8%	39.1%	38.8%	40.8%	37.9%	40.7%
Missing	1.7%	1.6%	1.7%	1.3%	1.8%	1.3%
Commissioning Source						
USMA	25.9%	26.2%	25.9%	28.2%	24.6%	28.4%
ROTC 3-4 Year Scholar	30.2%	29.7%	29.6%	30.4%	30.9%	28.1%
ROTC 2 Year Scholar	18.7%	19.1%	19.3%	18.1%	18.8%	19.5%
ROTC Non-Scholar	25.1%	24.9%	25.1%	23.2%	25.5%	24.0%
Deployment and Unit Information						
Months Deployed up to 3 Years of Service	4.9	4.6	4.5	5.3	4.8	4.3
Divisional Unit	67.0%	69.1%	68.7%	71.7%	65.7%	73.8%
Combat Non-Divisional Unit	11.7%	11.7%	11.3%	14.1%	11.1%	12.6%
Other Unit	20.3%	19.1%	20.0%	14.2%	23.2%	13.7%
N	19,774	14,760	12,556	2,204	8,443	6,317

NOTE. – See the note to Table 1 and Appendix 1 for variable descriptions. Panel A, column 1 reports summary statistics for all male lieutenants commissioned through USMA or ROTC, who entered in one of the 14 basic branches without extended initial active duty service obligations, and who served as platoon leaders (protégés) at any time during 1998-2008 and commissioned between 1994 and 2005. Column 2 of Panel A is a subset of column 1, and includes those protégés who had non-missing race information, who could be linked to their junior (company commander) and senior (battalion commander) mentors, and for whom the characterization of the mentors' promotion to major was not-missing. Panel B reports summary statistics by whether the protégé ever served under a high-performing junior mentor (company commander). Panel C reports summary statistics by whether the protégé ever served under a high-performing senior mentor (battalion commander). Cumulative months deployed is measure at 3 years of service. Ever Married at 3 Years of Service indicates someone was married between the time when they started at their first 3 years of service. Unit classifications are derived from Troop Program Sequence Numbers. Standard deviations of continuous variables are in parentheses.

Table 3: Retention at 8 Years of Service

	Panel A. Junior High-Performing Mentor				
Mean Retention without High-Performing Mentor			0.494		
	(1)	(2)	(3)	(4)	(5)
High-Performing Mentor	0.0243*	0.0267*	0.0252*		
	(0.0115)	(0.0113)	(0.0114)		
Months with High-Performing Mentor				0.0018	
				(0.0010)	
6-12 Months with High-Performing Mentor					0.0258
					(0.0142)
12+ Months with High-Performing Mentor					0.0245
					(0.0223)
Demographic and College Admissions Selectivity Controls	NO	YES	YES	YES	YES
Deployment Time and Unit Controls	NO	NO	YES	YES	YES
Observations	14,760	14,760	14,760	14,760	14,760
R-squared	0.0393	0.0606	0.0616	0.0615	0.0616
	Panel B. Senior High-Performing Mentor				
Mean Retention without High-Performing Mentor			0.485		
	(1)	(2)	(3)	(4)	(5)
High-Performing Mentor	0.0253*	0.0259*	0.0233*		
	(0.0084)	(0.0083)	(0.0083)		
Months with High-Performing Mentor				0.0017*	
				(0.0006)	
6-12 Months with High-Performing Mentor					0.0240*
					(0.0102)
12+ Months with High-Performing Mentor					0.0283*
					(0.0118)
Demographic and College Admissions Selectivity Controls	NO	YES	YES	YES	YES
Deployment Time and Unit Controls	NO	NO	YES	YES	YES
Observations	14,760	14,760	14,760	14,760	14,760
R-squared	0.0396	0.0608	0.0618	0.0618	0.0619
	Panel C. Junior and Senior High-Performing Mentor				
Mean Retention without High-Performing Mentor		0.495			
	(1)	(2)	(3)		
High-Performing Mentor	0.0454*	0.0479*	0.0460*		
	(0.0157)	(0.0156)	(0.0156)		
Demographic and College Admissions Selectivity Controls	NO	YES	YES		
Deployment Time and Unit Controls	NO	NO	YES		
Observations	14,760	14,760	14,760		
R-squared	0.0396	0.0608	0.0619		

Note. – Table reports coefficient estimates for our variable of interest (serving under a high-performing mentor) from estimation of our main regression, officer retention at 8 years of service (Equation 1). Within each panel, the variable of interest is specified: first as an indicator for ever served under a high-performing mentor; then as months served under a high performing mentor; and finally as a set of indicator variables for duration served under a high performing mentor. The impact on protégé retention of ever serving under a high-performing junior mentor is reported in Panel A while the effect of serving under a high-performing senior mentor is reported in Panel B. Panel C records the impact on retention of serving under both high-performing junior and senior mentors. All regressions include a constant and controls for military occupation, source of commissioning, and year of commissioning. Additional controls are added to the specifications reported in columns 2 through 5 as indicated. See Tables 1, 2, and Appendix 1 for complete descriptions of sample selection and variables. Robust standard errors are in parentheses. A single asterisk denotes $p < 0.05$

Table 4: Retention at 8 Years of Service, by Race and SAT Score

Panel A. Junior High-Performing Mentor						
	(1)	(2)	(3)	(4)	(5)	(6)
	All	White	Non-White	All, Not Missing SAT	SAT 0-50 Percentile	SAT 50-100 Percentile
Mean Retention without High-Performing Mentor	0.494	0.472	0.572	0.454	0.492	0.420
High-Performing Mentor	0.0252* (0.0114)	0.0256* (0.0127)	0.0239 (0.0254)	0.0206 (0.0133)	0.0178 (0.0195)	0.0202 (0.0181)
Observations	14,760	11,561	3,199	10,725	5,102	5,623
R-squared	0.0616	0.0533	0.0804	0.0579	0.0602	0.0575
Panel B. Senior High-Performing Mentor						
	(1)	(2)	(3)	(4)	(5)	(6)
	All	White	Non-White	All, Not Missing SAT	SAT 0-50 Percentile	SAT 50-100 Percentile
Mean Retention without High-Performing Mentor	0.485	0.462	0.567	0.441	0.485	0.402
High-Performing Mentor	0.0233* (0.0083)	0.0245* (0.0094)	0.0202 (0.0178)	0.0255* (0.0097)	0.0176 (0.0142)	0.0318* (0.0134)
Observations	14,760	11,561	3,199	10,725	5,102	5,623
R-squared	0.0618	0.0535	0.0805	0.0583	0.0603	0.0583
Panel C. Junior and Senior High-Performing Mentor						
	(1)	(2)	(3)	(4)	(5)	(6)
	All	White	Non-White	All, Not Missing SAT	SAT 0-50 Percentile	SAT 50-100 Percentile
Mean Retention without High-Performing Mentor	0.495	0.473	0.575	0.455	0.495	0.419
High-Performing Mentor	0.0460* (0.0156)	0.0532* (0.0174)	0.0175 (0.0355)	0.0456* (0.0179)	0.0117 (0.0263)	0.0711* (0.0243)
Observations	14,760	11,561	3,199	10,725	5,102	5,623
R-squared	0.0619	0.0537	0.0802	0.0582	0.0600	0.0588

Note. – Table reports coefficient estimates for our variable of interest (serving under a high-performing mentor) from estimation of our main regression, officer retention at 8 years of service (Equation 1), estimated over demographic subgroups denoted in columns 2 through 6. The impact on protégé retention of ever serving under a high-performing junior mentor is reported in Panel A while the effect of serving under a high-performing senior mentor is reported in Panel B. Panel C records the impact on retention of serving under both high-performing junior and senior mentors. All regressions include a constant and controls for military occupation, source of commissioning, and year of commissioning, as well as officer demographics, SAT score, college admissions selectivity, cumulative months deployed at 3 years of service, and unit controls. Columns 1-3 include an indicator for officers with missing SAT scores, whereas columns 4-6 are estimated over only those officers with non-missing SAT scores. See Tables 1, 2, and Appendix 1 for complete descriptions of sample selection and variables. Robust standard errors are in parentheses. A single asterisk denotes $p < 0.05$.

Table 5: Retention at 8 Years of Service, Type-Matched Protégé and Mentor

	Panel A. Junior Mentor						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	White	Non-White	SAT below Median	SAT above Median	State	Census Division	USMA Graduate
Mean Retention without Similar Mentor	0.456	0.571	0.484	0.420	0.497	0.492	0.401
Mentor with Same Characteristic	0.0132 (0.0131)	0.0078 (0.0188)	0.0073 (0.0180)	0.0055 (0.0175)	0.0257 (0.0173)	0.0357* (0.0104)	0.0248 (0.0171)
Observations	11,561	3,199	3,101	3,487	14,737	14,737	3,871
R-squared	0.0530	0.0802	0.0643	0.0593	0.0613	0.0619	0.0630
Percent of Population with Mentor of Same Characteristic	86%	29%	55%	62%	6%	18%	34%
	Panel B. Senior Mentor						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	White	Non-White	SAT below Median	SAT above Median	State	Census Division	USMA Graduate
Mean Retention without Similar Mentor	0.487	0.574	0.536	0.384	0.499	0.498	0.416
Mentor with Same Characteristic	-0.0121 (0.0144)	-0.0110 (0.0221)	-0.0508 (0.0276)	0.0245 (0.0248)	-0.0100 (0.0227)	0.0011 (0.0128)	-0.0017 (0.0164)
Observations	11,561	3,199	1,393	1,717	11,187	11,187	3,871
R-squared	0.0530	0.0802	0.0770	0.0638	0.0561	0.0561	0.0625
Percent of Population with Mentor of Same Characteristic	88%	18%	46%	60%	4%	16%	38%
	Panel C. Junior and Senior Mentor						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	White	Non-White	SAT below Median	SAT above Median	State	Census Division	USMA Graduate
Mean Retention without Similar Mentor	0.468	0.571	0.507	0.420	0.498	0.497	0.414
Mentor with Same Characteristic	0.0040 (0.0108)	0.0491 (0.0343)	-0.0566 (0.0430)	-0.0492 (0.0317)	0.1123 (0.0756)	0.0169 (0.0244)	0.0334 (0.0228)
Observations	11,561	3,199	880	1,108	11,187	11,187	3,871
R-squared	0.0529	0.0807	0.0937	0.0892	0.0563	0.0562	0.0630
Percent of Population with Mentor of Same Characteristic	76%	6%	20%	37%	0.4%	4%	14%

Note. – Variable of interest is an indicator for protégé having a mentor with the same characteristic (type-matched protégé and mentor), and empirical models estimate officer retention at 8 years of service. Protégé characteristic on which the sample is conditioned is reported at the top of columns 1 through 7. The impact on protégé retention of ever serving under a junior mentor with the same characteristic is reported in Panel A while the effect of ever serving under a senior mentor with the same characteristic is reported in Panel B. Panel C records the impact on retention of ever serving under both junior and senior mentors with the same characteristic. All regressions include a constant and controls for military occupation, source of commissioning, and year of commissioning, as well as officer demographics, SAT quartiles college admissions selectivity, cumulative months deployed at 3 years of service, and unit controls. The percent of each subsample that is type-matched (protégé and mentor share the same characteristic) is reported below the regression R-squared in each panel. See Tables 1, 2, and Appendix 1 for complete descriptions of sample selection and variables. Robust standard errors are in parentheses. A single asterisk denotes $p < 0.05$.

Table 6: Retention at 8 Years of Service, Type-Matched Protégé and Mentor and High-Performing Mentor

Panel A. Junior High-Performing Mentor							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	White	Non-White	Low SAT	High SAT	State	Census Division	West Point Grad
Mean Retention without Similar Mentor	0.472	0.576	0.490	0.424	0.498	0.497	0.417
Type-Matched and High-Performing	0.0320* (0.0136)	-0.0159 (0.0570)	-0.0284 (0.0392)	0.0816* (0.0271)	0.0699 (0.0511)	0.0867* (0.0275)	0.0604 (0.0325)
Observations	11,561	3,199	3,101	3,487	14,737	14,737	3,871
R-squared	0.0534	0.0801	0.0644	0.0618	0.0613	0.0618	0.0634
Percent of Population with High-Performing Mentor of Same	13%	2%	5%	11%	1%	2%	6%
Panel B. Senior High-Performing Mentor							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	White	Non-White	Low SAT	High SAT	State	Census Division	West Point Grad
Mean Retention without Similar Mentor	0.463	0.578	0.525	0.398	0.498	0.497	0.413
Type-Matched and High-Performing	0.0237* (0.0095)	-0.1009* (0.0443)	-0.0274 (0.0328)	0.0382 (0.0269)	0.0115 (0.0340)	0.0039 (0.0193)	0.0361 (0.0202)
Observations	11,561	3,199	1,393	1,717	11,187	11,187	3,871
R-squared	0.0534	0.0817	0.0752	0.0644	0.0561	0.0561	0.0633
Percent of Population with High-Performing Mentor of Same	40%	4%	22%	30%	2%	6%	19%
Panel C. Junior and Senior High-Performing Mentor							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	White	Non-White	Low SAT	High SAT	State	Census Division	West Point Grad
Mean Retention without Similar Mentor	0.474	0.575	0.495	0.412	0.498	0.498	0.421
Type-Matched and High-Performing	0.0528* (0.0190)	-0.1066 (0.1767)	-0.1789 (0.1407)	0.1320 (0.0745)	-0.4873* (0.0427)	0.0946 (0.1024)	0.1501* (0.0683)
Observations	11,561	3,199	880	1,108	11,187	11,187	3,871
R-squared	0.0536	0.0802	0.0932	0.0894	0.0563	0.0562	0.0637
Percent of Population with High-Performing Mentor of Same	6%	0.2%	1%	4%	0.02%	0.2%	1%

Note. – Variable of interest is an indicator for protégé having a mentor with the same characteristic (type-matched protégé and mentor) who is also high-performing, and empirical models estimate officer retention at 8 years of service. Protégé characteristic on which the sample is conditioned is reported at the top of columns 1 through 7. For example, column 6 reports the impact on protégé retention of ever serving under a junior mentor from the same home of record Census division who is also high-performing. The impact on protégé retention of ever serving under a high-performing junior mentor with the same characteristic is reported in Panel A while the effect of ever serving under a high-performing senior mentor with the same characteristic is reported in Panel B. Panel C records the impact on retention of ever serving under both high-performing junior and senior mentors with the same characteristic. All regressions include a constant and controls for military occupation, source of commissioning, and year of commissioning, as well as officer demographics, SAT quartiles, college admissions selectivity, cumulative months deployed at 3 years of service, and unit controls. The percent of each subsample that is type-matched (protégé and mentor share the same characteristic) and who served under a high-performing mentor is reported below the regression R-squared in each panel. See Tables 1, 2, and Appendix 1 for complete descriptions of sample selection and variables. Robust standard errors are in parentheses. A single asterisk denotes $p < 0.05$.

Table 7: Retention at 12 Years of Service, Junior Mentors

	Panel A. High-Performing Mentor					
	All			Men Only		
	(1)	(2)	(3)	(4)	(5)	(6)
Mean Retention without High-Performing Mentor		0.875			0.880	
High-Performing Mentor	0.0243* (0.0080)	0.0244* (0.0081)	0.0233* (0.0081)	0.0225* (0.0083)	0.0227* (0.0083)	0.0217* (0.0083)
Demographic, College Admissions Selectivity, and Unit Controls Designated as High-Performing	NO	YES	YES	NO	YES	YES
Observations	6,872	6,872	6,872	6,385	6,385	6,385
R-squared	0.0109	0.0125	0.0158	0.0112	0.0132	0.0171
	Panel B. High-Performing Mentor by Demographics					
	(1)	(2)	(3)	(4)	(5)	(6)
	All	White	Non-White	All, Not Missing SAT	SAT 0-50 Percentile	SAT 50-100 Percentile
Mean Retention without High-Performing Mentor	0.875	0.872	0.887	0.868	0.877	0.858
High-Performing Mentor	0.0233* (0.0081)	0.0241* (0.0090)	0.0201 (0.0181)	0.0285* (0.0098)	0.0134 (0.0140)	0.0465* (0.0139)
Demographic, College Admissions Selectivity, and Unit Controls Designated as High-Performing	YES	YES	YES	YES	YES	YES
Observations	6,872	5,357	1,515	4,709	2,338	2,371
R-squared	0.0158	0.0175	0.0381	0.0218	0.0283	0.0356
	Panel C. High-Performing Mentor by Demographics, Only Men					
	(1)	(2)	(3)	(4)	(5)	(6)
	All	White	Non-White	All, Not Missing SAT	SAT 0-50 Percentile	SAT 50-100 Percentile
Mean Retention without High-Performing Mentor	0.880	0.877	0.894	0.872	0.884	0.859
High-Performing Mentor	0.0217* (0.0083)	0.0234* (0.0092)	0.0159 (0.0194)	0.0263* (0.0102)	0.0090 (0.0145)	0.0465* (0.0143)
Demographic, College Admissions Selectivity, and Unit Controls Designated as High-Performing	YES	YES	YES	YES	YES	YES
Observations	6,385	5,069	1,316	4,389	2,145	2,244
R-squared	0.0171	0.0197	0.0410	0.0226	0.0298	0.0364

Note. – Variable of interest is an indicator for whether junior mentor ever served under a high-performing senior mentor, and coefficients are estimated from the main regression specification (Equation 1) in which the outcome of interest is now retention at 12 years of service. All regressions include a constant and controls for military occupation, source of commissioning, and year of commissioning. Additional controls are included as noted. Junior mentors “designated as high-performing” equals 1 for those junior mentors in Table 3 (captain serving as a mentor to their lieutenant protégés) who were subsequently promoted early to the rank of major. In Panel A, Columns 1 through 3 report the impact of ever having a high-performing mentor for our sample of all junior mentors, while columns 4-6 report the same estimates for the subsample of male junior mentors. Panel B reports the impact of serving under a high-performing mentor on junior mentor retention by race (columns 2 and 3) and by position in the distribution of SAT scores for junior mentors with non-missing SAT scores (columns 4 through 6). Panel C replicates the specifications in Panel B, but for male junior mentors only. See Tables 1, 2 and Appendix 1 for complete description of sample selection and variables. Robust standard errors are in parentheses. A single asterisk denotes $p < 0.05$.

Appendix Table 1: Covariate Regression

	Panel A.		Panel B.		Panel C.	
	DV: High-Perf. Jr.		DV: High-Perf Sr.		DV: High-Perf Jr. & Sr.	
	(1)	(2)	(1)	(2)	(1)	(2)
Non-White		-0.0108 (0.0073)		-0.0041 (0.0101)		-0.0039 (0.0053)
Ever Married at 3 YOS		-0.0007 (0.0060)		0.0014 (0.0081)		-0.0020 (0.0044)
SAT Quartile 3		-0.0042 (0.0118)		-0.0116 (0.0160)		-0.0041 (0.0086)
SAT Quartile 2		0.0022 (0.0108)		0.0066 (0.0143)		0.0038 (0.0079)
SAT Quartile 1		0.0011 (0.0099)		-0.0054 (0.0131)		-0.0004 (0.0073)
Missing SAT		0.0034 (0.0132)		-0.0229 (0.0182)		-0.0015 (0.0097)
Peterson Minimum		0.0070 (0.0202)		0.0428 (0.0289)		-0.0010 (0.0145)
Peterson Moderate		0.0162 (0.0166)		0.0329 (0.0232)		0.0025 (0.0119)
Peterson Most/Very Competitive		0.0132 (0.0184)		0.0119 (0.0257)		-0.0006 (0.0133)
Peterson Missing		-0.0079 (0.0261)		-0.0295 (0.0374)		-0.0071 (0.0188)
Months Deployed at 3 YOS		0.0022* (0.0007)		0.0036* (0.0010)		0.0025* (0.0005)
Divisional Unit		-0.0440* (0.0105)		-0.0198 (0.0136)		-0.0333* (0.0080)
Other Unit		-0.0615* (0.0122)		-0.1296* (0.0168)		-0.0443* (0.0089)
Observations	14,760	14,760	14,760	14,760	14,760	14,760
R-squared	0.0158	0.0185	0.0488	0.0564	0.0155	0.0188

Note. – Table tests whether characteristics of protégés observable to the Army are related to the likelihood that a protégé served under a high-performing mentor. In each Panel, column 1 estimates a linear probability model in which the dependent variable is an indicator for ever serving under a high-performing mentor, and the explanatory variables are structural controls: controls for military occupation, commissioning source, and commissioning year. Column 2 adds all the characteristics of a protégé (demographics, pre-service achievement, education, deployment time, and unit) observable to the Army. The p-value of the F-test of the joint significance of the added control variables appears in the bottom row of each column 2. The outcome of interest is: ever served under a high-performing junior mentor (Panel A); ever served under a high-performing senior mentor (Panel B); and ever served under both a high-performing junior and senior mentor (Panel C). Robust standard errors are reported in parentheses. See Tables 1, 2, and Appendix 1 for complete descriptions of the selected sample and included variables. A single asterisk denotes $p < 0.05$.

Appendix Table 2: Retention at 8 Years of Service, Probit Marginal Effects

	Panel A. Junior High-Performing Mentor				
Mean Retention without High-Performing Mentor			0.494		
	(1)	(2)	(3)	(4)	(5)
High-Performing Mentor	0.0242*	0.0265*	0.0252*		
	(0.0114)	(0.0113)	(0.0114)		
Months with High Performing Mentor				0.0018	
				(0.0010)	
6-12 Months with High-Performing Mentor					0.0257
					(0.0141)
12+ Months with High-Performing Mentor					0.0246
					(0.0222)
Demographic & Peterson Rankings	NO	YES	YES	YES	YES
Deployment and Unit Controls	NO	NO	YES	YES	YES
Observations	14,760	14,760	14,760	14,760	14,760
	Panel B. Senior High-Performing Mentor				
Mean Retention without High-Performing Mentor			0.485		
	(1)	(2)	(3)	(4)	(5)
High-Performing Mentor	0.0252*	0.0256*	0.0233*		
	(0.0084)	(0.0083)	(0.0083)		
Months with High-Performing Mentor				0.0016*	
				(0.0006)	
6-12 Months with High-Performing Mentor					0.0239*
					(0.0101)
12+ Months with High-Performing Mentor					0.0276*
					(0.0117)
Demographic & Peterson Rankings	NO	YES	YES	YES	YES
Deployment and Unit Controls	NO	NO	YES	YES	YES
Observations	14,760	14,760	14,760	14,760	14,760
	Panel C. Junior and Senior High-Performing Mentor				
Mean Retention without High-Performing Mentor		0.495			
	(1)	(2)	(3)		
High-Performing Mentor	0.0453*	0.0476*	0.0460*		
	(0.0157)	(0.0155)	(0.0156)		
Demographic & Peterson Rankings	NO	YES	YES		
Deployment and Unit Controls	NO	NO	YES		
Observations	14,760	14,760	14,760		

Note. – This table is a replication of Table 3 using probit analysis rather than linear probability model and reports marginal effects for our variable of interest (serving under a high-performing mentor) from estimation of our main regression, officer retention at 8 years of service (Equation 1). Within each panel, the variable of interest is specified: first as an indicator for ever served under a high-performing mentor; then as months served under a high performing mentor; and finally as a set of indicator variables for duration served under a high performing mentor. The impact on protégé retention of ever serving under a high-performing junior mentor is reported in Panel A while the effect of serving under a high-performing senior mentor is reported in Panel B. Panel C records the impact on retention of serving under both high-performing junior and senior mentors. All regressions include a constant and controls for military occupation, source of commissioning, and year of commissioning. Additional controls are added to the specifications reported in columns 2 through 5 as indicated. See Tables 1, 2, and Appendix 1 for complete descriptions of sample selection and variables. Robust standard errors are in parentheses. A single asterisk denotes $p < 0.05$.

Appendix Table 3: Retention at 8 Years of Service, Clustering

	Panel A. Junior High-Performing Mentor		
	(1)	(2)	(3)
Mean Retention without High-Performing Mentor		0.494	
High-Performing Mentor	0.0243*	0.0267*	0.0252*
Robust	(0.0115)	(0.0113)	(0.0114)
Clustered	[0.0116]	[0.0115]	[0.0116]
Demographic & Peterson Rankings	NO	YES	YES
Deployment and Unit Controls	NO	NO	YES
Number of Clusters	10,314	10,314	10,314
Observations	14,760	14,760	14,760
R-squared	0.0393	0.0606	0.0616
	Panel B. Senior High-Performing Mentor		
	(1)	(2)	(3)
Mean Retention without High-Performing Mentor		0.485	
High-Performing Mentor	0.0253*	0.0259*	0.0233*
Robust	(0.0084)	(0.0083)	(0.0083)
Clustered	[0.0091]	[0.0090]	[0.0091]
Demographic & Peterson Rankings	NO	YES	YES
Deployment and Unit Controls	NO	NO	YES
Number of Clusters	4,294	4,294	4,294
Observations	14,760	14,760	14,760
R-squared	0.0396	0.0608	0.0618
	Panel C. Junior and Senior High-Performing Mentor		
	(1)	(2)	(3)
Mean Retention without High-Performing Mentor		0.495	
High-Performing Mentor	0.0454*	0.0479*	0.0460*
Robust	(0.0157)	(0.0156)	(0.0156)
Clustered	[0.0161]	[0.0159]	[0.0159]
Demographic & Peterson Rankings	NO	YES	YES
Deployment and Unit Controls	NO	NO	YES
Number of Clusters	11,316	11,316	11,316
Observations	14,760	14,760	14,760
R-squared	0.0396	0.0608	0.0619

Note. – This table is a replication of Table 3 columns 1-3 and reports coefficients for our variable of interest (serving under a high-performing mentor) from estimation of our main regression, officer retention at 8 years of service (Equation 1). Robust standard errors are in parentheses and clustered standard errors (as outlined in Appendix 1) are in brackets. Within each panel, the variable of interest is specified: first as an indicator for ever served under a high-performing mentor; then as months served under a high performing mentor; and finally as a set of indicator variables for duration served under a high performing mentor. The impact on protégé retention of ever serving under a high-performing junior mentor is reported in Panel A while the effect of serving under a high-performing senior mentor is reported in Panel B. Panel C records the impact on retention of serving under both high-performing junior and senior mentors. All regressions include a constant and controls for military occupation, source of commissioning, and year of commissioning. Additional controls are added to the specifications reported in columns 2 through 5 as indicated. See Tables 1, 2, and Appendix 1 for complete descriptions of sample selection and variables. A single asterisk denotes $p < 0.05$

Appendix Table 4: Summary Statistics for Company Commanders

	Panel A: Previous Sample		Panel B: New Sample		Panel C: Men Only	
	(1)	(2)	(1)	(2)	(1)	(2)
	No H-P Mentor	H-P Mentor	No H-P Mentor	H-P Mentor	No H-P Mentor	H-P Mentor
% Female	8%	5%	9%	5%	0%	0%
Retain at 12	87%	90%	88%	90%	88%	90%
Missing Retain at 12	1%	2%	0%	0%	0%	0%
High-Performing	9%	11%	10%	12%	10%	12%
White	77%	80%	76%	80%	78%	81%
Non-White	23%	20%	24%	20%	22%	19%
Race Missing	0%	0%	0%	0%	0%	0%
SAT	1108	1124	1114	1131	1117	1133
	(177.8)	(174.5)	(176.4)	(173.9)	(175.8)	(173.9)
Missing SAT	35%	32%	33%	30%	33%	30%
Peterson Non-Competitive	5%	4%	5%	4%	4%	4%
Peterson Minimal	9%	9%	9%	8%	9%	8%
Peterson Moderate	55%	52%	54%	51%	54%	51%
Peterson Most/Very	28%	33%	30%	35%	30%	35%
Peterson Missing	3%	2%	3%	2%	3%	2%
USMA	19%	23%	20%	25%	20%	25%
ROTC Scholar	36%	33%	36%	33%	36%	33%
ROTC Non-Scholar	32%	32%	30%	30%	31%	30%
Other SOC	13%	12%	14%	12%	13%	12%
Division Unit	59%	71%	59%	72%	62%	74%
Combat Non-Division	12%	13%	12%	13%	12%	12%
Other Unit	30%	16%	29%	16%	26%	14%
N	4,540	3,328	3,964	2,908	3,627	2,758

Note: This table reports summary statistics on the captains in our sample who do and do not have high-performing mentors. In Panel A, we show the sample of captains that were junior mentors in Tables 3-6. In Panel B we drop individuals where we are missing retention information and further condition on being in the Army for 4 to 8 years at the time of the mentorship. In Panel C, we further restrict to only men. Explanations of the variables can be found in Table 1. Standard deviations of continuous variables are in parentheses.