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ABSTRACT

The Effects of Professor Gender on the Post-Graduation Outcomes of Female Students*

Although women earn approximately 50% of science, technology, engineering and math (STEM) bachelor's degrees, more than 70% of scientists and engineers are men. We explore a potential determinant of this STEM gender gap using newly collected data on the career trajectories of United States Air Force Academy students. Specifically, we examine the effects of being assigned female math and science professors on occupation and postgraduate education. We find that, among high-ability female students, being assigned a female professor leads to substantial increases in the probability of working in a STEM occupation and the probability of receiving a STEM master's degree.

JEL Classification: I20, J16, J24

Keywords: gender gap, STEM occupational choice, post-graduate education

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I. INTRODUCTION

According to the National Science Foundation (2017), women earn approximately half of all science, technology, engineering and math (STEM) bachelor's degrees in the United States. Nevertheless, women continue to be underrepresented in the science and engineering workforce. In 2015, the most recent year for which data are available, only 28% of employed scientists and engineers were women.[1]

One reason for this substantial gender gap is that, up until the late 1990s, the majority of STEM bachelor's degrees were earned by men (National Science Foundation 2017). Another contributing factor is that women who earn STEM degrees are much less likely than their male counterparts to end up working as a scientist or engineer; instead, they often pursue careers in education or healthcare (Beede et al. 2011, p. 6).[2]

Interventions intended to address the STEM gender gap are often predicated on the assumption that female students who are interested in math and science suffer from a lack of same gender-role models (Handelsman et al. 2005; Redden 2007). In fact, several studies provide evidence that exposure to female math and science professors encourages female college students to pursue STEM degrees (Rask and Bailey 2002; Bettinger and Long 2005; Carrell, Page and West 2010). However, much less is known about the relationship between professor gender and longer-run post-graduation outcomes.

[1] These figures come from the 2015 National Survey of College Graduates, conducted by the National Center for Science and Engineering Statistics (www.nsf.gov/statistics/wmpd/). According to the National Science Foundation (2017), science and engineering occupations include biological/physical scientists, computer/information scientists, engineers, mathematical scientists, psychologists, and social scientists. In 2014-2015, 57% of all bachelor's degrees and 60% of all master's degrees were awarded to female students.

[2] Approximately 40% of men with a STEM bachelor's degree work in STEM jobs, while 26% of women with a STEM degree work in STEM jobs (Beede et al. 2011, p. 6).

Using newly collected data on the career trajectories of United States Air Force Academy (USAFA) students who graduated during the period 2004-2008, the current study extends the research begun by Carrell, Page and West (2010). These authors (hereafter CP&W), drew upon detailed data on students from the USAFA to examine the effects of professor gender on academic performance, the choice to take advanced math courses, and major choice. One of the advantages of using data from the USAFA is that students there are quasi-randomly assigned to first-year math and science classes, which are mandatory. CP&W found that female students who were assigned to a female professor received higher grades in these classes than their counterparts who were assigned to a male professor. Among high-ability female students (i.e., those whose SAT math scores were above 700), assignment to female professors was also associated with an increase in the probability of graduating from the USAFA with a STEM degree.

We begin our analysis by examining the effect of being assigned a female professor on precisely the same educational outcomes as were used by CP&W. However, it should be emphasized that the data on these outcomes were based on original USAFA registrar and Institutional Research and Assessment Division (IRAD) records, which were collected from scratch without access to the data collected by CP&W. Despite this fact, and despite the fact that CP&W analyzed data on the USAFA graduating classes of 2001 through 2003 (to which we did not have access), we are able to closely replicate their basic results. Specifically, we find that high-ability female students who were assigned female professors did better in their first-year (and subsequent) math and science courses and were more likely to graduate with a STEM degree.

Having successfully replicated the main CP&W results, we turn our attention to the impact of professor gender on longer-run, post-graduation outcomes. Information on post-graduation outcomes was obtained from the Air Force Personnel Center (AFPC) for the period 2004-2016, so we are able to follow students for a minimum of 8 years after graduation, provided that they remained in the Air Force. Our results provide credible evidence that freshman-year interactions with female math and science professors can profoundly affect career trajectories. Specifically, we find that, among high-ability female students (i.e., those with math SAT scores above 700), a greater share of female professors is associated with a substantial increase in the probability of working in a STEM occupation. In addition, having a greater share of female professors is associated with an increase in the probability of receiving a STEM master's degree. Finally, we find evidence that, among high-ability female students, assignment to freshman-year female math and science professors reduces the probability of receiving a professional degree (e.g., a medical, dental, or law degree). Based on these results, we conclude that actively recruiting female math and science professors—and encouraging them to interact and mentor their female students—could have meaningful and long-lasting effects on the career trajectories of women.

II. BACKGROUND AND DATA

Non-economists have proposed a variety of interventions aimed at encouraging women to choose STEM majors and careers (Cronin and Roger 1999; Blickenstaff 2005; Lagesen 2007; Bilimoria, Joy and Liang 2008; Dworkin et al. 2008; Mavriplis et al. 2010). These interventions include ensuring students have equal access to classroom resources (Blickenstaff 2005), promoting a more inclusive workplace culture (Cronin and Roger 1999), and providing more networking opportunities for women working in STEM fields (Mavriplis et al. 2010).

Not surprisingly, economists have focused on other types of interventions and polices, especially those aimed at increasing the supply of female professors in mathematics and the hard sciences. Increasing the supply of female professors is often justified on the grounds that female students interested in STEM lack role models, but can also be justified on the grounds that they simply learn more from female professors, perhaps as a result of gender-based differences in teaching style or expectations about academic performance (CP&W, p. 1103). It has been also argued that professors can influence the career choices of STEM students through providing emotional support, encouragement, and networking opportunities (Johnson 2007; Carlone and Johnson 2007; Thiry, Laursen and Hunter 2011).

II.A. Previous studies

Researchers have expended considerable effort exploring how instructor (i.e., teacher or professor) gender affects academic outcomes. Previous studies in this area include: Canes and Rosen (1995), Neumark and Gardecki (1998), Bettinger and Long (2005), Hoffman and Oreopoulos (2009), Carrell, Page and West (2010), Fairlie, Hoffmann and Oreopoulos (2014), Muralidharan and Sheth (2016), and Lim and Meer (forthcoming).[3] However, with a few notable

[3] For instance, using data from three institutions of higher learning (Princeton University, the University of Michigan, and Whittier College), Canes and Rosen (1995) explored whether hiring female professors would attract more female majors. They found no evidence that the gender composition of professors in an academic department affected student major choices. By contrast, Neumark and Gardecki (1998) found that degree completion among female doctoral candidates in economics increased as the number of female professors in their department increased; Bettinger and Long (2005) found that female college students whose first math class was taught by a female professor were more likely to take subsequent, more advanced, math courses. See also Ehrenberg et al. (1995), Ashworth and Evans (2001), Rask and Bailey (2002), Hilmer and Hilmer (2007), Artz and Welsch (2014), Griffith (2014), Jagsi et al. (2014), and Price (2014).

exceptions (Carrell, Page and West 2010; Muralidharan and Sheth 2016; Lim and Meer, forthcoming), the results of these studies should be viewed with some skepticism given that students are not typically assigned to their instructors at random.

Much less work has been done on the relationship between professor gender and longer-run post-graduation outcomes. In fact, only two, essentially descriptive, studies have focused on this relationship. Rothstein (1995) found a positive correlation between the fraction of female faculty and the likelihood that female undergraduates would go on to obtain an advanced degree.[4] Jagsi et al. (2014) examined data on U.S. medical school graduates for the period 2006-2008. These authors found no evidence that specialty choice was related to the fraction of full-time faculty who were female.

II.B. The USAFA and its Students

The students and academic curriculum at the USAFA are similar in many respects to other selective liberal arts colleges, with an emphasis on balancing "Science, Technology, Engineering, and Mathematics (STEM) with the arts and humanities" (USAFA n.d.). Students complete a fully accredited academic program that offers 27 majors and 4 minors, and graduates earn a Bachelor's of Science degree along with a commission in the U.S. Air Force. The average SAT math and verbal scores of entering students are 672 and 642, respectively, and the admission rate is 13%. A regimented daily schedule includes military training and athletics in addition to 8-9 hours of dedicated academic time for a typical student. Students at the USAFA

[4] However, Rothstein (1995) found no evidence that the fraction of female faculty was related to labor market earnings. See also Kofoed and McGovney (forthcoming), who, using data from the U.S. Military Academy, found that female students who were randomly assigned to a female tactical officer were much more likely to select that officer's branch among their top three occupational choices.

are required to take a series of core courses, totaling approximately 85 semester hours, in the basic sciences, engineering, social sciences, and humanities.[5] Mandatory classes with small enrollments at the USAFA ensure that our findings do not reflect the effect of professor gender on attendance, but rather the effects of close contact between students and professors during class and during office hours.

Course scheduling is completed in a centralized process that amounts to pseudo-random assignment of students to professors. Courses are offered in multiple sections usually containing no more than 24 students. Each section may be offered in any of approximately 14 designated time slots, called "periods", and the first-year mandatory math and science courses that are the focus of this study generally have sufficiently high enrollment so that multiple sections are offered in each period. Students register for courses (but not sections or periods) before the start of each semester, and then the registrar assigns students to sections in a two-step process. First, students are assigned to periods by an algorithm that seeks to minimize scheduling conflicts, for example due to sports practice; students are then randomly assigned to a section within their assigned period.

The scheduling process results in two primary sources of variation in professor gender. First, while the assignment of students to periods gives no weight to student preferences, some students (e.g., intercollegiate athletes) are more likely to be assigned to certain periods based on scheduling constraints, and female (or male) professors may prefer teaching in these same periods. Although this process could produce systematic relationships between unobservable student and professor characteristics, we expect that any such relationships are far weaker and

[5] The mandatory set of core courses required for the 2004-2008 graduating classes can be found in the USAFA Curriculum Handbooks. The handbooks for each academic year can be found at (https://www.usafa.edu/academics/registrar/curriculum/).

more idiosyncratic than in a typical scheduling system in which students choose sections based on personal preference and knowledge of professors. Second, assignment of students to sections within each period is randomized by a computer algorithm, ensuring that observable and unobservable student and professor characteristics are uncorrelated within periods. While exploiting both sources of variation improves the precision of our estimates, the key results discussed below are not sensitive to using only the fully random variation from the second step of the scheduling process.

II.C. The USAFA Data

Our analysis relies on longitudinal administrative data for 5,929 students. We obtained administrative records describing the complete academic careers of USAFA students entering in the graduating classes of 2004 through 2008, consisting of 1,018 female students and 4,911 male students. We merged these data to administrative records describing the Air Force career histories of each graduate of these classes through 2016, enabling us to observe military careers for at least 8 years after graduation. Finally, we linked records of each course enrollment to information on the professor teaching that course. Summary statistics for each of the variables used in the analyses below are provided in Table 1 by gender. Although we obtained these data independently, the records and summary statistics are similar to those in CP&W, who analyzed academic records (but not post-graduation career information) for USAFA students belonging to the 2001-2008 graduating classes.

We use student pretreatment characteristics as controls throughout the analysis. The USAFA Registrar's office and IRAD provided indicators for attending a preparatory school, enlistment in the military prior to entering the USAFA, having been recruited as an intercollegiate athlete, gender, race, and age. We also use three numerical scores created by the USAFA Admissions office to describe a candidate's academic, leadership, and athletic potential.[6] On average, female students entered the USAFA with better academic and leadership composite scores than their male counterparts, while male students entered with better fitness test scores (Table 1).

Detailed academic records enable us to measure the same academic outcomes as CP&W. The USAFA Registrar's office provided final grades in mandatory first-year and follow-on math and science courses, enrollment in optional follow-on math courses, attrition from the USAFA, and whether the student graduated with a STEM bachelor's degree.[7] During the period under study, female USAFA students were less likely than their male counterparts to take optional follow-on math courses (34% vs. 50%), less likely to graduate with a STEM degree (28% vs. 47%), and less likely to leave the USAFA before graduation (17% vs. 20%).[8]

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[6] The academic composite score is a weighted average of two academic performance factors 1) prior academic record (PAR) and 2) college admission test scores. The PAR is a measure of academic performance based on a combination of high school class rank, high school GPA, and the quality of the high school attended. College admission test scores include the scores earned on either the SAT Reasoning test (verbal and math) or the ACT test (English, reading, math, and science reasoning). The leadership composite score is computed by the USAFA admissions office and measures high school leadership activities such as student council offices, Eagle Scout participation, and captaining a sports team. The fitness score is from a fitness assessment required of all students prior to admittance. See CP&W or (https://www.academyadmissions.com/admissions/) for more details on the academic composite, leadership composite, and fitness test scores.

[7] These mandatory first-year core courses are: Math 130, 141, 142, 152, Physics 110, Chemistry 141, and Engineering Mechanics 120. Descriptions of these courses can be found in the USAFA Curriculum Handbooks. Following CP&W, course grades were converted into grade points (an A is worth 4 grade points, an A- is worth 3.7 grade points, a B+ is worth 3.3 grade points, etc.) and then normalized to have a mean of zero and a variance of one within each course, semester, and year. It should also be noted that CP&W used two definitions of graduating with a STEM bachelor's degree. The first of these definitions included majors in the biological sciences and the second did not. We chose to exclude biological science degrees from our measure of graduating with a STEM degree because female participation rates are much higher in the biological sciences as compared to other STEM fields. Our primary interest is in exploring outcomes related to STEM occupations and degrees in which females are underrepresented.

[8] As noted in the introduction, CP&W analyzed data on students from the USAFA who composed the 2001-2008 graduating classes. In their data, female students were also less likely than their male counterparts to take optional follow-on math courses (34% vs. 51%), less likely to graduate with a STEM bachelor's degree (24% vs. 41%), and less likely to attrit (16% vs. 20%).

Academic records also enabled us to measure student-professor gender interactions. We linked each first-year math and science course to its professor using records from the registrar's office and the USAFA's historical archives. We have information on 285 professors (48 female and 237 male) who taught introductory math and science courses during the academic years 2000-2006. Table 1 shows that out of the 1,355 first year math and science sections taught, female professors taught approximately 20% (273 of 1,355), which is consistent with the figure reported by CP&W. Professor characteristics include gender, academic rank, education level (master's or Ph.D.) and whether they were civilian or military.

Male and female professors at the USAFA taught similar types of students (Table 1). For instance, in math and science courses the average class size for female professors was 18.9 compared to 19.3 for male professors. Moreover, male and female professors taught similar numbers of female students per class, and, on average, their students had similar math and verbal SAT scores. As a formal test of whether course assignment was random with respect to faculty gender, we regress faculty gender on the pre-enrollment characteristics (e.g., math and verbal SAT scores, academic score, leadership score, and fitness score) of their math and science students (Table 2). There is no evidence of a systematic relationship between pre-enrollment characteristics and faculty gender in the full sample. When we restrict the sample to students whose math SAT scores were above the median (i.e., above 660), three estimated coefficients (out of a total of 22 estimate coefficients) are significant at conventional levels. However, the joint tests of significance suggest that any relationship between the individual covariates and professor gender can be attributed to happenstance.[9]

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[9] CP&W also regressed professor gender on the pre-treatment characteristics of students and found similar results. Specifically, when they restricted their sample to students whose SAT math scores were above median, only two estimated coefficients were significant at conventional levels.

II.D. Post-Graduation Outcomes

We turn our attention to the effects of professor gender on occupation after replicating the basic CP&W results.[10] During their senior year, USAFA students are assigned to a job in a three-step process. First, students decide whether they wish to pursue one of approximately 4 rated occupations (which primarily involve piloting aircraft) or whether they wish to pursue a non-rated occupation such as intelligence, developmental engineer, or scientist.[11] Second, students submit their top 6 occupation choices to the AFPC, along with a relative weight for each choice. Finally, using these choices and weights, an algorithm matches USAFA graduates with their first job.[12] However, this initial assignment may not correspond to the occupation into which the graduate eventually settles. There are ample opportunities to switch jobs and the initial assignments include "graduate study", which we code as non-STEM despite the fact that graduate school may prepare students for a STEM career. Of the 4,313 USAFA graduates in our sample whose occupation history is observed, 3,675 were initially assigned to a non-STEM occupation (including pilot and graduate student). Two years after graduation, 160 had switched

[10] The primary source for occupation and other post-graduation outcomes of USAFA students is the AFPC. The AFPC data were made available to us through an agreement with IRAD and then merged with official USAFA records from the registrar and IRAD offices on students who graduated between 2004 and 2008.

[11] Rated occupations include pilot (both conventional and unmanned), navigator, combat systems operator, and air battle manager. Hereafter, we refer to all rated occupations as "pilots".

[12] The matching algorithm has the joint objectives of satisfying Air Force staffing needs, ensuring that the student is qualified for the job to which he or she is assigned, and meeting student preferences. Students must satisfy eligibility requirements for an occupation before listing it. While many occupations are open to all students, some require a specific academic degree (e.g., listing "physicist/nuclear engineer" requires a bachelor's degree in physics, astronomy, astrophysics, engineering physics, or nuclear physics). Appendix Table A7 lists all of the occupations observed in our data. Of the 178 distinct occupations listed, 10 are defined as STEM and 168 (including pilot) are defined as non-STEM. The algorithm gives more weight to the occupational preferences of the highest-ranked students within a graduating class, where rank is primarily determined by grade point average.

from a non-STEM to a STEM occupation; 4 years after graduation, 182 had switched from a non-STEM to a STEM occupation.[13]

We report the percent of USAFA graduates in our sample who worked in a STEM occupation by gender in Table 1. Any USAFA graduate who held a STEM-related job before 2016 (or before leaving the Air Force) is counted as having worked in a STEM occupation.[14] Female graduates were more likely to have worked in a STEM occupation than their male counterparts (22% vs. 20%), but they were less likely to have been a pilot (22% vs. 51%) and more likely to have worked in what we are describing as a "professional occupation" (4% vs. 2%).[15] Twenty-eight percent of female students obtained a STEM bachelor's degree but, of those who obtained a STEM bachelor's degree, only 50 percent went on to work in a STEM occupation. Less than one percent of female students who obtained a STEM bachelor's degree went on to work in a professional occupation.

In addition to occupation, we observe receipt of a master's degree, receipt of STEM master's degree, and receipt of a professional degree (e.g., a medical, dental, or law degree). Graduates of the USAFA are not expected to obtain a graduate or professional degree unless they are assigned to an occupation that requires it. Although a graduate degree is required for advancement in some occupations (e.g., operations research analyst, scientist, or academic

[13] Of the 1,041 high-ability students (i.e., those with math SAT scores above 700) in our sample, 851 were assigned to a non-STEM occupation upon graduation. Two years after graduation, 53 had switched from a non-STEM to a STEM occupation; 4 years after graduation, 64 had switched to from a non-STEM to a STEM occupation.

[14] Information on post-graduation outcomes from the AFPC is available through 2016. All students were followed for at least 8 years or until they left the Air Force.

[15] Specifically, the category "professional occupation" includes chaplain, dentist, general practice physician, judge advocate, lawyer, and surgeon.

instructor), whether and when to pursue additional education is ultimately the individual's choice.[16]

Female USAFA graduates were more likely to earn a master's degree within 6 years (49% vs. 36%), and were equally likely to earn a STEM master's degree within 6 years (12%). Among female graduates with a STEM bachelor's degree, 33% went on to earn a STEM master's degree within 6 years. Less than 1% of female graduates with a STEM bachelor's degree earned a professional degree within 6 years.[17]

III. STATISTICAL METHODS

We begin by estimating the same linear regression model as did CP&W using the newly collected data on academic outcomes described in the previous section. Specifically, we estimate the following equation:

$$(1) \qquad Y_{icsjt} = \phi_1 + \beta_1 F_i + \beta_2 F_j + \beta_3 F_i F_j + \boldsymbol{X}_i \boldsymbol{\phi}_2 + \boldsymbol{P}_j \boldsymbol{\phi}_3 + \gamma_{ct} + \varepsilon_{icsjt},$$

where Y_{icjst} is the normalized grade for student *i* in course *c* and section *s* taught by professor *j* in semester *t*.[18] F_i is an indicator equal to 1 if student *i* was female and equal to 0 otherwise. F_j is

[16] It is important to note that, although pursuing an advance degree is not typically required of USAFA graduates, it increases the likelihood of promotion. Air Force policy with regard to how much weight to give advanced degrees in promotion decisions has changed three times since 2000, but the fact that officers know it could be important towards future promotion could influence their choice to complete a graduate degree. See Switzer (2011) and the *Air Force Times* (www.airforcetimes.com) for more information detailing the Air Force policies towards the obtainment of advanced academic degrees.

[17] By comparison, among male graduates with a STEM bachelor's degree, 21% went on to earn a STEM master's degree within 6 years; less than 1% earned a professional degree within 6 years.

[18] There are three semesters per year at USAFA (spring, summer, and fall) and our data on academic outcomes cover 5 years, or 15 semesters (t = 1,2,3…15).

an indicator equal to 1 if professor j was female and equal to 0 otherwise. Our focus is on the coefficients β_1 through β_3. β_1 represents the mean difference in performance between male and female students when they are assigned to a male professor, β_2 represents the effect of being taught by a female professor on the grades of male students, and β_3 represents the effect of assignment to a female professor on the grades of female students (relative to those of male students). Because first-year math and science courses are mandatory and because assignment to sections is quasi-random, the estimates of β_2 and β_3 can be given a causal interpretation.

The vector of controls, $\boldsymbol{X}_i$, is composed of student characteristics including race, ethnicity, SAT verbal score, SAT math score, an academic composite score, a leadership composite score, and a fitness score. In addition, we include indicators for graduating class (i.e., cohort), age, whether the student attended preparatory school, whether the student was a recruited athlete, and whether the student enlisted in the Air Force prior to entering the USAFA. Professor characteristics, represented by the vector $\boldsymbol{P}_j$, include indicators for academic rank, terminal degree, and civilian status. These regressions include course-by-semester fixed effects (represented by the term γ_{ct}) and indicators for the time of day in which section s was taught. Standard errors are corrected for clustering at the professor level.

Following CP&W, we use a modified version of equation (1) to examine academic outcomes in follow-on STEM courses:

$$(2) \qquad Y_{ic's't'} = \phi_1 + \beta_1 F_i + (\beta_2 + \beta_3 F_i)\frac{\sum_{j|i} F_j}{n_i} + \boldsymbol{X}_i\,\boldsymbol{\phi}_2 + \gamma_{c's't'} + \varepsilon_{ic's't'},$$

where $Y_{ic's't'}$ is the normalized grade for student *i* in the follow-on course *c′*, section *s′*, and semester *t′*. $\frac{\sum_{j|i} F_j}{n_i}$ is the fraction of student *i*'s first-year math and sciences courses that were taught by female professors. β_2 is the effect of having more female professors in first-year math and science courses, and β_3 is the effect of having more female professors on the academic outcomes of female students relative to male students. In equation (2), the vector $\boldsymbol{X}_i$ also includes other professor characteristics from student *i*'s freshman year (i.e., the proportion who held the rank of Associate Professor, the proportion who held the rank of Professor, the proportion who were civilian, and the proportion who held a terminal degree).

Finally, we use a modified version of equation (2) to examine whether student *i* left the USAFA, whether student *i* took an advanced math course, whether student *i* graduated with a STEM degree, and the post-graduation outcomes discussed above:

$$(3) \qquad D_i = \phi_1 + \beta_1 F_i + (\beta_2 + \beta_3 F_i)\frac{\sum_{j|i} F_j}{n_i} + \boldsymbol{X}_i \boldsymbol{\phi}_2 + \varepsilon_i,$$

where D_i is one of the outcomes under study. Again, the vector $\boldsymbol{X}_i$ includes indicators for graduating class and the personal characteristics of student *i* as well as the professor characteristics discussed immediately above.

IV. RESULTS

IV.A. Effects of Professor Gender on Academic Outcomes

We begin by discussing estimates of the relationship between professor gender and the grades received by students in their first-year math and science courses, which are reported in

Table 3. This is essentially a replication exercise, although the CP&W estimates of this relationship were based on three additional years of data and a narrower definition of first-year math and science courses.

The first column of Table 3 shows results for the full sample without controlling for student fixed effects. Consistent with what CP&W found, these results suggest that female students, on average, do worse than their male counterparts when assigned to a male professor. Specifically, female students score 9.2% of a standard deviation lower than their male counterparts when assigned to a male professor. However, when they are assigned to a female professor, their performance in first-year math and science courses improves dramatically. In fact, it appears as though more than 80% of the gender gap is eliminated.[19]

In the second column of Table 3, we replace the controls contained in the vector $\boldsymbol{X}_i$ with student fixed effects. With the student fixed effects on the right-hand side of the estimating equation, the coefficient of the interaction term, $F_i F_j$, shows the value added for female students of being assigned to a female professor relative to their grades in other mandatory first-year math and science classes. On average, female students score 7.3% (-.001 + .074) of a standard deviation higher when assigned to a female professor. There is little evidence that male students do worse in first-year math and science courses when they were assigned to a female professor.

In the remaining columns of Table 3, we show estimates by observed math ability before entering the USAFA (as measured by math SAT scores). These estimates confirm CP&W's results: as math ability increases, so does the importance of professor gender. Among female students with SAT math scores equal to or below 660 (the median score), the estimated

[19] By comparison, CP&W found that female students scored, on average, 14.9% of a standard deviation lower than their male counterparts; 65% of this gap was eliminated when female students were assigned to a female professor. See Table IV on p.1121 of CP&W.

coefficient of the interaction term, β_3, is positive but it is not significant at conventional levels and it is only about half the size of β_1. By contrast, when female students with math SAT scores greater than 660 are assigned to a female math/science professor in their freshman year, the gender gap is completely eliminated.[20]

IV.B. Effects of Professor Gender on Other Academic Outcomes at the USAFA

CP&W argued that "course performance itself is only interesting to the extent that it affects pathways into STEM carriers" (p. 1124). In an effort to explore the effects of professor gender on these pathways, CP&W collected information on the following outcomes: performance in required follow-on STEM courses, withdrawal from the USAFA before graduation, the taking of advanced math courses, and graduation with a STEM degree. In Table 4, we provide estimates of professor gender on these same outcomes. Again, our estimates are similar to those of CP&W.

The first column of Table 4 shows estimates of equation (2). Although the estimate of β_3 is relatively small and statistically insignificant in the full sample (Panel A), there is strong evidence that high-ability female students (as measured by math SAT scores) perform better in follow-on STEM classes when they are assigned to female math and science professors their freshman year.

For instance, female students in the top quartile of math ability (i.e., those with math SAT scores above 700) score 18.4% of a standard deviation lower than their male counterparts in

[20] CP&W found that 75% of the gender gap was eliminated when female students who scored above 660 on the math SAT were assigned to a female professor. CP&W found that the entire gender gap was eliminated when female students who scored above 700 on the math SAT were assigned to a female professor. See Table IV on p.1121 of CP&W. When student fixed effects are included, estimates of β_3 are positive but lose significance for female students with SAT math scores above 660.

follow-on STEM courses if all of their first-year math and science courses are taught by male professors (Panel D), but increasing the fraction of first-year classes taught by female professors from 0% to 20% would lead to a 9.8% of a standard deviation increase in their scores, enough to reduce the gender gap by half (.098/.184 = .53).[21]

In the remaining columns of Table 4, we show estimates of equation (3). Similar to what CP&W found, these estimates provide no evidence that professor gender is related to the probability of leaving USAFA before graduation. The estimates of the effect of professor gender on the probability of taking an advanced math course are generally small and imprecise.[22] By contrast, consistent with the results of CP&W, we find strong evidence that high-ability female students are more likely to graduate with a STEM degree when taught by a female professor their freshman year. For instance, female students in the top quartile of math ability are, on average, 36.6 percentage points less likely to graduate with a STEM degree than their male counterparts if all of their first-year math and science courses are taught by male professors (Panel D), but increasing the fraction of first-year classes taught by female professors from 0% to 20% is associated with more than a one-third reduction in this gender gap.[23]

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[21] β_3, the coefficient of the interaction between F_i and $\frac{\sum_{j|i} F_j}{n_i}$ gives the effect of increasing the fraction of first-year female professors from 0% to 100%. Multiplying this coefficient by 0.20 gives the estimated effect of increasing the fraction of first-year female professors from 0% to 20% (.490 x .2 = .098).

[22] It might be noted that the estimate of β_3, for female students in the top quartile of the math ability distribution is large relative to the estimate of β_1, but not precise (Panel D). CP&W found that female students in the top quartile of the math ability distribution were more likely to take an advanced math course when taught by a female professor. See Panel D of Table V on p.1127 of CP&W.

[23] Note that .656, the estimate of β_3 in column (4), multiplied by one-fifth is equal to .131, and 131/.366 is equal to .358.

IV.C. Effects of Professor Gender on Occupation

Our principal interest is in the relationship between professor gender and post-graduation outcomes, beginning with occupation. Only about a quarter of U.S. women who earn a bachelor's degree in math, science or engineering go on to work in a STEM occupation (Beede et al. 2011, p. 6), but this figure is much higher among the USAFA graduates: in fact, half (50%) of female students in our sample who earned a STEM bachelor's degree from the USAFA went on to work in a STEM occupation at some point during their Air Force career.[24]

In Table 5, we report OLS estimates of equation (3). Specifically, we examine three dichotomous outcomes: whether a USAFA graduate became a pilot, whether he/she worked in a STEM occupation, and whether he/she worked in a professional occupation.[25] In the full sample, we find little evidence that being assigned to female first-year professors affects the occupation female graduates (Panel A). By contrast, among female students with math SAT scores above 700, professor gender appears to have a powerful effect on career paths. Specifically, increasing the fraction of female professors in first-year math and science courses from 0% to 100% is associated with a 0.445 increase in the probability that high-ability female students worked in a STEM occupation (Panel D). This estimate suggests that, by doubling the fraction of first-year math and science classes taught by female faculty (from 20% to 40%), the USAFA could increase the probability of high-ability female students working in STEM by 0.089 (.2 x .445 =

[24] Thirty-nine percent of females with a STEM degree worked as pilots during their career. By contrast, 30 percent of male students with a STEM degree from the USAFA went on to work in a STEM occupation at some point in their career and 67 percent worked as pilots.

[25] As noted above, these occupational categories (pilot, STEM and professional) are not mutually exclusive. If, for example, a graduate started her career as a pilot and then went on to work in a STEM occupation then she was counted as having worked in both occupational categories.

.089), which represents a 27% increase relative to the sample mean (.089/.336 = .265).[26] Put another way, if the USAFA doubled the fraction of first-year math and science classes taught by female professors, this estimate suggests that 2.5 additional female students from each graduating class would work in STEM at some point during their career.[27, 28]

Finally, the estimates reported in Table 5 provide evidence that professor gender also affects the career paths of male students. Among male students whose math SAT scores were above the median, the estimates of β_2 are consistently negative and statistically significant at conventional levels, which suggests that a policy aimed at increasing the supply of female professors could have the unintended effect of discouraging male students from going into STEM careers.[29]

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[26] On average, high-ability female students at the USAFA took one-fifth of their first-year math and science courses from female professors.

[27] During the period 2004-2008, 141 female students with math SAT scores above 700 graduated from the USAFA, or an average of 28.2 per year. This latter figure multiplied by .089 is equal to 2.5. Doubling the fraction of first-year math and science courses taught by female professors could be accomplished through hiring 5 or 6 additional female STEM professors above and beyond those currently employed by the USAFA.

[28] As a robustness check, we replaced professor characteristics with professor indicators, equal to one if student *i* took an introductory STEM course from professor *j* and equal to zero otherwise. During the period under study, a total of 285 USAFA professors taught first-year math and science courses. Students could take up to 7 first-year math and science courses, but the average was 4.49. These indicators, which were not used by CP&W, are intended to flexibly control for professor-specific effects potentially correlated with $\frac{\sum_{j|i} F_j}{n_i}$. The results are similar to those reported in Table 5 (Appendix Table A1).

[29] In Appendix Table A5, we show the results of using the job choices made by students during their senior year as the dependent variable in equation (3). Specifically, we used the following indicators: whether their first job choice was to become a pilot, whether their first job choice was in a STEM-related occupation, whether their first or second job choice was in a STEM-related occupation, and whether any of their 6 job choices were in a STEM-related occupation. The results do not provide much evidence that professor gender affects the job choices made at graduation. The estimate of β_3 is positive and sizable for high-ability students when the dependent variable is an indicator for whether the first job choice was a pilot and for any of the 6 job choices were in STEM, but not statistically significant at conventional levels. In Appendix Table A6, we examine the effects of professor gender on whether students' first job was in STEM. Not surprisingly given the results in Appendix Table A5, there is no evidence that professor gender is related to this outcome. However, we find strong evidence that being taught by female professors in first-year math and science courses has the effect of encouraging high-ability female students to switch from non-STEM to STEM occupations within 2, 4, and 6 years of graduating. Specifically, increasing the

IV.D. Effects of Professor Gender on the Receipt of Advanced Degrees

Upon graduating from the USAFA, students typically begin their occupation training immediately. The length of this training varies from a few months (aircraft maintenance managers) to years (pilots, medical doctors and surgeons). After completing their occupation training, students may choose to pursue a master's degree, although it should be noted that, if a student is assigned to a professional occupation (e.g., lawyer, medical doctor, or chaplain), earning a professional degree is usually considered part of their formal occupation training.[30]

Of the 4,768 students who graduated the USAFA between 2004 and 2008, 801 received a master's degree within four years, 231 received a master's degree in a STEM field, and 65 received a professional degree. In columns (1) through (3) of Table 6, we explore the relationship between professor gender and these outcomes. In columns (1) through (3) of Table 7, we explore the relationship between professor gender and receipt of an advanced degree within 6, as opposed to 4, years of graduation.

The results suggest that the effects of professor gender are not limited to occupation. For instance, estimates of β_3 reported in Table 6 provide evidence that being assigned to female professors discourages low-ability (as measured by math SAT scores) female students from

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fraction of female professors in first-year math and science courses from 0% to 100% is associated with a 0.400 increase in the probability that high-ability female students worked in a STEM occupation within two years of graduating from the USAFA, and a 0.617 increase in the probability that high-ability female students worked in a STEM occupation within 6 years of graduating. This latter estimate suggests that, by doubling the fraction of first-year math and science classes taught by female faculty (from 20% to 40%), the USAFA could increase the probability of high-ability female students working in STEM by 0.123 (.2 x .617 = .123), which represents a 39% increase relative to the sample mean (.123/.320 = .386).

[30] In addition, it should be noted that often the Air Force will sponsor (i.e., pay for) advanced academic degrees for individuals. Once through formal training and partway through their first military assignment Air Force officers can apply to pursue an advanced academic degree through the Air Force Advanced Academic Degree (AAD) program. If selected, individuals will have the opportunity to pursue a degree at the Air Force Institute of Technology (if their degree is offered) or at a civilian institution. Alternatively, if not selected for the AAD program, Air Force officers may apply to pursue an advanced academic degree through the Air Force Tuition Assistance Program in order to attend a local masters or professional degree program while on assignment at their current duty station.

pursuing a master's degree (Panel B). However, estimates of β_3 for this group reported in Panel B of Table 7, although negative, are much smaller and are not statistically significant, suggesting that assigning female students whose math SAT scores are below the median to female math and science professors simply delays, but does not prevent, their pursuit of a master's degree.

Among high-ability female students, assignment to female first-year math and science professors is positively associated with receipt of a STEM master's degree. Specifically, increasing the fraction of female professors in first-year math and science courses from 0% to 100% is associated with a 0.424 increase in the probability that high-ability female students receive a STEM master's degree within 4 years of graduation (Panel D, Table 6) and a 0.491 increase in the probability that high-ability female students receive a STEM master's degree within 6 years of graduation (Panel D, Table 7). These estimates suggest that by doubling the fraction of first-year math and science classes taught by female faculty (from 20% to 40%), the USAFA could increase the probability of high-ability female students obtaining a STEM master's degree within 6 years of graduation by at least 0.098 (.2 x .491 = .098). Put another way, if the USAFA doubled the fraction of first-year math and science classes taught by female professors, 2.8 additional female students from each graduating class would obtain a STEM master's degree within 6 years.[31]

As noted in the introduction, women who earn STEM degrees are less likely than their male counterparts to work as a scientist or engineer but are more likely to pursue careers in education or healthcare (Beede et al. 2011, p. 6). Estimates reported in Panel D of Tables 6 and

[31] During the period 2004-2008, 141 female students with math SAT scores above 700 graduated from the USAFA, or an average of 28.2 per year. This latter figure multiplied by .098 is equal to 2.8. As noted above, doubling the fraction of first-year math and science courses taught by female professors could be accomplished through hiring 5 or 6 additional female STEM professors above and beyond those currently employed by the USAFA.

7 suggest that any tendency among female undergraduates to obtain a professional (as opposed to a STEM) degree may be counteracted by assignment to female professors. Specifically, increasing the fraction of female professors in first-year math and science courses from 0% to 100% is associated with a 0.211 decrease in the probability that high-ability female students receive a professional degree within 4 years of graduation (Panel D, Table 6) and a 0.310 decrease in the probability that high-ability female students receive a professional degree within 6 years of graduation (Panel D, Table 7).[32]

Finally, the estimates reported in Panel A of Table 6 provide some evidence that professor gender also affects the educational choices of male students. Specifically, increasing the fraction of female professors in first-year math and science courses from 0% to 100% is associated with a (statistically insignificant) 0.035 decrease in the probability that male students obtain a STEM master's degree within 4 years of graduation, which is offset by a 0.035 increase in the probability that they obtain a professional degree. The estimates of β_2 are reported in Panel A of Table 7 also suggest that male students are more likely to obtain a professional degree when assigned to female professors. Again, we interpret these results as consistent with the notion that policies aimed at increasing the supply of female professors could have the unintended effect of discouraging male students from going into STEM careers.

[32] We also explored the effects of professor gender on obtaining a STEM master's degree within 2 years of graduation. The results, which are reported in Appendix Table A2, are similar to those reported in Tables 6 and 7. We were unable to estimate the effects for professional degrees within 2 years of graduation since professional training programs, e.g., medical school, normally last longer than 2 years before a professional degree is conferred. As a final robustness check, we replaced professor characteristics with professor indicators, equal to one if student *i* took an introductory STEM course from professor *j* and equal to zero otherwise. The results are similar to those reported in Tables 6 and 7 (Appendix Tables A3 and A4).

IV.E. Effects of Professor Gender on Separation from the Air Force

Students are contractually obligated to serve as an active-duty commissioned officer in the Air Force for a minimum of 5 years after graduating from the USAFA. However, approximately 11% of our sample left the Air Force before their 5-year commitment was over.[33]

Separation from the Air Force could have been non-voluntary, although some graduates likely voluntarily transferred to reserve or guard positions.[34] Once a USAFA graduate separates from the active duty Air Force, we have no method of tracking them and no further information about their career trajectories. If separation were related to professor gender and the outcomes under study, our inability to track graduates could produce biased, and even misleading, estimates of β_1 through β_3.

In the fourth column of Table 6, we report estimates of the relationship between professor gender and the probability of separating from the Air Force within four years of graduating from the USAFA. Female graduates of the USAFA are 4.4 percentage points more likely to separate from the Air Force than their male counterparts, but there is no evidence that professor gender affects this outcome: the estimate of β_3 is small and statistically insignificant.

In the fourth column of Table 7, we report estimates of the relationship between professor gender and the probability of separating from the Air Force within 6 years of graduating from the USAFA, an outcome that captures the behavior of students who completed their obligatory 5 years of post-graduation service. Again, professor gender does not appear to influence whether

[33] The 5-year active-duty service commitment is for non-pilot occupations. Pilots have a 10-year active-duty service commitment after successful completion of pilot training. The mean years of active-duty service in our sample was 8.5.

[34] Voluntary transfer programs include the Air Force "Palace Chase Program" through which members of the active duty Air Force can transfer to reserve or guard positions in the Air Force, or Department of Defense programs through which members can transfer to positions into one of the other four services (e.g., Army, Navy, Marine Corps, or Coast Guard).

USAFA graduates left the Air Force. As a final robustness check, we explored the effect of professor gender on separation from the Air Force within 2 years of graduation. The results, which are reported in Appendix Table A2, are consistent with those obtained using the 4- and 6-year separation measures: that is, we find no evidence that professor gender affects the likelihood of leaving the Air Force.

V. CONCLUSION

Researchers and policymakers alike have searched for effective methods of increasing the representation of women in STEM occupations. Economists have focused much of their attention on evaluating efforts to provide young women with STEM role models by, for instance, assigning them to female math and science professors (Rask and Bailey 2002; Bettinger and Long 2005; Carrell, Page and West 2010). However, there is a dearth of evidence with regard to whether the effects of such efforts persist after graduation.

Using newly collected data on the academic outcomes and career trajectories of students from the United States Air Force Academy (USAFA) who graduated during the period 2004-2008, we examine the effects of being assigned female math and science professors as a freshman on a variety of outcomes. One of the advantages of using data from the USAFA is that students there are quasi-randomly assigned to first-year math and science classes. We find that, among high-ability female students (i.e., those who scored in the top quartile of the math SAT), being assigned a female professor is associated with substantial increases in the probability of working in a STEM occupation and the probability of receiving a STEM master's degree within 6 years of graduation. By contrast, it is associated with a decrease in the probability of receiving a professional degree (e.g., a medical, dental, or law degree).

Our results mirror and extend those of Carrell, Page and West (2010). These authors, who also used USAFA data, found that high-ability female students who were assigned female math and science professors did better in follow-on math courses and were more likely to choose a STEM major. Our findings, which are not explained by attrition from military service, suggest that actively recruiting more female math and science professors could have long-lasting effects on the career trajectories of women, especially those of high ability.

Future research might fruitfully focus on why professor gender appears to be such an important determinant of choosing STEM majors and occupations. While gender-based teaching styles may affect student academic performance, the post-graduation effects we find are consistent with the argument that female professors serve as lifelong role models whose influence extends well past graduation and suggest that interventions aimed at encouraging them to interact and mentor their female students could, over time, substantially narrow the STEM gender gap.

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Table 1. Summary Statistics

	Female students		Male students	
	Observations	Mean (std dev)	Observations	Mean (std dev)
Student-level variables				
Total course hours	1018	13.48	4911	13.12
(STEM first-year core courses)		(3.62)		(3.74)
Total course hours	982	18.86	4699	19.13
(STEM follow-on core courses)		(5.47)		(5.50)
STEM first-year core course grades	4577	-0.09	21475	0.02
(normalized)		(1.00)		(1.00)
STEM follow-on core course grades	6172	-0.01	29961	-0.00
(normalized)		(0.97)		(1.00)
Attrited	1018	0.17	4911	0.20
		(0.38)		(0.40)
Took higher-level math elective	1010	0.34	4865	0.50
		(0.47)		(0.50)
Graduated with bachelors degree	1018	0.83	4911	0.80
		(0.38)		(0.40)
Graduated with STEM bachelors degree	840	0.28	3928	0.47
		(0.45)		(0.50)
Pilot	824	0.22	3843	0.51
		(0.41)		(0.50)
STEM occupation	824	0.22	3843	0.20
		(0.41)		(0.40)
Professional occupation	824	0.04	3843	0.02
		(0.21)		(0.13)
Separated military	840	0.56	3928	0.35
		(0.50)		(0.48)
Separated military ≤ 4 years	840	0.10	3928	0.07
		(0.31)		(0.25)
Separated military ≤ 6 years	840	0.27	3928	0.13
		(0.44)		(0.34)
Master's degree	840	0.56	3928	0.59
		(0.50)		(0.49)
Master's degree ≤ 4 years	752	0.27	3668	0.16
		(0.44)		(0.37)
Master's degree ≤ 6 years	613	0.49	3398	0.36
		(0.50)		(0.48)
STEM master's degree	840	0.13	3928	0.17
		(0.33)		(0.38)
STEM master's degree ≤ 4 years	752	0.07	3668	0.06
		(0.25)		(0.24)
STEM master's degree ≤ 6 years	613	0.12	3398	0.12
		(0.32)		(0.33)
Professional degree	840	0.04	3928	0.02
		(0.20)		(0.13)
Professional degree ≤ 4 years	752	0.03	3668	0.01
		(0.16)		(0.11)
Professional degree ≤ 6 years	613	0.04	3398	0.01
		(0.21)		(0.12)

Table 1 (continued).

	Female students		Male students	
	Observations	Mean (std dev)	Observations	Mean (std dev)
Proportion female professors	1018	0.19	4911	0.20
(STEM first-year core courses)		(0.20)		(0.20)
SAT verbal	1011	634.54	4881	626.97
		(69.77)		(68.73)
SAT math	1011	643.65	4881	662.13
		(63.13)		(65.05)
Academic composite score	1012	3253.84	4881	3239.46
		(286.29)		(295.34)
Leadership composite score	1012	1757.25	4881	1719.52
		(189.76)		(183.56)
Fitness score	1010	445.95	4881	477.18
		(93.48)		(96.16)
White	999	0.74	4814	0.82
		(0.44)		(0.39)
Black	999	0.07	4814	0.05
		(0.26)		(0.22)
Hispanic	999	0.08	4814	0.06
		(0.28)		(0.24)
Asian	999	0.09	4814	0.05
		(0.28)		(0.21)
Other	999	0.02	4814	0.02
		(0.14)		(0.15)
Recruited athlete	1018	0.30	4911	0.27
		(0.46)		(0.44)
Attended preparatory school	1018	0.16	4911	0.21
		(0.37)		(0.41)
Prior enlisted	1018	0.14	4911	0.14
		(0.34)		(0.35)
Age 17-19	1012	0.96	4884	0.92
		(0.19)		(0.27)
Age 20-23	1012	0.04	4884	0.08
		(0.19)		(0.27)

Table 1 (continued).

	Female professors		Male professors	
	Observations	Mean (std dev)	Observations	Mean (std dev)
Professor-level variables				
(STEM first-year core courses)				
Number of sections per professor	48	5.69	237	4.57
		(3.81)		(3.92)
Lecturer	48	0.46	237	0.39
		(0.50)		(0.49)
Assistant professor	48	0.33	237	0.30
		(0.48)		(0.46)
Associate or full professor	48	0.13	237	0.26
		(0.33)		(0.44)
Professor has a terminal degree	48	0.31	237	0.42
		(0.47)		(0.49)
Professor is a civilian	48	0.35	237	0.21
		(0.48)		(0.41)
Class-level variables				
(STEM first-year core courses)				
Class size	273	18.89	1082	19.31
		(5.12)		(5.72)
Average number of female students	273	3.25	1082	3.41
		(1.92)		(2.10)
Average class SAT verbal	273	621.54	1077	625.02
		(27.26)		(29.80)
Average class SAT math	273	649.03	1077	649.74
		(33.49)		(36.24)
Average class academic composite score	273	3185.55	1077	3199.95
		(162.89)		(176.83)
Average class leadership composite score	273	1726.74	1077	1730.37
		(54.50)		(57.14)
Average class fitness score	273	474.71	1077	472.11
		(36.73)		(35.33)

Notes: Our data are from the 5,929 students who entered the Air Force Academy during the period 2000-2004, 4,768 of whom graduated. Sample sizes are smaller for post-graduation variables due to attrition from the military.

Table 2. Randomness Check: Estimates from Regressing Faculty Gender on Student Characteristics

	All students		SAT math <= 660 (median)		SAT math > 660 (median)		SAT math > 700 (75th pctile)	
	Male & Female	Female	Male & Female	Female	Male & Female	Female	Male & Female	Female
Specification	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female students	-0.003	--	-0.012	--	0.021*	--	0.038*	--
	(0.008)		(0.010)		(0.012)		(0.022)	
SAT verbal	-0.005	-0.013	-0.000	-0.007	-0.013	-0.028	-0.016	-0.003
	(0.005)	(0.012)	(0.007)	(0.014)	(0.008)	(0.019)	(0.010)	(0.032)
SAT math	0.005	0.027	0.007	0.003	-0.002	0.063	0.002	0.033
	(0.012)	(0.019)	(0.017)	(0.029)	(0.016)	(0.047)	(0.028)	(0.069)
Academic composite score	-0.004	-0.004	-0.003	-0.003	-0.006*	-0.008	-0.005	-0.010
	(0.003)	(0.004)	(0.004)	(0.005)	(0.003)	(0.007)	(0.003)	(0.010)
Leadership composite score	-0.001	-0.003	0.001	-0.002	-0.003	-0.003	-0.003	0.003
	(0.002)	(0.004)	(0.002)	(0.005)	(0.003)	(0.008)	(0.003)	(0.012)
Fitness score	0.003	0.016	0.001	0.017	0.005	0.014	0.006	0.021
	(0.006)	(0.011)	(0.008)	(0.012)	(0.007)	(0.017)	(0.008)	(0.024)
Observations	25,646	4,504	15,331	3,126	10,315	1,378	4,906	606
P-value: Joint significance (p-value)	0.255	0.408	0.186	0.782	0.283	0.228	0.336	0.799

*Statistically significant at the 10% level; ** at the 5% level; *** at the 1% level.

Notes: Each column shows estimates from a separate course-level regression of professor gender (i.e., an indicator equal to 1 if the professor was female and equal to 0 otherwise) on student characteristics. Student characteristics include SAT verbal score, SAT math score, academic composite score, leadership composite score, fitness score, and indicators for black, Hispanic, Asian, other, recruited athlete, attended preparatory school, enlisted prior to entering the Academy, and age 17-19. SAT scores, academic, leadership and fitness scores are divided by 100. Pooled regressions based on courses taken by both male and female students include a female indicator. Standard errors clustered at the professor level are reported in parentheses.

Table 3. Professor Gender and First-Year STEM Course Performance

	All students		SAT math <= 660 (median)		SAT math > 660 (median)		SAT math > 700 (75th pctile)	
Specification	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female professor	-0.009	-0.001	-0.006	-0.010	-0.016	0.012	0.013	0.011
	(0.030)	(0.026)	(0.031)	(0.028)	(0.043)	(0.035)	(0.052)	(0.047)
Female student	-0.092***	--	-0.107***	--	-0.057*	--	-0.194***	--
	(0.020)		(0.025)		(0.032)		(0.041)	
Female student x female professor	0.076**	0.074**	0.057	0.094**	0.114*	0.028	0.220***	0.096
	(0.038)	(0.037)	(0.044)	(0.042)	(0.067)	(0.062)	(0.085)	(0.090)
Observations	25,646	26,052	15,331	15,538	10,315	10,514	4,906	5,037
Student fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Dependent variable mean (female students)	-0.092		-0.248		0.261		0.346	
Dependent variable mean (male students)	0.020		-0.161		0.265		0.424	

*Statistically significant at the 10% level; ** at the 5% level; *** at the 1% level.

Notes: Each column shows the results of regressing STEM course grade on student and professor characteristics. Student characteristics include SAT verbal score, SAT math score, academic composite score, leadership composite score, fitness score, and indicators for black, Hispanic, Asian, other, recruited athlete, attended preparatory school, enlisted prior to entering the Academy, and age 17-19. Professor characteristics include indicators for academic rank, terminal degree, and civilian status. All regressions include course-by-semester fixed effects, and indicators for graduating class and time of day. Standard errors clustered at the professor level are reported in parentheses.

Table 4. Professor Gender and Outcomes at USAFA

Specification	Follow-on STEM course performance (1)	Attrited (2)	Took higher-level math (3)	Graduated with STEM bachelors degree (4)
	Panel A. All students			
Proportion of female professors	-0.027	0.060*	-0.003	0.041
(STEM first-year courses)	(0.054)	(0.033)	(0.034)	(0.041)
Female student	-0.037	-0.032	-0.112***	-0.168***
	(0.033)	(0.019)	(0.023)	(0.025)
Female student x proportion of female professors	0.143	0.032	-0.016	0.087
	(0.121)	(0.076)	(0.080)	(0.094)
Observations	35,554	5,808	5,780	4,690
Dependent variable mean (female students)	-0.008	0.175	0.340	0.275
Dependent variable mean (male students)	-0.002	0.200	0.498	0.474
	Panel B. SAT math <= 660 (median)			
Proportion of female professors	0.102	0.057	0.058	0.150**
(STEM first-year courses)	(0.079)	(0.051)	(0.049)	(0.061)
Female student	-0.003	-0.052**	-0.107***	-0.120***
	(0.043)	(0.026)	(0.027)	(0.030)
Female student x proportion of female professors	-0.119	0.114	-0.093	-0.183
	(0.166)	(0.106)	(0.097)	(0.114)
Observations	19,146	3,200	3,184	2,521
Dependent variable mean (female students)	-0.211	0.182	0.224	0.175
Dependent variable mean (male students)	-0.240	0.218	0.344	0.333

*Statistically significant at the 10% level; ** at the 5% level; *** at the 1% level.

Notes: In column (1) the regression is at the student-course-section level and the dependent variable is equal to the normalized grade from the follow-on STEM course. All other estimates reported in Table 4 are from student-level regressions. In column (2) the dependent variable is equal to 1 if the student dropped out of the Air Force Academy and is equal to 0 otherwise; in column (3) the dependent variable is equal to 1 if the student took a higher-level math course and is equal to 0 otherwise; and in column (4) the dependent variable is equal to 1 if the student graduated with a STEM degree and is equal to 0 otherwise. Controls include SAT verbal score, SAT math score, academic composite score, leadership composite score, fitness score, and indicators for black, Hispanic, Asian, other, recruited athlete, attended preparatory school, enlisted prior to entering the Academy, and age 17-19. All regressions include indicators for graduating class. In addition, student-level regressions control for the proportion of student *i*'s professors in first-year STEM courses who held the rank of Associate Professor or Professor, the proportion who held a terminal degree, and the proportion who were civilian. Regressions at the student-course-section level include section-by-course-by-semester fixed effects. Standard errors from the course-level regressions are corrected for clustering at the student level. Standard errors are reported in parentheses.

Table 4 (continued).

Specification	Follow-on STEM course performance (1)	Attrited (2)	Took higher-level math (3)	Graduated with STEM bachelors degree (4)
	Panel C. SAT math > 660 (median)			
Proportion of female professors	-0.127*	0.058	-0.066	-0.052
(STEM first-year courses)	(0.073)	(0.043)	(0.048)	(0.057)
Female student	-0.069	0.003	-0.105***	-0.217***
	(0.052)	(0.030)	(0.039)	(0.043)
Female student x proportion of female professors	0.402**	-0.086	0.052	0.374**
	(0.181)	(0.105)	(0.136)	(0.153)
Observations	16,408	2,608	2,596	2,169
Dependent variable mean (female students)	0.350	0.161	0.555	0.454
Dependent variable mean (male students)	0.254	0.181	0.670	0.623
	Panel D. SAT math > 700 (75th pctile)			
Proportion of female professors	-0.020	-0.028	-0.054	-0.042
(STEM first-year courses)	(0.093)	(0.054)	(0.064)	(0.076)
Female student	-0.184**	0.026	-0.220***	-0.366***
	(0.074)	(0.044)	(0.057)	(0.062)
Female student x proportion of female professors	0.490**	-0.092	0.254	0.656***
	(0.236)	(0.143)	(0.180)	(0.203)
Observations	8,474	1,323	1,317	1,127
Dependent variable mean (female students)	0.432	0.180	0.576	0.447
Dependent variable mean (male students)	0.386	0.166	0.750	0.686

*Statistically significant at the 10% level; ** at the 5% level; *** at the 1% level.

Notes: In column (1) the regression is at the student-course-section level and the dependent variable is equal to the normalized grade from the follow-on STEM course. All other estimates reported in Table 4 are from student-level regressions. In column (2) the dependent variable is equal to 1 if the student dropped out of the Air Force Academy and is equal to 0 otherwise; in column (3) the dependent variable is equal to 1 if the student took a higher-level math course and is equal to 0 otherwise; and in column (4) the dependent variable is equal to 1 if the student graduated with a STEM degree and is equal to 0 otherwise. Controls include SAT verbal score, SAT math score, academic composite score, leadership composite score, fitness score, and indicators for black, Hispanic, Asian, other, recruited athlete, attended preparatory school, enlisted prior to entering the Academy, and age 17-19. All regressions include indicators for graduating class. In addition, student-level regressions control for the proportion of student *i*'s professors in first-year STEM courses who held the rank of Associate Professor or Professor, the proportion who held a terminal degree, and the proportion who were civilian. Regressions at the student-course-section level include section-by-course-by-semester fixed effects. Standard errors from the course-level regressions are corrected for clustering at the student level. Standard errors are reported in parentheses.

Table 5. Professor Gender and Occupation

Specification	Pilot (1)	STEM occupation (2)	Professional occupation (3)
	Panel A. All students		
Proportion of female professors	0.031	-0.043	0.021
(STEM first-year courses)	(0.044)	(0.035)	(0.014)
Female student	-0.276***	0.007	0.025**
	(0.024)	(0.023)	(0.012)
Female student x proportion of female professors	0.012	0.105	0.007
	(0.090)	(0.088)	(0.048)
Observations	4,635	4,635	4,635
Dependent variable mean (female students)	0.218	0.220	0.045
Dependent variable mean (male students)	0.513	0.200	0.016
	Panel B. SAT math <= 660 (median)		
Proportion of female professors	-0.019	0.086	-0.002
(STEM first-year courses)	(0.065)	(0.052)	(0.014)
Female student	-0.285***	0.019	0.014
	(0.032)	(0.029)	(0.013)
Female student x proportion of female professors	0.032	-0.011	-0.018
	(0.118)	(0.113)	(0.049)
Observations	2,486	2,486	2,486
Dependent variable mean (female students)	0.192	0.186	0.027
Dependent variable mean (male students)	0.477	0.172	0.010

*Statistically significant at the 10% level; ** at the 5% level; *** at the 1% level.

Notes: Each column reports the results of a separate student-level regression. The dependent variable in column (1) is equal to 1 if the student worked as a pilot and is equal to 0 otherwise. The dependent variable in column (2) is equal to 1 if the student worked in a STEM occupation (e.g., engineer, physicist, chemist, scientist, meteorologist, operations research, cyberspace operations, space operations) and is equal to 0 otherwise. The dependent variable in column (3) is equal to 1 if the student worked in a professional occupation (e.g., doctor, surgeon, dentist, lawyer, chaplain) and is equal to 0 otherwise. Controls include SAT verbal score, SAT math score, academic composite score, leadership composite score, fitness score, and indicators for black, Hispanic, Asian, other, recruited athlete, attended preparatory school, enlisted prior to entering the Academy, and age 17-19. In addition, student-level regressions control for the proportion of student i's professors in first-year STEM courses who held the rank of Associate Professor or Professor, the proportion who held a terminal degree, and the proportion who were civilian. All regressions include indicators for graduating class.

Table 5 (continued).

Specification	Pilot (1)	STEM occupation (2)	Professional occupation (3)
		Panel C. SAT math > 660 (median)	
Proportion of female professors	0.065	-0.144***	0.039*
(STEM first-year courses)	(0.059)	(0.046)	(0.022)
Female student	-0.274***	0.011	0.042*
	(0.038)	(0.040)	(0.022)
Female student x proportion of female professors	0.007	0.195	0.036
	(0.138)	(0.138)	(0.087)
Observations	2,149	2,149	2,149
Dependent variable mean (female students)	0.266	0.279	0.077
Dependent variable mean (male students)	0.551	0.229	0.023
		Panel D. SAT math > 700 (75th pctile)	
Proportion of female professors	0.114	-0.190***	0.083**
(STEM first-year courses)	(0.079)	(0.063)	(0.036)
Female student	-0.283***	-0.013	0.078**
	(0.054)	(0.062)	(0.036)
Female student x proportion of female professors	-0.090	0.445**	-0.114
	(0.186)	(0.208)	(0.121)
Observations	1,114	1,114	1,114
Dependent variable mean (female students)	0.200	0.336	0.086
Dependent variable mean (male students)	0.541	0.251	0.024

*Statistically significant at the 10% level; ** at the 5% level; *** at the 1% level.

Notes: Each column reports the results of a separate student-level regression. The dependent variable in column (1) is equal to 1 if the student worked as a pilot and is equal to 0 otherwise. The dependent variable in column (2) is equal to 1 if the student worked in a STEM occupation (e.g., engineer, physicist, chemist, scientist, meteorologist, operations research, cyberspace operations, space operations) and is equal to 0 otherwise. The dependent variable in column (3) is equal to 1 if the student worked in a professional occupation (e.g., doctor, surgeon, dentist, lawyer, chaplain) and is equal to 0 otherwise. Controls include SAT verbal score, SAT math score, academic composite score, leadership composite score, fitness score, and indicators for black, Hispanic, Asian, other, recruited athlete, attended preparatory school, enlisted prior to entering the Academy, and age 17-19. In addition, student-level regressions control for the proportion of student i's professors in first-year STEM courses who held the rank of Associate Professor or Professor, the proportion who held a terminal degree, and the proportion who were civilian. All regressions include indicators for graduating class.

Table 6. Professor Gender Effects on Separation from the Military and Education Outcomes

Specification	Master's degree ≤ 4 years (1)	STEM master's degree ≤ 4 years (2)	Professional degree ≤ 4 years (3)	Separated military ≤ 4 years (4)
	Panel A. All students			
Proportion of female professors	0.006	-0.035	0.035**	0.013
(STEM first-year courses)	(0.033)	(0.021)	(0.015)	(0.022)
Female student	0.130***	-0.009	0.021**	0.044***
	(0.026)	(0.014)	(0.010)	(0.016)
Female student x proportion of female professors	-0.163*	0.100*	-0.045	-0.005
	(0.092)	(0.057)	(0.036)	(0.063)
Observations	4,345	4,345	4,345	4,690
Dependent variable mean (female students)	0.269	0.066	0.025	0.105
Dependent variable mean (male students)	0.163	0.059	0.013	0.066
	Panel B. SAT math <= 660 (median)			
Proportion of female professors	0.014	-0.013	-0.000	0.016
(STEM first-year courses)	(0.050)	(0.026)	(0.012)	(0.035)
Female student	0.133***	-0.001	0.003	0.042**
	(0.033)	(0.014)	(0.008)	(0.020)
Female student x proportion of female professors	-0.295**	-0.001	-0.019	-0.002
	(0.120)	(0.052)	(0.025)	(0.088)
Observations	2,325	2,325	2,325	2,521
Dependent variable mean (female students)	0.237	0.033	0.008	0.104
Dependent variable mean (male students)	0.151	0.029	0.006	0.070

*Statistically significant at the 10% level; ** at the 5% level; *** at the 1% level.

Notes: Each column reports the results of a separate student-level regression. In columns (1)-(3), the sample is restricted to USAFA graduates who served for at least 4 years. The dependent variable in column (1) is equal to 1 if the student received a master's degree within 4 years after graduating and is equal to 0 otherwise. The dependent variable in column (2) is equal to 1 if the student received a STEM master's degree within 4 years after graduating and is equal to 0 otherwise. The dependent variable in column (3) is equal to 1 if the student received a professional degree within 4 years after graduating and is equal to 0 otherwise. The dependent variable in column (4) is equal to 1 if the student separated from the military within 4 years after graduating and is equal to 0 otherwise. Controls include SAT verbal score, SAT math score, academic composite score, leadership composite score, fitness score, and indicators for black, Hispanic, Asian, other, recruited athlete, attended preparatory school, enlisted prior to entering the Academy, and age 17-19. In addition, regressions include controls for the proportion of student *i*'s professors in first-year STEM courses who held the rank of Associate Professor or Professor, the proportion who held a terminal degree, and the proportion who were civilian. All regressions include indicators for graduating class.

Table 6 (continued).

Specification	Master's degree ≤ 4 years (1)	STEM master's degree ≤ 4 years (2)	Professional degree ≤ 4 years (3)	Separated military ≤ 4 years (4)
	Panel C. SAT math > 660 (median)			
Proportion of female professors	-0.005	-0.054	0.063***	0.012
(STEM first-year courses)	(0.045)	(0.033)	(0.024)	(0.027)
Female student	0.136***	-0.014	0.044**	0.049*
	(0.042)	(0.028)	(0.021)	(0.025)
Female student x proportion of female professors	-0.012	0.210*	-0.068	-0.014
	(0.142)	(0.107)	(0.072)	(0.090)
Observations	2,020	2,020	2,020	2,169
Dependent variable mean (female students)	0.326	0.126	0.056	0.106
Dependent variable mean (male students)	0.176	0.091	0.019	0.063
	Panel D. SAT math > 700 (75th pctile)			
Proportion of female professors	-0.001	-0.068	0.108***	0.023
(STEM first-year courses)	(0.064)	(0.047)	(0.040)	(0.038)
Female student	0.132**	-0.067	0.059*	0.042
	(0.064)	(0.042)	(0.031)	(0.037)
Female student x proportion of female professors	0.004	0.424**	-0.211**	0.066
	(0.221)	(0.182)	(0.090)	(0.135)
Observations	1,049	1,049	1,049	1,127
Dependent variable mean (female students)	0.371	0.153	0.048	0.121
Dependent variable mean (male students)	0.207	0.116	0.021	0.060

*Statistically significant at the 10% level; ** at the 5% level; *** at the 1% level.

Notes: Each column reports the results of a separate student-level regression. In columns (1)-(3), the sample is restricted to USAFA graduates who served for at least 4 years. The dependent variable in column (1) is equal to 1 if the student received a master's degree within 4 years after graduating and is equal to 0 otherwise. The dependent variable in column (2) is equal to 1 if the student received a STEM master's degree within 4 years after graduating and is equal to 0 otherwise. The dependent variable in column (3) is equal to 1 if the student received a professional degree within 4 years after graduating and is equal to 0 otherwise. The dependent variable in column (4) is equal to 1 if the student separated from the military within 4 years after graduating and is equal to 0 otherwise. Controls include SAT verbal score, SAT math score, academic composite score, leadership composite score, fitness score, and indicators for black, Hispanic, Asian, other, recruited athlete, attended preparatory school, enlisted prior to entering the Academy, and age 17-19. In addition, regressions include controls for the proportion of student *i*'s professors in first-year STEM courses who held the rank of Associate Professor or Professor, the proportion who held a terminal degree, and the proportion who were civilian. All regressions include indicators for graduating class.

Table 7. Professor Gender Effects on Separation from the Military and Education Outcomes

Specification	Master's degree ≤ 6 years (1)	STEM master's degree ≤ 6 years (2)	Professional degree ≤ 6 years (3)	Separated military ≤ 6 years (4)
		Panel A. All students		
Proportion of female professors	-0.016	-0.037	0.039**	0.005
(STEM first-year courses)	(0.045)	(0.031)	(0.016)	(0.029)
Female student	0.115***	-0.007	0.046***	0.151***
	(0.032)	(0.021)	(0.014)	(0.024)
Female student x proportion of female professors	-0.005	0.043	-0.087*	-0.036
	(0.118)	(0.075)	(0.046)	(0.089)
Observations	3,938	3,938	3,938	4,690
Dependent variable mean (female students)	0.488	0.119	0.044	0.270
Dependent variable mean (male students)	0.361	0.121	0.015	0.135
		Panel B. SAT math <= 660 (median)		
Proportion of female professors	0.001	0.030	0.001	0.005
(STEM first-year courses)	(0.069)	(0.043)	(0.013)	(0.045)
Female student	0.110**	0.005	0.023*	0.159***
	(0.043)	(0.024)	(0.013)	(0.032)
Female student x proportion of female professors	-0.019	-0.055	-0.056	-0.018
	(0.169)	(0.085)	(0.038)	(0.127)
Observations	2,086	2,086	2,086	2,521
Dependent variable mean (female students)	0.477	0.080	0.023	0.283
Dependent variable mean (male students)	0.361	0.081	0.007	0.141

*Statistically significant at the 10% level; ** at the 5% level; *** at the 1% level.

Notes: Each column reports the results of a separate student-level regression. In columns (1)-(3), the sample is restricted to USAFA graduates who served for at least 6 years. The dependent variable in column (1) is equal to 1 if the student received a master's degree within 6 years after graduating and is equal to 0 otherwise. The dependent variable in column (2) is equal to 1 if the student received a STEM master's degree within 6 years after graduating and is equal to 0 otherwise. The dependent variable in column (3) is equal to 1 if the student received a professional degree within 6 years after graduating and is equal to 0 otherwise. The dependent variable in column (4) is equal to 1 if the student separated from the military within 6 years after graduating and is equal to 0 otherwise. Controls include SAT verbal score, SAT math score, academic composite score, leadership composite score, fitness score, and indicators for black, Hispanic, Asian, other, recruited athlete, attended preparatory school, enlisted prior to entering the Academy, and age 17-19. In addition, regressions include controls for the proportion of student *i*'s professors in first-year STEM courses who held the rank of Associate Professor or Professor, the proportion who held a terminal degree, and the proportion who were civilian. All regressions include indicators for graduating class.

Table 7 (continued).

Specification	Master's degree ≤ 6 years (1)	STEM master's degree ≤ 6 years (2)	Professional degree ≤ 6 years (3)	Separated military ≤ 6 years (4)
	Panel C. SAT math > 660 (median)			
Proportion of female professors	-0.025	-0.078*	0.069***	0.002
(STEM first-year courses)	(0.060)	(0.044)	(0.026)	(0.038)
Female student	0.116**	-0.021	0.076***	0.144***
	(0.049)	(0.038)	(0.027)	(0.036)
Female student x proportion of female professors	0.021	0.144	-0.118	-0.065
	(0.167)	(0.125)	(0.084)	(0.121)
Observations	1,852	1,852	1,852	2,169
Dependent variable mean (female students)	0.507	0.185	0.079	0.248
Dependent variable mean (male students)	0.362	0.163	0.022	0.128
	Panel D. SAT math > 700 (75th pctile)			
Proportion of female professors	-0.043	-0.130**	0.114***	0.017
(STEM first-year courses)	(0.082)	(0.060)	(0.044)	(0.053)
Female student	0.134*	-0.108**	0.117***	0.154***
	(0.071)	(0.053)	(0.045)	(0.054)
Female student x proportion of female professors	-0.042	0.491**	-0.310***	0.045
	(0.231)	(0.207)	(0.115)	(0.181)
Observations	959	959	959	1,127
Dependent variable mean (female students)	0.545	0.218	0.089	0.284
Dependent variable mean (male students)	0.380	0.189	0.025	0.127

*Statistically significant at the 10% level; ** at the 5% level; *** at the 1% level.

Notes: Each column reports the results of a separate student-level regression. In columns (1)-(3), the sample is restricted to USAFA graduates who served for at least 6 years. The dependent variable in column (1) is equal to 1 if the student received a master's degree within 6 years after graduating and is equal to 0 otherwise. The dependent variable in column (2) is equal to 1 if the student received a STEM master's degree within 6 years after graduating and is equal to 0 otherwise. The dependent variable in column (3) is equal to 1 if the student received a professional degree within 6 years after graduating and is equal to 0 otherwise. The dependent variable in column (4) is equal to 1 if the student separated from the military within 6 years after graduating and is equal to 0 otherwise. Controls include SAT verbal score, SAT math score, academic composite score, leadership composite score, fitness score, and indicators for black, Hispanic, Asian, other, recruited athlete, attended preparatory school, enlisted prior to entering the Academy, and age 17-19. In addition, regressions include controls for the proportion of student *i*'s professors in first-year STEM courses who held the rank of Associate Professor or Professor, the proportion who held a terminal degree, and the proportion who were civilian. All regressions include indicators for graduating class.

Table A1. Professor Gender and Occupational Assignment: Controlling for First-Year Professor Indicators

	Pilot	STEM occupation	Professional occupation
Specification	(1)	(2)	(3)
		Panel A. All students	
Proportion of female professors	0.231	-0.267*	0.064
(STEM first-year courses)	(0.160)	(0.138)	(0.058)
Female student	-0.272***	0.012	0.022*
	(0.026)	(0.024)	(0.012)
Female student x proportion of female professors	0.010	0.142	0.017
	(0.096)	(0.092)	(0.049)
Observations	4,635	4,635	4,635
Dependent variable mean (female students)	0.218	0.220	0.045
Dependent variable mean (male students)	0.513	0.200	0.016
		Panel B. SAT math <= 660 (median)	
Proportion of female professors	-0.239	0.239	-0.050
(STEM first-year courses)	(0.321)	(0.258)	(0.069)
Female student	-0.275***	0.026	0.014
	(0.035)	(0.030)	(0.013)
Female student x proportion of female professors	0.014	0.023	-0.018
	(0.129)	(0.118)	(0.051)
Observations	2,486	2,486	2,486
Dependent variable mean (female students)	0.192	0.186	0.027
Dependent variable mean (male students)	0.477	0.172	0.010

*Statistically significant at the 10% level; ** at the 5% level; *** at the 1% level.

Notes: Each column reports the results of a separate student-level regression. The dependent variable in column (1) is equal to 1 if the student worked as a pilot and is equal to 0 otherwise. The dependent variable in column (2) is equal to 1 if the student worked in a STEM occupation (e.g., engineer, physicist, chemist, scientist, meteorologist, operations research, cyberspace operations, space operations) and is equal to 0 otherwise. The dependent variable in column (3) is equal to 1 if the student worked in a professional occupation (e.g., doctor, surgeon, dentist, lawyer, chaplain) and is equal to 0 otherwise. Controls include SAT verbal score, SAT math score, academic composite score, leadership composite score, fitness score, and indicators for black, Hispanic, Asian, other, recruited athlete, attended preparatory school, enlisted prior to entering the Academy, and age 17-19. All regressions include indicators for graduating class and introductory course professors.

Table A1 (continued).

Specification	Pilot (1)	STEM occupation (2)	Professional occupation (3)
	Panel C. SAT math > 660 (median)		
Proportion of female professors	0.293	-0.297	0.042
(STEM first-year courses)	(0.220)	(0.188)	(0.085)
Female student	-0.271***	-0.001	0.039*
	(0.042)	(0.043)	(0.022)
Female student x proportion of female professors	-0.032	0.313**	0.054
	(0.149)	(0.151)	(0.088)
Observations	2,149	2,149	2,149
Dependent variable mean (female students)	0.266	0.279	0.077
Dependent variable mean (male students)	0.551	0.229	0.023
	Panel D. SAT math > 700 (75th pctile)		
Proportion of female professors	0.108	-0.163	0.004
(STEM first-year courses)	(0.285)	(0.246)	(0.141)
Female student	-0.257***	-0.059	0.079**
	(0.069)	(0.069)	(0.036)
Female student x proportion of female professors	-0.180	0.658***	-0.108
	(0.218)	(0.229)	(0.125)
Observations	1,114	1,114	1,114
Dependent variable mean (female students)	0.200	0.336	0.086
Dependent variable mean (male students)	0.541	0.251	0.024

*Statistically significant at the 10% level; ** at the 5% level; *** at the 1% level.

Notes: Each column reports the results of a separate student-level regression. The dependent variable in column (1) is equal to 1 if the student worked as a pilot and is equal to 0 otherwise. The dependent variable in column (2) is equal to 1 if the student worked in a STEM occupation (e.g., engineer, physicist, chemist, scientist, meteorologist, operations research, cyberspace operations, space operations) and is equal to 0 otherwise. The dependent variable in column (3) is equal to 1 if the student worked in a professional occupation (e.g., doctor, surgeon, dentist, lawyer, chaplain) and is equal to 0 otherwise. Controls include SAT verbal score, SAT math score, academic composite score, leadership composite score, fitness score, and indicators for black, Hispanic, Asian, other, recruited athlete, attended preparatory school, enlisted prior to entering the Academy, and age 17-19. All regressions include indicators for graduating class and introductory course professors.

Table A2. The Effects of Professor Gender on Separation from the Military and Educational Attainment

Specification	Master's degree ≤ 2 years (1)	STEM master's degree ≤ 2 years (2)	Separated military ≤ 2 years (3)
		Panel A. All students	
Proportion of female professors	-0.000	-0.015	0.003
(STEM first-year courses)	(0.022)	(0.016)	(0.014)
Female student	0.039**	-0.008	0.014
	(0.017)	(0.010)	(0.009)
Female student x proportion of female professors	-0.027	0.058	-0.044
	(0.059)	(0.040)	(0.028)
Observations	4,567	4,567	4,690
Dependent variable mean (female students)	0.097	0.036	0.029
Dependent variable mean (male students)	0.062	0.034	0.025
		Panel B. SAT math <= 660 (median)	
Proportion of female professors	0.017	0.009	0.010
(STEM first-year courses)	(0.026)	(0.016)	(0.023)
Female student	0.052***	0.010	0.015
	(0.018)	(0.009)	(0.011)
Female student x proportion of female professors	-0.116**	-0.026	-0.048
	(0.058)	(0.029)	(0.037)
Observations	2,458	2,458	2,521
Dependent variable mean (female students)	0.065	0.015	0.028
Dependent variable mean (male students)	0.030	0.008	0.024

*Statistically significant at the 10% level; ** at the 5% level; *** at the 1% level.

Notes: Each column reports the results of a separate student-level regression. In columns (1)-(2), the sample is restricted to USAFA graduates who served for at least 2 years. The dependent variable in column (1) is equal to 1 if the student received a master's degree within 2 years after graduating and is equal to 0 otherwise. The dependent variable in column (2) is equal to 1 if the student received a STEM master's degree within 2 years after graduating and is equal to 0 otherwise. The dependent variable in column (3) is equal to 1 if the student separated from the military within 2 years after graduating and is equal to 0 otherwise. Controls include SAT verbal score, SAT math score, academic composite score, leadership composite score, fitness score, and indicators for black, Hispanic, Asian, other, recruited athlete, attended preparatory school, enlisted prior to entering the Academy, and age 17-19. In addition, regressions include controls for the proportion of student *i*'s professors in first-year STEM courses who held the rank of Associate Professor or Professor, the proportion who held a terminal degree, and the proportion who were civilian. All regressions include indicators for graduating class.

Table A2 (continued).

Specification	Master's degree ≤ 2 years (1)	STEM master's degree ≤ 2 years (2)	Separated military ≤ 2 years (3)
		Panel C. SAT math > 660 (median)	
Proportion of female professors	-0.013	-0.032	-0.002
(STEM first-year courses)	(0.034)	(0.027)	(0.018)
Female student	0.029	-0.029	0.013
	(0.031)	(0.021)	(0.016)
Female student x proportion of female professors	0.069	0.145*	-0.045
	(0.108)	(0.080)	(0.045)
Observations	2,109	2,109	2,169
Dependent variable mean (female students)	0.154	0.072	0.030
Dependent variable mean (male students)	0.095	0.062	0.027
		Panel D. SAT math > 700 (75th pctile)	
Proportion of female professors	-0.043	-0.058	0.007
(STEM first-year courses)	(0.050)	(0.041)	(0.024)
Female student	0.020	-0.070**	0.012
	(0.051)	(0.033)	(0.024)
Female student x proportion of female professors	0.147	0.297**	-0.028
	(0.181)	(0.145)	(0.073)
Observations	1,095	1,095	1,127
Dependent variable mean (female students)	0.199	0.096	0.035
Dependent variable mean (male students)	0.122	0.084	0.027

*Statistically significant at the 10% level; ** at the 5% level; *** at the 1% level.

Notes: Each column reports the results of a separate student-level regression. In columns (1)-(2), the sample is restricted to USAFA graduates who served for at least 2 years. The dependent variable in column (1) is equal to 1 if the student received a master's degree within 2 years after graduating and is equal to 0 otherwise. The dependent variable in column (2) is equal to 1 if the student received a STEM master's degree within 2 years after graduating and is equal to 0 otherwise. The dependent variable in column (3) is equal to 1 if the student separated from the military within 2 years after graduating and is equal to 0 otherwise. Controls include SAT verbal score, SAT math score, academic composite score, leadership composite score, fitness score, and indicators for black, Hispanic, Asian, other, recruited athlete, attended preparatory school, enlisted prior to entering the Academy, and age 17-19. In addition, regressions include controls for the proportion of student i's professors in first-year STEM courses who held the rank of Associate Professor or Professor, the proportion who held a terminal degree, and the proportion who were civilian. All regressions include indicators for graduating class.

Table A3. Professor Gender Effects on Separation from the Military and Education Outcomes: Controlling for First-Year Professor Indicators

Specification	Master's degree ≤ 4 years (1)	STEM master's degree ≤ 4 years (2)	Professional degree ≤ 4 years (3)	Separated military ≤ 4 years (4)
		Panel A. All students		
Proportion of female professors	-0.023	-0.168*	0.035	-0.021
(STEM first-year courses)	(0.134)	(0.096)	(0.056)	(0.089)
Female student	0.133***	-0.004	0.018*	0.046***
	(0.027)	(0.015)	(0.010)	(0.016)
Female student x proportion of female professors	-0.150	0.099	-0.033	-0.002
	(0.095)	(0.060)	(0.037)	(0.065)
Observations	4,345	4,345	4,345	4,690
Professor indicators	Yes	Yes	Yes	Yes
Dependent variable mean (female students)	0.269	0.066	0.025	0.105
Dependent variable mean (male students)	0.163	0.059	0.013	0.066
		Panel B. SAT math <= 660 (median)		
Proportion of female professors	0.050	-0.070	-0.064	0.295
(STEM first-year courses)	(0.257)	(0.162)	(0.067)	(0.204)
Female student	0.121***	0.005	0.003	0.032
	(0.035)	(0.015)	(0.008)	(0.021)
Female student x proportion of female professors	-0.243*	-0.022	-0.015	0.048
	(0.131)	(0.056)	(0.028)	(0.092)
Observations	2,325	2,325	2,325	2,521
Professor indicators	Yes	Yes	Yes	Yes
Dependent variable mean (female students)	0.237	0.033	0.008	0.104
Dependent variable mean (male students)	0.151	0.029	0.006	0.070

*Statistically significant at the 10% level; ** at the 5% level; *** at the 1% level.

Notes: Each column reports the results of a separate student-level regression. In columns (1)-(3), the sample is restricted to USAFA graduates who served for at least 4 years. The dependent variable in column (1) is equal to 1 if the student received a master's degree within 4 years after graduating and is equal to 0 otherwise. The dependent variable in column (2) is equal to 1 if the student received a STEM master's degree within 4 years after graduating and is equal to 0 otherwise. The dependent variable in column (3) is equal to 1 if the student received a professional degree within 4 years after graduating and is equal to 0 otherwise. The dependent variable in column (4) is equal to 1 if the student separated from the military within 4 years after graduating and is equal to 0 otherwise. Controls include SAT verbal score, SAT math score, academic composite score, leadership composite score, fitness score, and indicators for black, Hispanic, Asian, other, recruited athlete, attended preparatory school, enlisted prior to entering the Academy, and age 17-19. All regressions include indicators for graduating class and introductory course professors.

Table A3 (continued).

Specification	Master's degree ≤ 4 years (1)	STEM master's degree ≤ 4 years (2)	Professional degree ≤ 4 years (3)	Separated military ≤ 4 years (4)
	Panel C. SAT math > 660 (median)			
Proportion of female professors	-0.014	-0.214	0.011	-0.120
(STEM first-year courses)	(0.184)	(0.144)	(0.082)	(0.109)
Female student	0.145***	-0.023	0.037*	0.056**
	(0.045)	(0.031)	(0.020)	(0.026)
Female student x proportion of female professors	-0.045	0.246**	-0.040	-0.009
	(0.152)	(0.117)	(0.073)	(0.091)
Observations	2,020	2,020	2,020	2,169
Professor indicators	Yes	Yes	Yes	Yes
Dependent variable mean (female students)	0.326	0.126	0.056	0.106
Dependent variable mean (male students)	0.176	0.091	0.019	0.063
	Panel D. SAT math > 700 (75th pctile)			
Proportion of female professors	0.007	-0.303	0.020	-0.173
(STEM first-year courses)	(0.266)	(0.225)	(0.136)	(0.146)
Female student	0.140*	-0.109**	0.052*	0.049
	(0.074)	(0.052)	(0.031)	(0.043)
Female student x proportion of female professors	-0.109	0.471**	-0.221**	0.053
	(0.248)	(0.209)	(0.095)	(0.134)
Observations	1,049	1,049	1,049	1,127
Professor indicators	Yes	Yes	Yes	Yes
Dependent variable mean (female students)	0.371	0.153	0.048	0.121
Dependent variable mean (male students)	0.207	0.116	0.021	0.060

*Statistically significant at the 10% level; ** at the 5% level; *** at the 1% level.

Notes: Each column reports the results of a separate student-level regression. In columns (1)-(3), the sample is restricted to USAFA graduates who served for at least 4 years. The dependent variable in column (1) is equal to 1 if the student received a master's degree within 4 years after graduating and is equal to 0 otherwise. The dependent variable in column (2) is equal to 1 if the student received a STEM master's degree within 4 years after graduating and is equal to 0 otherwise. The dependent variable in column (3) is equal to 1 if the student received a professional degree within 4 years after graduating and is equal to 0 otherwise. The dependent variable in column (4) is equal to 1 if the student separated from the military within 4 years after graduating and is equal to 0 otherwise. Controls include SAT verbal score, SAT math score, academic composite score, leadership composite score, fitness score, and indicators for black, Hispanic, Asian, other, recruited athlete, attended preparatory school, enlisted prior to entering the Academy, and age 17-19. All regressions include indicators for graduating class and introductory course professors.

Table A4. Professor Gender Effects on Separation from the Military and Education Outcomes: Controlling for First-Year Professor Indicators

Specification	Master's degree ≤ 6 years (1)	STEM master's degree ≤ 6 years (2)	Professional degree ≤ 6 years (3)	Separated military ≤ 6 years (4)
		Panel A. All students		
Proportion of female professors	-0.117	-0.262**	0.022	-0.106
(STEM first-year courses)	(0.173)	(0.119)	(0.060)	(0.116)
Female student	0.131***	0.009	0.044***	0.155***
	(0.034)	(0.022)	(0.014)	(0.024)
Female student x proportion of female professors	-0.035	0.015	-0.074	-0.041
	(0.123)	(0.079)	(0.047)	(0.090)
Observations	3,938	3,938	3,938	4,690
Professor indicators	Yes	Yes	Yes	Yes
Dependent variable mean (female students)	0.488	0.119	0.044	0.270
Dependent variable mean (male students)	0.361	0.121	0.015	0.135
		Panel B. SAT math <= 660 (median)		
Proportion of female professors	0.488	0.273	-0.080	0.405
(STEM first-year courses)	(0.354)	(0.233)	(0.073)	(0.251)
Female student	0.139***	0.029	0.023*	0.155***
	(0.048)	(0.027)	(0.013)	(0.033)
Female student x proportion of female professors	-0.037	-0.114	-0.050	-0.018
	(0.182)	(0.094)	(0.043)	(0.132)
Observations	2,086	2,086	2,086	2,521
Professor indicators	Yes	Yes	Yes	Yes
Dependent variable mean (female students)	0.477	0.080	0.023	0.283
Dependent variable mean (male students)	0.361	0.081	0.007	0.141

*Statistically significant at the 10% level; ** at the 5% level; *** at the 1% level.

Notes: Each column reports the results of a separate student-level regression. In columns (1)-(3), the sample is restricted to USAFA graduates who served for at least 6 years. The dependent variable in column (1) is equal to 1 if the student received a master's degree within 6 years after graduating and is equal to 0 otherwise. The dependent variable in column (2) is equal to 1 if the student received a STEM master's degree within 6 years after graduating and is equal to 0 otherwise. The dependent variable in column (3) is equal to 1 if the student received a professional degree within 6 years after graduating and is equal to 0 otherwise. The dependent variable in column (4) is equal to 1 if the student separated from the military within 6 years after graduating and is equal to 0 otherwise. Controls include SAT verbal score, SAT math score, academic composite score, leadership composite score, fitness score, and indicators for black, Hispanic, Asian, other, recruited athlete, attended preparatory school, enlisted prior to entering the Academy, and age 17-19. All regressions include indicators for graduating class and introductory course professors.

Table A4 (continued).

Specification	Master's degree ≤ 6 years (1)	STEM master's degree ≤ 6 years (2)	Professional degree ≤ 6 years (3)	Separated military ≤ 6 years (4)
	Panel C. SAT math > 660 (median)			
Proportion of female professors	-0.169	-0.387**	-0.000	-0.314**
(STEM first-year courses)	(0.236)	(0.167)	(0.089)	(0.143)
Female student	0.109**	-0.023	0.071***	0.159***
	(0.054)	(0.041)	(0.026)	(0.038)
Female student x proportion of female professors	-0.015	0.166	-0.086	-0.082
	(0.183)	(0.136)	(0.085)	(0.125)
Observations	1,852	1,852	1,852	2,169
Professor indicators	Yes	Yes	Yes	Yes
Dependent variable mean (female students)	0.507	0.185	0.079	0.248
Dependent variable mean (male students)	0.362	0.163	0.022	0.128
	Panel D. SAT math > 700 (75th pctile)			
Proportion of female professors	-0.234	-0.659***	0.018	-0.099
(STEM first-year courses)	(0.360)	(0.245)	(0.149)	(0.195)
Female student	0.119	-0.157**	0.121***	0.209***
	(0.086)	(0.065)	(0.045)	(0.063)
Female student x proportion of female professors	-0.142	0.573**	-0.297**	-0.003
	(0.268)	(0.243)	(0.117)	(0.192)
Observations	959	959	959	1,127
Professor indicators	Yes	Yes	Yes	Yes
Dependent variable mean (female students)	0.545	0.218	0.089	0.284
Dependent variable mean (male students)	0.380	0.189	0.025	0.127

*Statistically significant at the 10% level; ** at the 5% level; *** at the 1% level.

Notes: Each column reports the results of a separate student-level regression. In columns (1)-(3), the sample is restricted to USAFA graduates who served for at least 6 years. The dependent variable in column (1) is equal to 1 if the student received a master's degree within 6 years after graduating and is equal to 0 otherwise. The dependent variable in column (2) is equal to 1 if the student received a STEM master's degree within 6 years after graduating and is equal to 0 otherwise. The dependent variable in column (3) is equal to 1 if the student received a professional degree within 6 years after graduating and is equal to 0 otherwise. The dependent variable in column (4) is equal to 1 if the student separated from the military within 6 years after graduating and is equal to 0 otherwise. Controls include SAT verbal score, SAT math score, academic composite score, leadership composite score, fitness score, and indicators for black, Hispanic, Asian, other, recruited athlete, attended preparatory school, enlisted prior to entering the Academy, and age 17-19. All regressions include indicators for graduating class and introductory course professors.

Table A5. Professor Gender and Occupational Choice

	Pilot #1 Choice	STEM #1 Choice	STEM Top 2 Choices	STEM Anywhere among Choices
Specification	(1)	(2)	(3)	(4)
	Panel A. All students			
Proportion of female professors	0.025	-0.006	0.031	0.051
(STEM first-year courses)	(0.044)	(0.030)	(0.048)	(0.048)
Female student	-0.312***	0.060***	-0.010	-0.133***
	(0.029)	(0.022)	(0.028)	(0.030)
Female student x proportion of female professors	0.059	-0.007	-0.108	-0.068
	(0.116)	(0.089)	(0.111)	(0.118)
Observations	3,809	3,809	3,809	3,809
Dependent variable mean (female students)	0.403	0.160	0.308	0.469
Dependent variable mean (male students)	0.718	0.103	0.344	0.623
	Panel B. SAT math <= 660 (median)			
Proportion of female professors	-0.038	0.081*	0.083	0.129*
(STEM first-year courses)	(0.067)	(0.043)	(0.069)	(0.073)
Female student	-0.328***	0.044*	-0.013	-0.121***
	(0.038)	(0.026)	(0.035)	(0.039)
Female student x proportion of female professors	-0.030	-0.015	-0.168	-0.146
	(0.156)	(0.113)	(0.141)	(0.162)
Observations	2,010	2,010	2,010	2,010
Dependent variable mean (female students)	0.379	0.121	0.240	0.408
Dependent variable mean (male students)	0.693	0.0852	0.275	0.545

*Statistically significant at the 10% level; ** at the 5% level; *** at the 1% level.

Notes: Each column reports the results of a separate student-level regression. The dependent variable in column (1) is equal to 1 if the student listed pilot as their #1 occupational choice and is equal to 0 otherwise. The dependent variable in column (2) is equal to 1 if the student listed a STEM occupation as their #1 occupational choice and is equal to 0 otherwise. The dependent variable in column (3) is equal to 1 if the student listed a STEM occupation in their top 2 occupational choices and is equal to 0 otherwise. The dependent variable in column (4) is equal to 1 if the student listed a STEM occupation anywhere in their occupational choices and is equal to 0 otherwise. Controls include SAT verbal score, SAT math score, academic composite score, leadership composite score, fitness score, and indicators for black, Hispanic, Asian, other, recruited athlete, attended preparatory school, enlisted prior to entering the Academy, and age 17-19. In addition, student-level regressions control for the proportion of student i's professors in first-year STEM courses who held the rank of Associate Professor or Professor, the proportion who held a terminal degree, and the proportion who were civilian. All regressions include indicators for graduating class.

Table A5 (continued).

Specification	Pilot #1 Choice (1)	STEM #1 Choice (2)	STEM Top 2 Choices (3)	STEM Anywhere among Choices (4)
	Panel C. SAT math > 660 (median)			
Proportion of female professors	0.073	-0.070*	0.002	-0.009
(STEM first-year courses)	(0.058)	(0.042)	(0.067)	(0.062)
Female student	-0.305***	0.100**	0.007	-0.144***
	(0.046)	(0.040)	(0.047)	(0.046)
Female student x proportion of female professors	0.201	-0.045	-0.074	-0.011
	(0.174)	(0.140)	(0.180)	(0.174)
Observations	1,799	1,799	1,799	1,799
Dependent variable mean (female students)	0.449	0.230	0.432	0.580
Dependent variable mean (male students)	0.743	0.121	0.413	0.701
	Panel D. SAT math > 700 (75th pctile)			
Proportion of female professors	0.162**	-0.112*	0.016	-0.038
(STEM first-year courses)	(0.080)	(0.062)	(0.095)	(0.086)
Female student	-0.310***	0.088	-0.027	-0.132**
	(0.066)	(0.060)	(0.071)	(0.066)
Female student x proportion of female professors	0.151	0.004	0.004	0.169
	(0.235)	(0.207)	(0.265)	(0.232)
Observations	938	938	938	938
Dependent variable mean (female students)	0.405	0.250	0.474	0.655
Dependent variable mean (male students)	0.732	0.134	0.454	0.713

*Statistically significant at the 10% level; ** at the 5% level; *** at the 1% level.

Notes: Each column reports the results of a separate student-level regression. The dependent variable in column (1) is equal to 1 if the student listed pilot as their #1 occupational choice and is equal to 0 otherwise. The dependent variable in column (2) is equal to 1 if the student listed a STEM occupation as their #1 occupational choice and is equal to 0 otherwise. The dependent variable in column (3) is equal to 1 if the student listed a STEM occupation in their top 2 occupational choices and is equal to 0 otherwise. The dependent variable in column (4) is equal to 1 if the student listed a STEM occupation anywhere in their occupational choices and is equal to 0 otherwise. Controls include SAT verbal score, SAT math score, academic composite score, leadership composite score, fitness score, and indicators for black, Hispanic, Asian, other, recruited athlete, attended preparatory school, enlisted prior to entering the Academy, and age 17-19. In addition, student-level regressions control for the proportion of student i's professors in first-year STEM courses who held the rank of Associate Professor or Professor, the proportion who held a terminal degree, and the proportion who were civilian. All regressions include indicators for graduating class.

Table A6. The Effects of Professor Gender on STEM Occupation Over Different Periods

Specification	STEM occupation is first job (1)	STEM occupation ≤ 2 years (2)	STEM occupation ≤ 4 years (3)	STEM occupation ≤ 6 years (4)
	Panel A. All students			
Proportion of female professors	-0.004	-0.042	-0.038	-0.035
(STEM first-year courses)	(0.031)	(0.035)	(0.035)	(0.035)
Female student	0.028	0.012	-0.004	-0.019
	(0.022)	(0.023)	(0.024)	(0.025)
Female student x proportion of female professors	0.033	0.095	0.119	0.218**
	(0.081)	(0.087)	(0.092)	(0.099)
Observations	4,613	4,505	4,284	3,877
Dependent variable mean (female students)	0.177	0.214	0.204	0.195
Dependent variable mean (male students)	0.150	0.187	0.187	0.172
	Panel B. SAT math <= 660 (median)			
Proportion of female professors	0.083*	0.088*	0.083	0.090*
(STEM first-year courses)	(0.047)	(0.052)	(0.053)	(0.054)
Female student	0.014	0.012	0.004	-0.009
	(0.026)	(0.029)	(0.031)	(0.032)
Female student x proportion of female professors	0.009	0.006	0.027	0.133
	(0.106)	(0.114)	(0.124)	(0.134)
Observations	2,477	2,420	2,287	2,048
Dependent variable mean (female students)	0.141	0.178	0.177	0.171
Dependent variable mean (male students)	0.133	0.164	0.166	0.153

*Statistically significant at the 10% level; ** at the 5% level; *** at the 1% level.

Notes: Each column reports the results of a separate student-level regression. The dependent variables in columns (1)-(4) is equal to 1 if the student worked in a STEM occupation (e.g., engineer, physicist, chemist, scientist, meteorologist, operations research, cyberspace operations, space operations) and is equal to 0 otherwise. In column (2), the sample is restricted to USAFA graduates who served for at least 2 years. In column (3), the sample is restricted to USAFA graduates who served for at least 4 years. In column (4), the sample is restricted to USAFA graduates who served for at least 6 years. Controls include SAT verbal score, SAT math score, academic composite score, leadership composite score, fitness score, and indicators for black, Hispanic, Asian, other, recruited athlete, attended preparatory school, enlisted prior to entering the Academy, and age 17-19. In addition, regressions include controls for the proportion of student *i*'s professors in first-year STEM courses who held the rank of Associate Professor or Professor, the proportion who held a terminal degree, and the proportion who were civilian. All regressions include indicators for graduating class.

Table A6 (continued).

Specification	STEM occupation is first job (1)	STEM occupation ≤ 2 years (2)	STEM occupation ≤ 4 years (3)	STEM occupation ≤ 6 years (4)
	Panel C. SAT math > 660 (median)			
Proportion of female professors	-0.067	-0.146***	-0.133***	-0.134***
(STEM first-year courses)	(0.041)	(0.046)	(0.046)	(0.044)
Female student	0.069*	0.036	0.003	-0.021
	(0.038)	(0.040)	(0.040)	(0.042)
Female student x proportion of female professors	0.021	0.155	0.201	0.300**
	(0.124)	(0.133)	(0.137)	(0.147)
Observations	2,136	2,085	1,997	1,829
Dependent variable mean (female students)	0.241	0.279	0.254	0.235
Dependent variable mean (male students)	0.167	0.211	0.210	0.193
	Panel D. SAT math > 700 (75th pctile)			
Proportion of female professors	-0.079	-0.202***	-0.188***	-0.166***
(STEM first-year courses)	(0.058)	(0.064)	(0.063)	(0.061)
Female student	0.078	0.000	-0.013	-0.038
	(0.058)	(0.061)	(0.063)	(0.066)
Female student x proportion of female professors	0.086	0.400*	0.405*	0.617***
	(0.187)	(0.205)	(0.216)	(0.219)
Observations	1,108	1,080	1,034	944
Dependent variable mean (female students)	0.281	0.326	0.317	0.320
Dependent variable mean (male students)	0.181	0.232	0.234	0.214

*Statistically significant at the 10% level; ** at the 5% level; *** at the 1% level.

Notes: Each column reports the results of a separate student-level regression. The dependent variables in columns (1)-(4) is equal to 1 if the student worked in a STEM occupation (e.g., engineer, physicist, chemist, scientist, meteorologist, operations research, cyberspace operations, space operations) and is equal to 0 otherwise. In column (2), the sample is restricted to USAFA graduates who served for at least 2 years. In column (3), the sample is restricted to USAFA graduates who served for at least 4 years. In column (4), the sample is restricted to USAFA graduates who served for at least 6 years. Controls include SAT verbal score, SAT math score, academic composite score, leadership composite score, fitness score, and indicators for black, Hispanic, Asian, other, recruited athlete, attended preparatory school, enlisted prior to entering the Academy, and age 17-19. In addition, regressions include controls for the proportion of student *i*'s professors in first-year STEM courses who held the rank of Associate Professor or Professor, the proportion who held a terminal degree, and the proportion who were civilian. All regressions include indicators for graduating class.

Table A7. STEM and Non-STEM Occupations

Occupation Code	STEM Occupation
13S	Space Operations
14W, 15W⁺	Weather
17S	Cyber Warfare Operations
32E	Civil Engineer
61A	Operations Research Analyst
61B⁺	Behavioral Scientist
61C	Chemist/Nuclear Chemist
61D	Physicist/Nuclear Engineer
61S⁺	Scientist
62E⁺⁺	Developmental Engineer

Occupation Code	Non-STEM Occupation
11B	Bomber Pilot
11E	Experimental Test Pilot
11F	Fighter Pilot
11G	Generalist Pilot
11H	Rescue Pilot
11K	Trainer Pilot
11M	Mobility Pilot
11R	Reconnaissance/Surveillance/Electronic Warfare Pilot
11S	Special Operations Pilot
11U	Remotely Piloted Aircraft Pilot
11X	Pilot
12B	Bomber Combat Systems Officer
12E	Experimental Test Combat Systems Officer
12F	Fighter Combat Systems Officer
12G	Generalist Combat Systems Officer
12H	Rescue Combat Systems Officer
12K	Trainer Combat Systems Officer
12M	Mobility Combat Systems Officer
12R	Reconnaissance/Surveillance/Electronic Warfare Combat Systems Officer
12S	Special Operations Combat Systems Officer
12U	Remotely Piloted Aircraft Pilot
12X	Combat Systems Officer
13A	Astronaut
13B	Air Battle Manager
13C	Special Tactics
13D	Combat Rescue Officer
13L	Air Liaison Officer
13M	Airfield Operations
13N	Nuclear and Missile Operations
14F	Information Operations

Table A7 (continued).

14N	Intelligence
16F	Regional Affairs Strategist
16G	Air Force Operations Staff Officer
16P	Political Military Affairs Strategist
16R	Planning and Programming
16X	Operations Support
17C	Cyberspace Operations Commander
17D	Cyberspace Operations
18A	Attack Remotely Piloted Aircraft Pilot
18E	Experimental Test Remotely Piloted Aircraft Pilot
18G	Generalist Remotely Piloted Aircraft Pilot
18R	Reconnaissance Remotely Piloted Aircraft Pilot
18S	Special Operations Remotely Piloted Aircraft Pilot
18X	Remotely Piloted Aircraft Pilot
20C	Logistics Commander
20X	Logistics
21A	Aircraft Maintenance
21M	Munitions and Missile Maintenance
21R	Logistics Readiness
21X	Logistics Utilization
30C	Support Commander
31P	Security Forces
33S[+]	Communication and Information
34M[+]	Services
35B	Air Force Band
35P	Public Affairs
36P[+], 37F[+], 38P[+]	Personnel
38F	Force Support
38M[+]	Manpower
40C	Medical Commander
41A	Health Services Administrator
42B	Physical Therapist
42E	Optometrist
42F	Podiatrist
42G	Physician Assistant
42N	Audiologist
42P	Clinical Psychologist
42S	Clinical Social Worker
42T	Occupational Therapist
42X	Biomedical Clinician
43A	Aerospace and Operational Physiologist
43B	Biomedical Scientist
43D	Dietitian
43E	Bioenvironmental Engineer

Table A7 (continued).

43H	Public Health Officer
43P	Pharmacist
43T	Biomedical Laboratory
43X	Biomedical Specialist
44A	Chief Hospital/Clinic Services
44B	Preventive Medicine
44D	Pathologist
44E	Emergency Services Physician
44F	Family Physician
44G	General Practice Physician
44H	Nuclear Medicine Physician
44J	Clinical Geneticist
44K	Pediatrician
44M	Internist
44N	Neurologist
44O	Physician
44P	Psychiatrist
44R	Diagnostic Radiologist
44S	Dermatologist
44T	Radiotherapist
44U	Occupational Medicine
44X	Physician
44Y	Critical Care Medicine
44Z	Allergist
45A	Anesthesiologist
45B	Orthopedic Surgeon
45E	Ophthalmologist
45G	Obstetrician and Gynecologist
45N	Otorhinolaryngologist
45P	Physical Medicine Physician
45S	Surgeon
45U	Urologist
45X	Surgery
46A	Nursing Administrator
46F	Flight Nurse
46N	Clinical Nurse
46P	Mental Health Nurse
46S	Operating Room Nurse
46X	Nurse
46Y	Advanced Practice Registered Nurse
47B	Orthodontist
47D	Oral and Maxillofacial Pathologist
47E	Endodontist
47G	Dentist

Table A7 (continued).

47H	Periodontist
47K	Pediatric Dentist
47P	Prosthodontist
47S	Oral and Maxillofacial Surgeon
47X	Dental
48A	Aerospace Medicine Specialist
48G	General Medical Officer Flight Surgeon
48R	Residency Trained Flight Surgeon
48V	Pilot Physician
48X	Aerospace Medicine
51J	Judge Advocate
52R	Chaplain
60C	Senior Materiel Leader-Upper Echelon
63A	Acquisition Manager
63F, 65F⁺	Financial Management
63G	Senior Materiel Leader-Lower Echelon
63S	Materiel Leader
64P	Contracting
65W	Cost Analysis
71S	Special Investigations
81T	Instructor
82I	Recruiting Service
84H	Historian
85G	Air Force Honor Guard
86M	Operations Management
86P	Command and Control
87G	Wing Inspector General
87I	Director Wing Inspections
87Q	Director Complaints Resolution
88A	Aide-De-Camp
90G	General Officer
91C	Commander
91W	Wing Commander
92J	Air Force Reserve Officer Training Corps Educational Delay Law Student
92M	Health Professions Scholarship Program Medical Student
92P	Physician Assistant Student
92R	Chaplain Candidate
92S	Student Officer Authorization
92T	Pilot Trainee
92W	Combat Wounded Warrior
93P	Patient
95A	USAFA Liaison Officer or Civil Air Patrol Reserve Assistance Program Officer
96A	Disqualified Officer-Reasons Beyond Their Control
96B	Disqualified Officer-Reasons Within Their Control

Table A7 (continued).

96D	Officer Not Available For Use in Awarded Air Force Specialty Code for Cause
96U	Unclassified Officer
96V	Unallotted
97E	Executive Officer
99A	Unspecified AFSC
99G	Gold Bar Diversity Recruiter

[+] Occupation no longer exists or occupation code was changed during the time period of analysis.
[++] Developmental engineer includes the following occupations: Aeronautical Engineer, Astronautical Engineer, Computer Systems Engineer, Electrical/Electronic Engineer, Flight Test Engineer, Project Engineer, and Mechanical Engineer.