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Gender Disparities in Educational Attainment in the New Century: Trends, Causes and Consequences

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In a longstanding ritual, each spring tasseled graduates march across the stages of American colleges and universities, clutching diplomas – bachelor's, master's, doctorates. Over time, women have come to dominate that throng.

Consider the statistics. In 1970, 58% of college students were men; in 2010, 57% were women (National Center for Education Statistics, 2012). By all predictions, women will gain in college enrollment and graduation over the next decade, widening the gender-gap, albeit more slowly than in recent decades (National Center for Education Statistics, 2012, table 283). The "feminization" of higher education is not unique to the United States; it has occurred in most industrialized societies. College administrators, policy makers and the media have noted the trend.[1] Researchers are trying to understand it.

This report analyzes women's educational gains in the United States and places them within the broader international context. We describe the changes in the relative educational attainment of females and males in the United States over the twentieth and early twenty-first centuries and consider the explanations for the reversal of the gender gap in college completion during these years. We show that the same trend is found for every main racial/ethnic group, although the timing occurred much earlier for blacks than for other groups. It coincides with a substantial reduction in segregation across fields of study in the early 1970s, though this equalization has leveled off in recent years. We find that as early as the 1928 birth cohort men tended to delay college graduation. At the youngest age (22) they lagged slightly behind white women but surpassed them at older ages, but for more recent cohorts they are farther behind at 22 and do not catch up with age. In the quest to understand why women have overtaken men in their rates of

[1] See, for example, "Colleges Look for Ways to Reverse a Decline in Enrollment of Men" *Chronicle of Higher Education* November 26, 1999; "The Male Minority" *Time Magazine* December 2, 2000; "The New Gender Gap" *Business Week* May 26, 2003; "Male Students' College Achievement Gap Brings Concern" *The Washington Post* August 31, 2003. "The Chronicle of Higher Education," Section B, "Diversity in Academe: The Gender Issue." November 2, 2012.

college degree receipt, this report considers macro-societal changes as well as gender differences in academic performance. The female advantage in college completion emerged out of the combination of a longstanding female advantage in academic performance and the development of a more egalitarian society that raised the incentive for girls to obtain higher education.

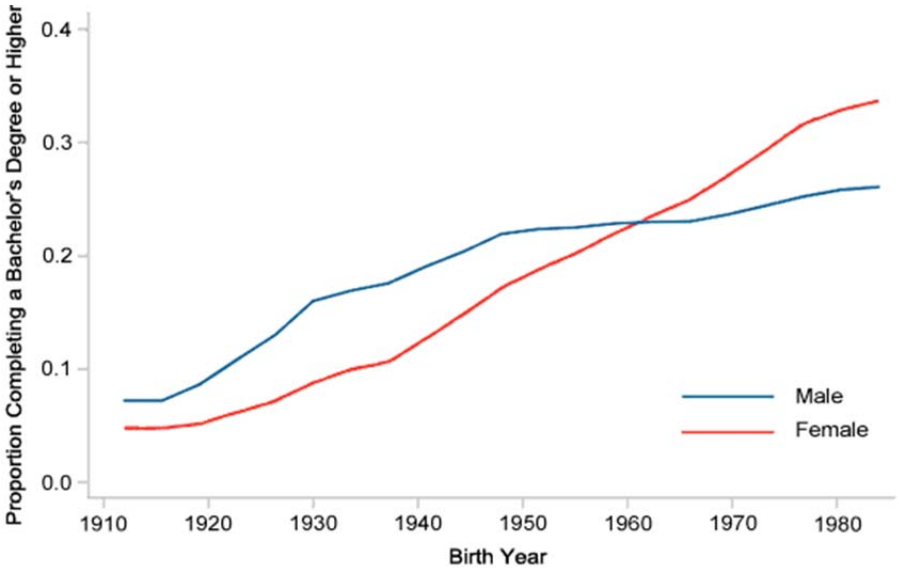
1. Gender Gaps in Educational Attainment: 1940-2010

In the twentieth century, America's high schools, then its colleges and universities, expanded dramatically. In 1900 most people had only primary schooling. By 1920 high school graduation was widespread, and by 1960 most high school graduates had attended college (Fischer and Hout, 2006, p. 10). In the latter part of the twentieth century, college graduation supplanted high school graduation as the educational watershed. While fewer than 7 percent of people born in 1915 graduated from college, 28 percent of those born in 1975 graduated from college by the age of 25 (Bailey and Dynarski, 2009). The expansion of higher education reflected a public commitment, manifested through the creation of state college systems and direct federal aid to students (first with the GI Bill, later with grant and loan programs) (Fischer and Hout, 2006, p. 14). Of course, although overall the education of the population rose, the trend varied by gender and race.

Trends in bachelor's degrees for men and women are shown in Figure 1, based on U.S. census data from 1940-2000 and American Community Survey data from 2010. In 1940 (when cohorts born in 1912-1914 were 26-28 years old), only about five percent of women and seven percent of men completed a bachelor's degree by ages 26-28.[2] By 2010, 36 percent of women and 28 percent of men in this age range had completed a bachelor's degree. How did this reversal

[2] For convenience, we sometimes use "BA" as a shorthand for "bachelor's degree," though colleges and universities award many types of bachelor's degree – most notably a Bachelor of Science (BS), but also a Bachelor of Engineering (BE), a Bachelor of Science in Engineering (BSE), a Bachelor of Business Administration (BBA), a Bachelor of Nursing (BN), a Bachelor of Fine Arts (BFA), and other variants– depending on one's major or university attended.

Figure 1. Proportion of 26-28 Year Olds with Bachelor's Degree, Birth Cohorts 1912-1984, by Birth year



Source: Author's compilation based on IPUMS census data, 1940 to 2000 (Ruggles et al. 2010); American Community Survey (U.S. Census Bureau 2010).

happen? The male/female gap in degrees was relatively small in 1940. But from 1940 onward, men earned more bachelor's degrees than women; by 1960 (when cohorts born in 1932-1934 were 26-28 years old), 15 percent of men earned bachelor's degrees, compared to 8 percent of women. Over the next decade the rate of degree receipt increased for men and women, but 1950 marked a watershed: men's rate of BA completion stopped growing. That stagnation persisted for years: men born in the mid-1960s had virtually the same rate of graduation as men born fifteen years earlier. The Vietnam war draft figured into the stagnation: many men stayed in school to take advantage of student exemptions and avoid serving in the military (Freeman, 1976; Card and Lemieux, 2001). Also, during this time, the wage premium for a college degree declined (economists blame the large supply of new college-educated job seekers from the early baby boom cohorts: Freeman, 1976). However, the persistent stagnation in men's college completion rates has deeper causes. As of 1980, the proportion of 26-28 year old men completing a

bachelor's degree was still 25 percent, and reached only 26 percent by 2000 and 28 percent by 2010.

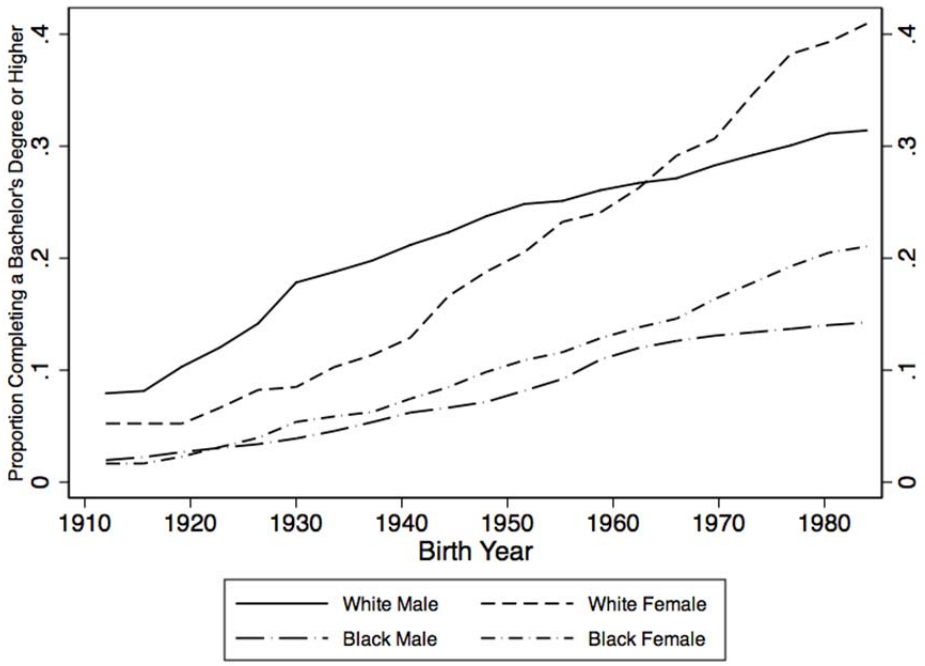
In contrast, more women were entering and graduating from college. Their rate of graduation continued to rise after the birth cohorts of 1950 even as male rates stagnated. By the time the 1960 birth cohorts had moved through the college enrollment years, the gender gap had closed. In the past thirty years, the proportion of 26-28 year old women earning at least a bachelor's degree rose from 21 percent (1980) to 30 percent (2000) to 36 percent (2010). Two factors are crucial: 1) the stable growth in the proportion of American women who earn college degrees, and 2) the prolonged stagnation in the comparable rates for American men.

Race and Ethnic Differences in Gender Disparities in Educational Attainment

In the educational arena, women predominate, but the size of the male/female gap varies by race and ethnicity. It is largest for blacks, but it is also large for Hispanics and Native Americans. In 2010, women earned 66% of all bachelor's degrees awarded to blacks, 61% for Hispanics, 60% for Native Americans, 55% for Asians, and 56% for whites (National Center for Education Statistics, 2012). Consider the trends in college completion for much of the past century. Figure 2 presents the proportion of 26-28 year-old blacks and non-Hispanic whites with at least a bachelor's degree by gender and race across the birth cohorts covered by the census and ACS data from 1940 to 2010. The trend for the two groups differs. With whites, the gender-gap reversed. However, black men never led black women in rates of graduation. In 1940, only 1.3 percent of 26-28 year old black men, and 1.6 percent of black women, earned a college degree.[3] And since 1940 black women have advanced faster.

[3] The appearance of crossing in the early birth cohorts for blacks is an artifact of the statistical smoothing of the graphs.

Figure 2: Proportion of 26-28 Year Olds with a Bachelor's Degree or Higher by Gender for Blacks and Non-Hispanic Whites, Birth Cohorts 1912-1984, by Birth Year.

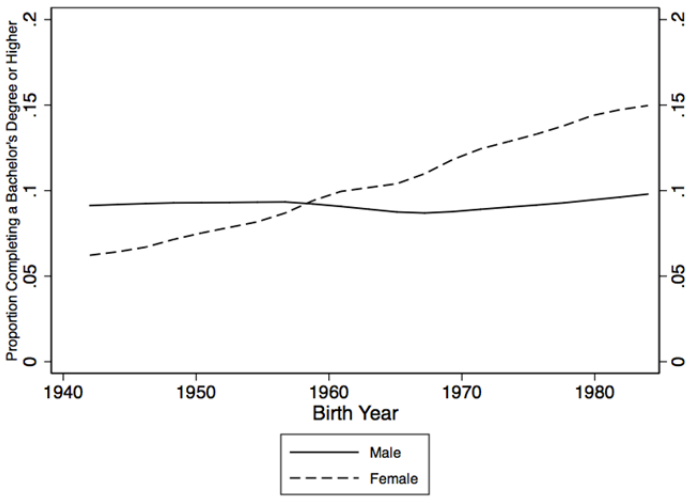


The trends for Asians, Hispanics and Native Americans are similar to those for whites. Despite the large racial and ethnic differences in the proportion of population completing a bachelor's degree, women out-perform men within each racial and ethnic group. Data for these groups from 1980 to the present[4] are shown in Figure 3. (Note that Hispanics and Native Americans are placed on a different scale from Asians, whose college graduation rates are higher than those of any other ethnic group.) Among Hispanics, Asians, and Native Americans, women were in the process of passing men in their rate of BA completion for 26-28 year olds born in the early 1960s. By 2010, among birth cohorts of the early 1980s, the female lead had widened for all three groups: for Hispanics (17 percent of women versus 12 percent of men), for Asians (62 percent of women versus 58 percent of men) and for Native Americans (14 percent of women versus 11 percent of men).

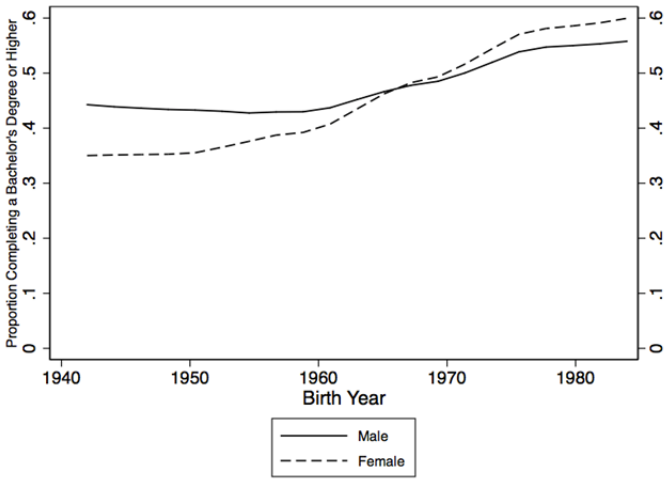
[4] Small sample sizes for these three groups limit the ability to document trends prior to 1980.

Figure 3: Proportion of 26-28 Year Olds with a Bachelor's Degree or Higher by Gender and Hispanic, Asian, and Native-American Status, Birth Cohorts 1942-1984, by Birth Year. Source: IPUMS 1940-2000, ACS 2010.

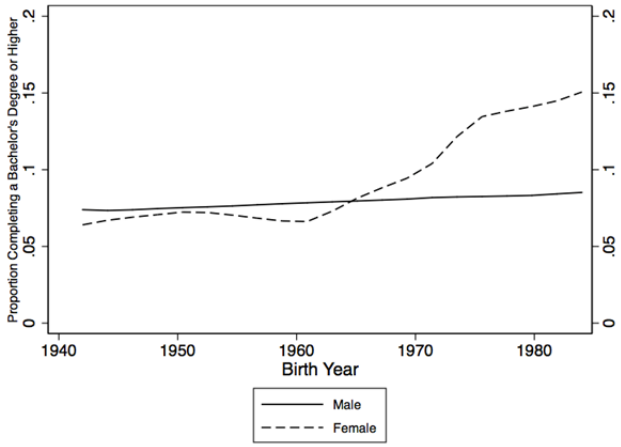
Hispanics



Asians



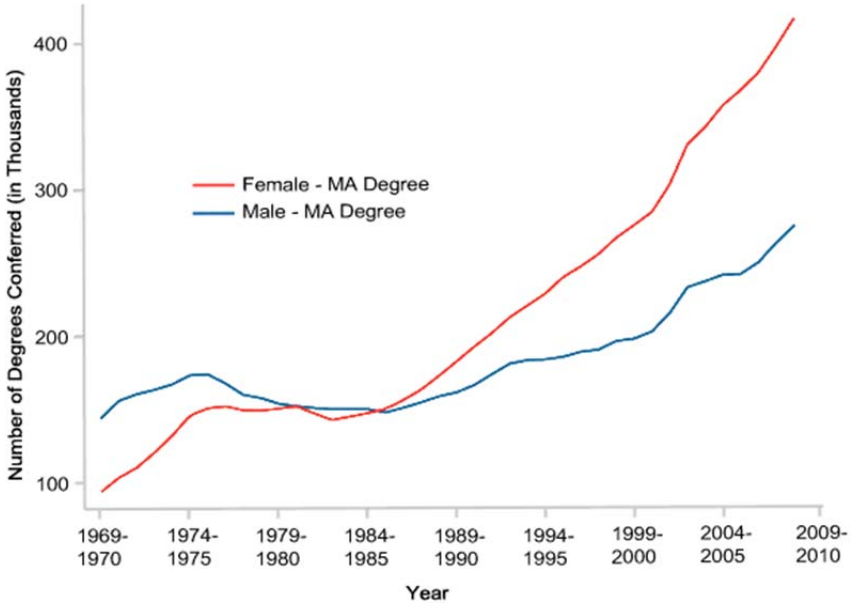
Native Americans



Gender Gaps in Graduate and Professional Degrees

Masters' degrees show the same gender gap. Figure 4 displays trends in men's and women's completion of master's degrees from the 1969-1970 school year to the 2009-2010 school year. Just over three decades ago, in 1969-1970, more men earned master's degrees than women (143,083 master's degrees to men versus 92,481 to women).[5] But from 1980 onward, women oupaced men. By 2009-10, women were awarded roughly 50% more master's degrees than men (417,828 degrees versus 275,197).

Figure 4: Number of Master's Degrees Conferred (in Thousands) by Gender, 1969-1970 to 2009-10.



Source: Author's compilation based on Snyder and Dillow (2012).

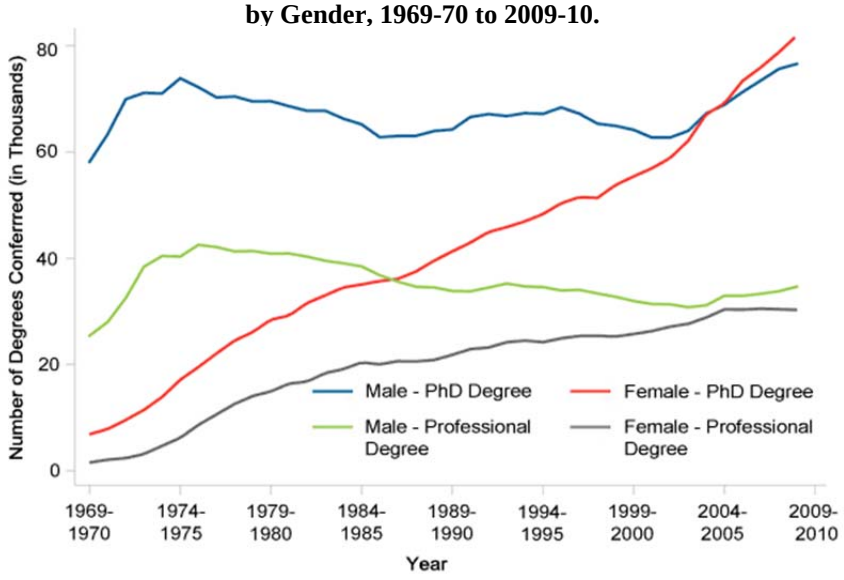
Women's growth in professional and doctoral degrees has been slower than that for bachelor's or master's degrees (Figure 5), and women have only recently reached parity with men in professional and doctoral degrees. In 1970, men completed sixteen times more professional degrees (such as medical, dentistry or law degrees) than women. Since 1982, the number of professional degrees completed by men has declined slightly (from 40,229 in 1982 to

[5] Statistics on the number of degrees awarded come from National Center for Education Statistics (2012).

34,661 in 2010), while women again outpaced men – from 1,534 professional degrees in 1970 to 30,289 in 2010.

The pattern for doctoral degrees is similar: men completed almost eight times as many doctoral degrees as women in 1969-70 (58,137 doctoral degrees to men versus 6,861 to women). By 2009-10, women received more doctoral degrees (81,953 versus 76,605). If these trends continue, the gender gap in professional and doctoral degrees may soon resemble the female-favorable gender gap in bachelor's and master's degrees.

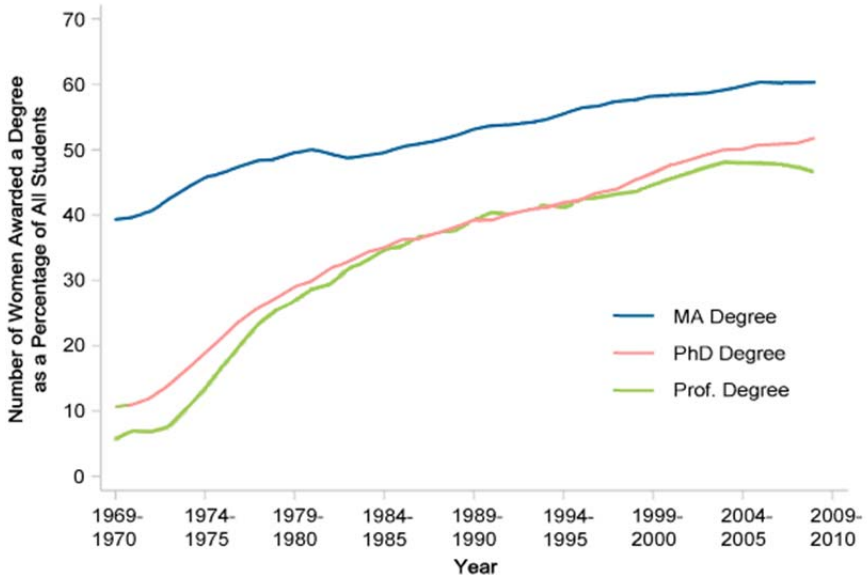
Figure 5: Number of Doctoral and Professional Degrees Conferred (in Thousands) by Gender, 1969-70 to 2009-10.



Source: Authors' compilation based on Snyder and Dillow (2012).

Figure 6 presents the data from Figures 4 and 5 in terms of women's share of degrees. In 1969-70, women comprised almost forty percent of master's degrees' recipients, but only 11 percent of doctoral recipients and 6 percent of professional degree recipients. Women's share of master's degrees has grown: women currently comprise 60 percent of students earning master's degrees. Their share of professional and doctoral degrees has increased as well: women now earn 47 percent of professional degrees and 52 percent of doctoral degrees. At every level of education, women have achieved equality or surpassed men in the number of degrees earned.

Figure 6: Women's Share of Master's, Doctoral and Professional Degrees Awarded, 1969-70 to 2009-10.



Source: Author's compilation based on data from the National Center for Education Statistics (Snyder and Dillow 2012).

Gender Segregation in Fields of Study

Gender differences in type of institution (elite versus nonelite, public versus private) and field of study (major) also matter. They mark what Charles and Bradley (2002) have termed the "horizontal" dimensions of educational sex segregation (for a review, see Gerber and Cheung, 2008). In contrast to the rapid advancement of women in eduational attainment, the gender composition of fields of study has changed far more slowly (England and Li, 2006). Figure 7 displays changes in the dissimilarity index over the past 40 years for bachelor's degree recipients, calculated by Mann and DiPrete (2012), using 53 field-of-study categories in the National Science Foundation's WebCASPAR database. The figure combines the fields into three general categories: Arts and Sciences, Sciences and Education-Business-Other.[6] The disssimilarity index

[6] The arts and sciences consist of psychology, economics, political science and public administration, sociology, anthropology, linguistics, history of science, area and ethnic studies, other social sciences, history, English and literature, foreign languages, other humanities, religion and theology, arts and music, and architecture and environmental design. The sciences consist of the aerospace engineering, chemical engineering, civil engineering, electrical engineering, mechanical engineering, materials engineering, industrial engineering, other

shows a pronounced decline in gender segregation through the mid-1990s, when the decline began to stagnate. Over a decade ago Jacobs (1995) and Turner and Bowen (1999) identified this slowdown in gender integration. The key factor, however, was the decline in the education-business-other index through the mid-1980s. Gender segregation in fields within the arts and sciences has been more uneven. As for the sciences, the overall level of segregation has been much higher and appears to be rising.

Mann and DiPrete (Figure 7) also computed trends in the index of association using WebCASPAR data. The index of association measures the factor by which women are underrepresented in the average field of study (Charles and Grusky, 1995); it is not affected by changes in the share of students in particular fields. This is important because the overall attractiveness of many STEM fields has changed. With this measure, the gender segregation trends become more pronounced. The index decreased for all fields (total) before 1980, dropping from more than 6 in the late 1960s to about 3 in 1980. In terms of the broad subfields, gender segregation in education-business-other majors has diminished, albeit more slowly than in the 1980s, but segregation in the arts and sciences (especially in the sciences) has risen slightly over the past decade.

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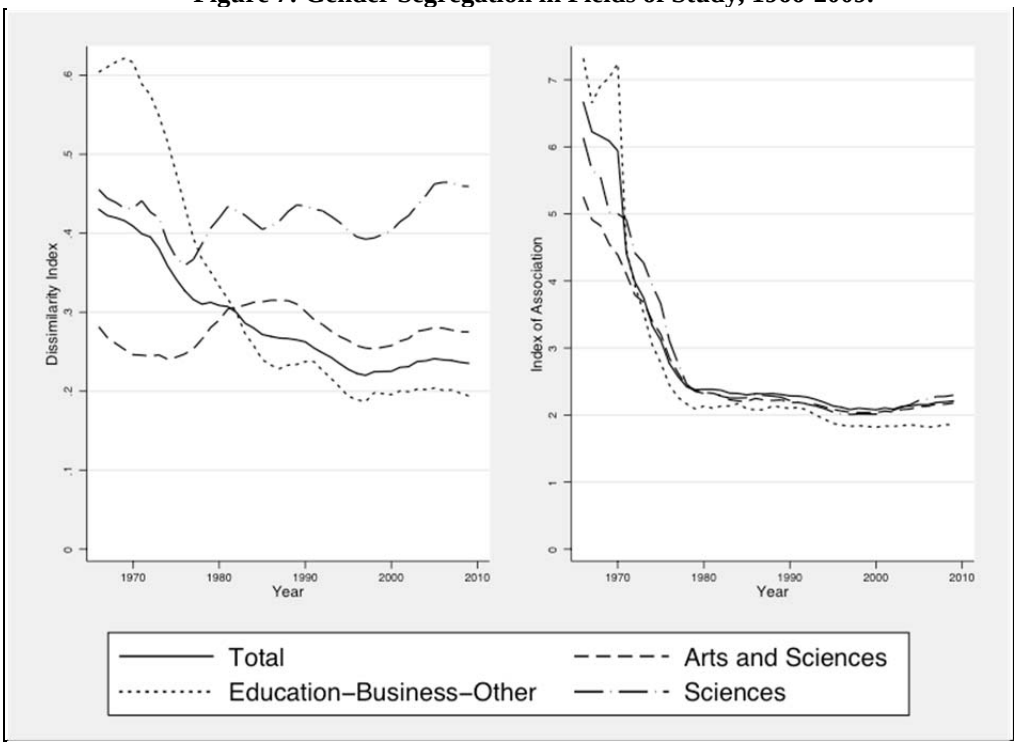
engineer, astronomy, chemistry, physics, other physical sciences, atmospheric sciences, earth sciences, oceanography, mathematics and statistics, computer science, biological sciences, and agricultural science. The "education-business-other" fields are science technologies, engineering technologies, health technologies, other science and engineering technologies, interdisciplinary or other sciences, communication and librarianship, law, social service professions, vocational studies and home economics, other non-sciences or unknown, medical sciences, other life sciences, education, science education, mathematics education, social science education, other science/technical education, non-science education, and business and management.

Figure 7: Gender Segregation in Fields of Study, 1966-2009.



Source: Mann and Di Prete (2012). Data drawn from National Science Foundation Web-CASPAR Database. Note: The first graphic displays the index of dissimilarity from years 1966-2009. The second displays the index of association for the same years. Each contains a total all-fields index and sub-field indices, as indicated in the legend.

2. The Pathways to College Completion in Contemporary America

Before graduating from college, students must finish elementary school, middle school, then high school. Children usually start first grade at age 6, complete high school by age 18, and college by age 22. Many events can disrupt this normative trajectory including late entry into elementary school, grade retentions, delayed entry into college. In addition, students may matriculate first at a community college, attend school part-time, or exit and re-enter college. Here we delve into the impact of some of these factors on gender differences in graduation among blacks and whites. First, we examine age-specific four-year college completion rates, then we examine trends in the educational transitions preceding college graduation.

Age and cohort differences

Table 1 highlights the importance of age on the gender gap. Across the birth cohorts covered by the 1940-2000 census data, men consistently delayed the school transitions. Over time, the magnitude and direction of the age-specific gender gap has changed. For the 1918 cohort, white men and women both completed college by age 22 at almost the same rates (1.02), but men quickly surpassed women and by age 28, white women had only two-thirds the odds of completing college as did men (0.63).[7] In the 1928 cohort white men were at a distinct disadvantage at age 22, but they caught up and by age 28, white women had only half (0.48) the chance of completing college. The 1938 and 1948 cohorts mark the nadir for white women; they lagged behind men at age 22 and continued to fall behind. But by the 1968 cohort women had higher odds of graduating at age 22 and maintained an advantage at age 28. Their advantage was even greater for the 1974 cohort.

The pattern is somewhat different among blacks, although here also we find the tendency for men to delay graduation. As shown in Table 1, black women had higher odds of completing college across all time points and most ages In the 1938 birth cohort, the odds of completing college by age 22 for black women were 2.6 times higher than for black men. In this 1938 birth cohort black men gradually reduced their education deficit: by age 26-28, they lagged only slightly behind black women in their likelihood of finishing four years of college. The 1948 cohort of black men was similar to the 1938 cohort: they lagged well behind black women in rates of college completion during their early twenties, but achieved near parity with black women by their late twenties. Across subsequent cohorts, however, black men, like white men,

[7] The odds of an event is the ratio of the probability that an event occurs and the probability that the event does not occur (e.g., when the odds are 2 to 1 in favor of the home team winning, they are twice as likely to win as to lose). If females in the 1918 birth cohort had 2/3 the odds of completing college as did white males, then the ratio of the odds for females and males (i.e., the odds ratio) is .66.

fell back. The female-to-male odds ratio at age 26 grew from 1.12 for the 1938 birth cohort, to 1.17 for the 1948 birth cohort, 1.24 for the 1958 birth cohort, and 1.40 for the 1968 birth cohort. It remained roughly at this level for the 1974 birth cohort as well.

Table 1: Female to Male Odds Ratios for Completing Four-Year College by Age, Year and Race

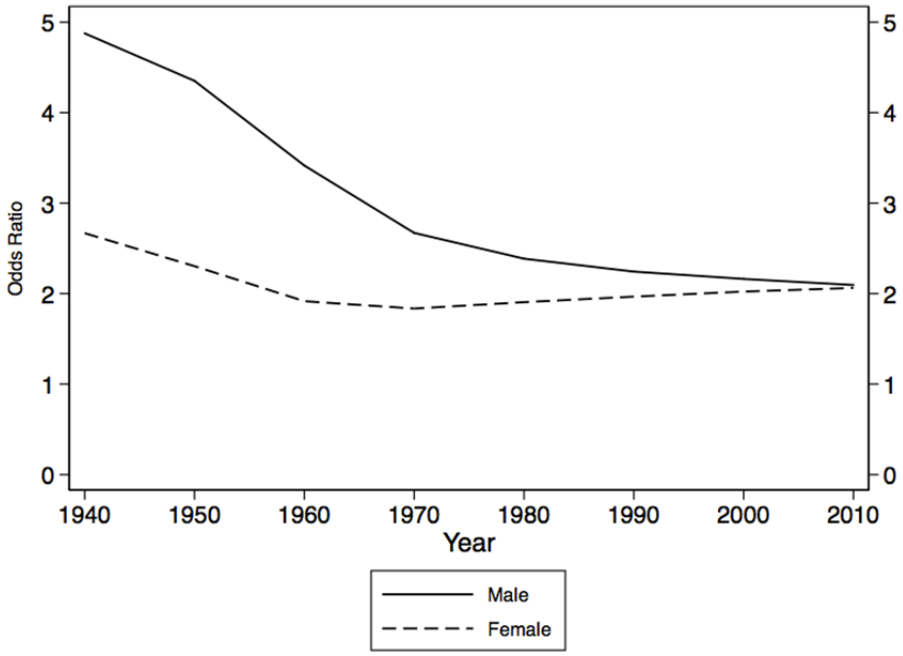
	Census Year/Birth Cohort						
	1940/1918	**1950/1928**	**1960/1938**	**1970/1948**	**1980/1958**	**1990/1968**	**1996/1974**
Whites							
22	1.02	1.58	0.82	0.86	1.19	1.41	1.56
23	0.85	1.18	0.71	0.81	1.08	1.38	1.57
24	0.76	0.75	0.69	0.81	0.98	1.20	1.42
25	0.65	0.57	0.59	0.77	0.99	1.21	1.39
26	0.58	0.51	0.58	0.74	0.95	1.15	1.24
27	0.58	0.51	0.55	0.70	0.91	1.15	1.29*
28	0.63	0.48	0.52	0.69	0.89	1.12	1.25*
Blacks							
22	1.70	3.15	2.63	1.41	1.79	1.34	1.67
23	1.49	2.33	1.72	1.35	1.61	1.57	1.65
24	1.70	1.22	1.41	1.56	1.34	1.41	1.43
25	1.54	1.47	1.53	1.30	1.27	1.48	1.59
26	1.14	0.92	1.12	1.17	1.24	1.40	1.39
27	1.55	1.66	1.36	1.32	1.27	1.42	1.61*
28	1.54	1.21	0.95	0.95	1.31	1.53	1.47*

* Computed based on extrapolating 1990-2000 results into the future. Source: McDaniel et al., 2011.

These statistics can be looked at in another way, comparing blacks and whites within each gender. Figure 8 presents the changing odds ratio in the education of 26-28 year old men (white to black) and women (white to black). The relative odds of a white man versus a black man completing college have declined from nearly 5 times as high in 1940 to only twice as high in 2000, black males making strong gains until 1980 and slower gains thereafter. In contrast, black women have not shown the same progress. Since about 1960, there has been little or no trend in the relative odds of a black woman versus a white woman graduating from college. Black women have not gained in relative terms on white women because both groups have made comparably large strides in their rates of graduation. But because white men have made relatively little progress in their rates of college completion, it has been easier for black men to reduce their

disadvantage. The differing trajectories of white men and women, not of black men and women, have driven the convergence.

Figure 8: White v. Black Odds of Completing a Bachelor's Degree by Ages 26-28, 1940 - 2010, by Gender.



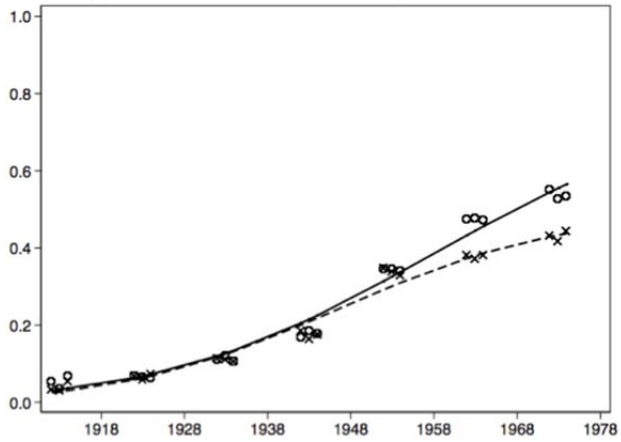
Steps toward higher education

In the many pathways that students take to college (Goldrick-Rab, 2006; Pallas, 2003; Mare, 1981), in the United States, high school graduation is the first step. Many youth do not complete high school. High school graduates who opt for college must then apply, be admitted, and matriculate, before they become college students. Then they must graduate. American college students, especially men, frequently do not get that crucial degree. Consequently, to understand mean gender differences in college completion, we examine gender and racial differences in the transitions that lead to college graduation.[8] Figure 9 shows the trend in rates of black male and

[8] Using the 1940–2000 IPUMS data, we compute the probabilities of enrolling in postsecondary education and completing college, given enrollment, for all observable birth cohorts of individuals aged 22 to 28. Because completed education at every age is known, we can compute the proportion of a group that has completed a specific number of years of education conditional on having completed a particular educational level. Thus, we can analyze differences in the rate of college completion between men and women, for whites and blacks, at any specific age, and for a particular birth cohort in terms of their relative probabilities of

female entry into post-secondary education for census respondents aged 26-28, by birth year.[9] Figure 10 shows the trend in the probability of completing four-year college, given some post-secondary education for the same samples. The growing black gender gap largely reflects the differential in rates of entering post-secondary education. This rise in post-secondary education involved both increased rates of enrollment in community colleges (Snyder and Dillow, 2007), and a more academically diverse population opting to enroll in higher education. Both processes probably contributed to the declining odds of completing four-year college, given college entry, for men and women. The decline in the odds of completing four-year college, given college entry, was actually greater for black women than black men, but this greater decline was not enough to offset the advantage that stemmed from women's more rapid rise in post-secondary enrollment.

Figure 9: Probability of Attaining Some College, by Birth Year, for Blacks Aged 26-28.

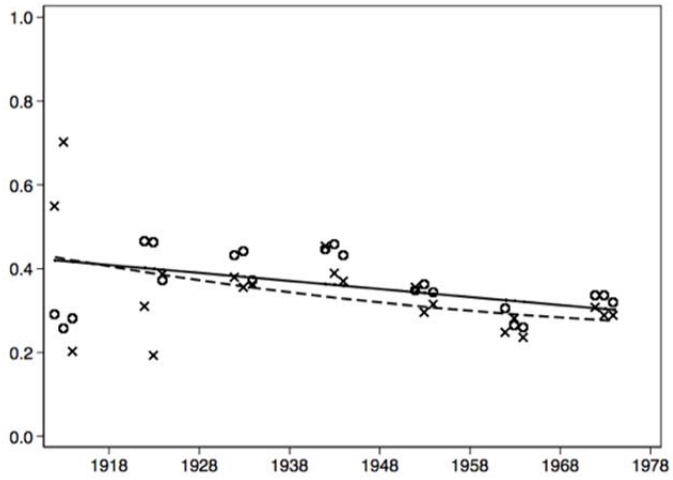


Unconditional, o = female, x = male. Source: McDaniel et al. (2011).

completing each of the transitions necessary to complete college. Figures 9-12 present the decompositions in terms of two transitions by gender and race: first, the unconditional probability of obtaining some college (e.g., college enrollment), and second, the probability of obtaining a bachelor's degree, conditional on college enrollment. The figures show actual data points for each cohort as well as fitted proportions completing each of the transitions by birth cohort from a second-degree fractional polynomial regression.

[9] Census data do not distinguish between these two routes to completing high school for most of the period covered by these figures. Because adolescents following these two routes are not equivalent in terms of the probability that they will complete college, and because the composition of high school graduates over these two alternative routes has changed over time, we do not present trends in rates of high school completion.

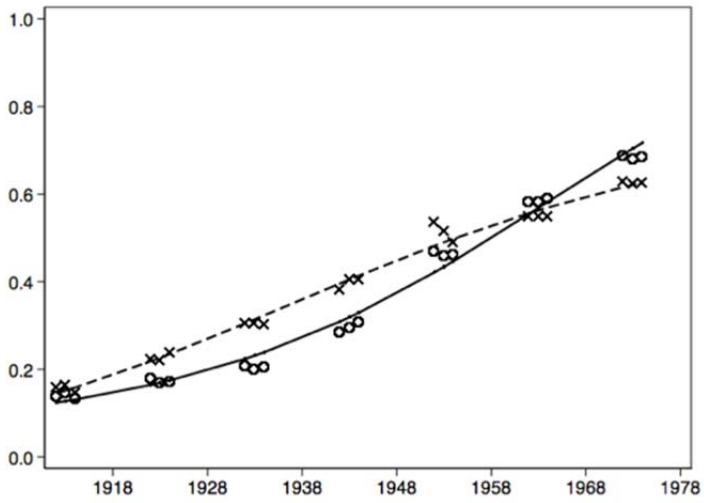
Figure 10: Probability of BA, Given Some College, by Birth Year, for Blacks Aged 26-28



o = female, x = male. Source: McDaniel et al. (2011).

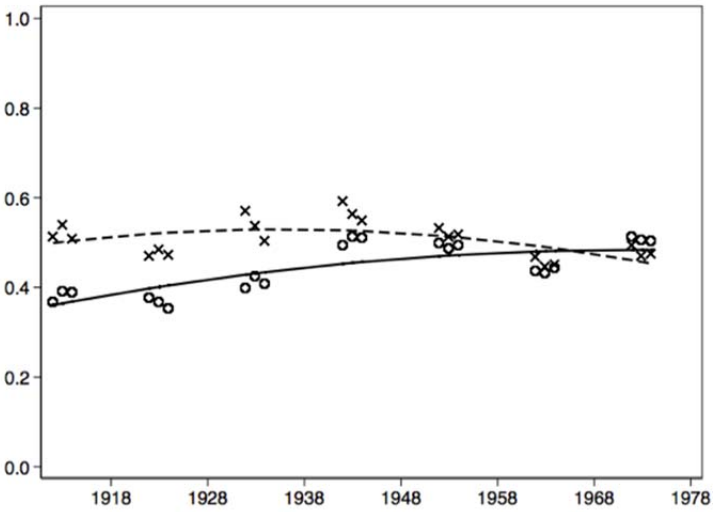
Figures 11 and 12 present the corresponding graphs for whites. In qualitative terms, the story is the same: whites also experienced rising rates of college entry. The white male rate of completing a bachelor's degree, conditional on college enrollment, was constant or declining over the past 30 years. This pattern, similar to that for blacks, is probably due to the same reasons: the increasing share of postsecondary students in community college and the wider academic diversity of students entering postsecondary education. Just as for blacks, the rising female advantage in college completion for whites is largely due to rising rates of college entry. However, the gender gap in completing college, given some postsecondary education, is larger for whites, and where the black female line trends slightly downward, the white female line trends upward. In combination with the strong gender gap among whites in trends in college entry, the gender gap in trends in graduation contributes to the strong female-favorable trend in the probability of completing college by ages 26–28 for whites.

Figure 11: Probability of Attaining Some College, by Birth Year, for Whites Aged 26-28.



o = female, x = male. Source: McDaniel et al. (2011).

Figure 12: Probability of BA, Given Some College, by Birth Year, for Whites Aged 26-28.



o = female, x = male. Source: McDaniel et al. (2011).

Gender Trends in Educational Transitions

Gender differences emerge in the transition rates between high school and post-secondary education, between two-year and four year college, and between college entry and graduation (Buchmann and DiPrete, 2006). From a statistical perspective, the probability of graduating from

four-year college can be expressed as the probability of transitioning to post-secondary education multiplied by the probability of completing four-year college, given that one has some post-secondary education. Women have shown a faster increase in the probability of making a transition to post-secondary education, given high school graduation. The fact that women's gains have occurred largely through higher rates of transition from high school to college, however, does not mean that increasing men's rates of transitioning to college is the best way to increase their college graduation rates.

Although the rate of transition to post-secondary education is already very high in the U.S., many students who begin college do not graduate by age 26. Table 2, taken from our analysis of the NELS data (Buchmann and DiPrete, 2006), breaks down each cohort of men and women according to their route through the educational system. Twenty-two percent of male high school graduates, and 19% of female high school graduates attended four-year college but did not graduate by age 25-26. Focusing only on students who made the transition from high school directly to four-year college, 9% of men who only attended four-year college had not completed a degree by ages 25-26 compared with only 7% of women. To put it another way, 68% of men and 77% of women who only attend four-year college have completed a BA, while only 39% of males and 47% of females who spent any time in community colleges have completed a BA by age 25-26. As Bowen et al. (2009) highlighted, the most straightforward way to increase college completion rates would be to ensure that more of the students who start four year college – whether via a transition from two-year college or directly from high school – complete a bachelor's degree. Both men and women have a problem with starting but not completing college, but it is a greater problem for men. Moreover, this gender gap in completion rates, given a transition to four-year college, is related to educational performance.

Table 2: Route through the Educational System by Ages 25-26, NELS.

		HS Grads Only		All Students	
		Males	Females	Males	Females
No HS Diploma		N/A	N/A	9%	8%
HS Diploma, but no college		24%	21%	22%	19%
2-year college only		24%	27%	22%	25%
2-year plus 4-year college	**BA**	9%	11%	8%	10%
	No BA	14%	12%	13%	11%
4-year college only	**BA**	20%	22%	18%	20%
	No BA	9%	7%	8%	6%
Total		100%	100%	100%	100%

Note: Data are from NELS. See Buchmann and DiPrete (2006) for further details.

Analysis of NELS data confirms that the primary reason for the growing gender gap is males' weaker academic performance (Buchmann and DiPrete, 2006). For the NELS cohort, the gender gap in the probability of completing a BA by age 25-26 was about 5 percentage points (33% for women and 28% for men). As Table 3 shows, this gap can be statistically broken down into that part due to different rates of transition into postsecondary education and that part due to different rates of completing a BA, given a particular transition into postsecondary education. Relatively little of the gap (13%) is due to women's higher rates of transition into two-year college, and even less is explained (6%) when we take account of men's higher rate of making a transition from 2 year college to 4 year college (because this factor advantaged men). As Table 3 shows, .47 x .48 x .39 = about 9 percentage points of the .28 male BA completion rate comes from students who had some two year college. For women, the corresponding figure (.50 x .46 x .47) is a higher 11 percentage points, which accounts for 46% of the overall gender gap in BA completion. Table 3 further shows that most of this explanatory power (.33 of the .46) comes from the fact that women get better grades than men in college. Another 45% of the overall gender gap comes from the higher grades that women who go directly to a four-year college receive in college. Thus, the gender gap comes predominantly from higher educational

performance and the advantages it conveys in college graduation rates as opposed to higher transition rates into college. Since 1988, when the NELS cohort was in eighth grade, women have opened up a larger lead in transition rates to post-secondary education. For more recent cohorts of young men and women, the combination of this higher rate of transition to college and women's higher educational performance accounts for the growing gender gap in the rate of BA completion.

Table 3: Breaking Down the Gender Gap in Terms of Pathways and Performance

Probability of completing:	Men	Women	Men if they had women's grades	Fraction of total gap
Any 2-year college	0.47	0.50		0.13
Any 4 year college, conditional on some 2-year college	0.48	0.46		0.06
BA, given both 4-year and 2-year college	0.39	0.47	-0.46	0.46
Only 4-year college	0.29	0.29		0.49
BA, given only 4-year college	0.68	0.77	-0.76	1.00

Note: Data are from NELS. Source: Buchmann and DiPrete (2006) .

3. Why Did Women Overtake Men in Completing College?

The data are clear: women have overtaken men in the educational arena. The reasons include the increasing educational opporrunities and labor market opportunities for women, and their incentives to seize them. Additionally, girls have performed better academically, showing better social and behavioral skills (also known as "non-cognitive" skills), than boys. As for men, successive cohorts have lagged in their adaptive response to the changing labor market. Researchers do not fully understand this inertial force that resists adaptive change, though we have important insights. Each of these components is central to understanding the growing female advantage in college graduation.

Changes in the Labor Market, Families and Incentives for More Education

In the 20th century, the position of women shifted in the labor market, and, at the same time, in the family. From 1900 to 2000, the labor participation rate of American women soared from 20% to 60% (Fischer and Hout, 2006; Goldin, 1990; U.S. Department of Labor, 2010). Briefly, over the course of the 20th century, the expanding opportunity for clerical jobs along with women's large-scale entry into occupations that favored or required some form of higher education – teaching, nursing, and even some white-collar clerical work – increased their incentives to seek schooling beyond high school. In the early decades of the twentieth century women entered the teaching profession, and school administrators wanted to hire only unmarried women; consequently, as women left the profession upon marriage, younger women stepped in to fill their ranks (Rury, 2008, p. 110). By the early 1940s, when the pervasive workplace bans on married women were almost completely eliminated and when wartime demands for female labor were escalating, women entered the labor force in greater numbers (Goldin et al., 2006). In the two decades after World War II, the U.S. economy expanded; and productivity, living standards, and college enrollments all rose. This economic growth increased the demand for labor and raised women's wages. Women saw a higher opportunity cost in remaining full-time homemakers (Bergmann, 2005). Not surprisingly, more women entered the workforce and remained there for longer periods. For example, before World War II most women worked only until they married and had children. After the War women often returned to work after their children were school age or older (Goldin 1990; Thistle, 2006). In the 1960s and 1970s, the civil rights movement and the women's rights movement spurred "equal opportunity" legislation in education and employment.[10] Finally, advances in birth control (specifically the pill and the

[10] Notably Title VII of the Civil Rights Act of 1964 and Title IX of the Education Amendments of 1972.

intrauterine device) made it easier for women to control their fertility – which in turn made it easier for women to get advanced skills and work outside the home, even combining a career with child-rearing.

The fact that women and men tend to segregate in different occupations is one reason for the continuing gender wage gap. But women's gains in the high-skill sectors have not solely been due to "demand shifts" favoring traditionally female occupations. Women have also gained by entering high status, previously male-dominated occupations, like law, business, and life sciences (Goldin et al., 2006). In 2009, for the first time in history, women comprised the majority (51%) of workers in highly paid managerial and professional occupations positions, even though they comprised 47% of the total workforce (U.S. Department of Labor 2010, p. 1). Women have also gained skills and experience on the job through higher rates of labor force attachment. Conversely, the share of women in traditional female careers such as teaching and nursing has declined. The net effect: women adapted more successfully to shifts in demand that have eroded employment opportunities in middle-skill clerical, administrative, and production jobs (Autor, 2010). Importantly, because of occupational sex segregation, this job polarization has had different impacts on men and women. "The decline of middle-skill jobs has clearly displaced males toward the tails of the occupational distribution and the net effect is an increase in the share of males in low-skill occupations compared to the share of males in high-skill occupations. Women's losses in middle skill occupations were substantially offset by employment gains in high-skill occupations, and this is true for both high school- and some-college-educated females" (Autor, 2010, p. 10). These changes in the labor market experiences of women have encouraged them to complete college.

Women's rapid educational gains are certainly linked with gains in women's real wages as well as their wages relative to men. A substantial gender gap in wages still exists. In 2012, full-

time women earned 81% of what full time men earned. But this gap is far smaller than it was in 1978, when women earned 62% of what men earned. The gender wage gap has shrunk in part because women have entered well-paying managerial and professional occupations. As Blau and Kahn (2007) note, women's earnings gains are particularly remarkable in light of the fact that they occurred during a period of rising overall wage inequality.[11] In fact, in many metropolitan labor markets today, young women earn more on average than their male counterparts (Dougherty, 2010). The reason? Women's quantitative advantage in education outweighs their disadvantage from gender segregation in the labor market.

Ironically, men's college graduation rates stagnated even while wages for high school educated males declined - the result of both technological change and the decline of blue collar unions. It is unclear why, in the face of these changes, more men did not complete college. Moreover, men's stagnant graduation rates exacerbated the wage decline for high school educated workers and increased the worth of a college degree (Goldin and Katz, 2008). Also, while real wages for high school educated men were falling, the wages for high school educated women remained stable (Appelbaum et al., 2003); yet women, not men, rapidly increased their rates of college enrollment and graduation. Men's failure to respond, as women have, to the economic incentives arising from the stagnant wages of high school educated workers and the rising relative wages of college-educated workers is puzzling and demands examination.

For black Americans, legal and *de facto* discrimination and segregation muted the impact of these labor market shifts. The much lower rate of college completion for blacks was due in part to the meager educational resources devoted to blacks, especially in the South (Rury, 2008). Even

[11] It is hard to predict how the gender wage gap will change in the future, even as women's educational attainment continues to rise. Blau and Kahn (2007) maintain that the remaining wage gap is almost completely unaccounted for by the main predictors of wages – education and labor market experience – contained in the classic human capital earnings function.

the GI bill, which was race-neutral in statutory terms, did not help Southern black men very much. The combination of state-supported segregation and minimal state investment in the "black" colleges kept many southern black men from using the GI bill to obtain college degrees (Turner and Bound, 2003). At the same time, different structures of occupational opportunities for blacks and whites and for men and women (e.g., the unwillingness of American business to hire blacks into the male-dominated managerial and engineering occupations) created different incentive structures for each group.

The small but prolonged female advantage in college graduation for blacks prior to 1980 may also be related to the high labor force participation rates of educated black women. Employment rates were higher for college-educated black women in all the decennial censuses from 1940 through 2000 (McDaniel et al., 2011). They were far more likely than white college-educated women to be employed until the 1980s. In 1930, black women were three times more likely to work than white women. By 1970 black women were 1.3 times more likely than white women to work (Goldin, 1990). Historically, black women worked to bolster their families' income, in part to offset black men's high unemployment rates and low education levels. However, Goldin (1977) found that black women worked more than white women even if they had the same education, family income, and number of children. As a legacy of slavery, black women who worked outside the home were less likely to feel a social stigma than white women (Goldin, 1977). As a consequence, the employment gap among college-educated women and men was much smaller for blacks than for whites. Historical differences in labor force participation rates of black and white women arguably contributed to the higher rate of college graduation of black women relative to black men.

Even while job opportunities expanded, women confronted a new family dynamic. The same institutional and technological forces that made college education an economic asset put a

financial strain on families headed by high school (or lower) educated men. As we discussed in DiPrete and Buchmann (2006), highly educated women had better prospects and gained financially from the combination of educational homogamy and the increasingly strong earnings gains of highly educated men. These women were also less likely to divorce because their marriages suffered fewer financial strains, even as their own earnings gave them the freedom to leave unattractive marriages. Finally, their higher earnings protected them from poverty even if their marriages did dissolve. These family-based incentives for greater education were generally stronger for women than for men even if – as several studies have reported (Averett and Burton, 1996; Goldin and Katz, 2000; Charles and Luoh, 2003; DiPrete and Buchmann 2006, but also see Hubbard, 2011) – women's economic returns to education were not growing faster than men's.

Military Service

Because men are more likely than women to serve in the military, it is reasonable to ask whether military service competes with higher education and contributes to the gender gap. The U.S. military recruits about 200,000 enlisted personnel each year; almost all are high school graduates. Since 1973 the military has comprised less than 1% of the total population. In fiscal year 2010, almost 1.2 million people served on active duty; most (85%) are men (Office of the Under Secretary of Defense, Personnel, and Readiness, 2012). The median age of enlistees is 27, so it is possible that military service competes with college as a destination for young adults. The GI Bill offset some of these potentially negative effects of military service; starting in 1944 it offered educational benefits to veterans of World War II and later the Korean War (Turner and Bound, 2003; Stanley, 2003). Stanley (2003) shows that the trend in male BAs after WWII was along the same trajectory established in the 1936-1940 period; this finding is consistent with an interpretation that the GI bill offset the direct negative effect on educational attainment during the

years when some GIs otherwise would have attended college. Indeed, many people who enlist after high school cite the subsidies for college during or after their military service (Kleykamp, 2006). Thus, for some, military service may have made college enrollment possible, albeit at a later point in life, and may be one explanation for men's delayed college enrollment. Of the 20,000 officers commissioned by the armed forces each year, nearly all are college graduates; and about 40% received their commission through their university's Reserve Officer Training Program (ROTC) (Segal and Segal, 2004, p. 8). This group enlists after graduation.

On the whole, men who serve in the military receive less education than those who do not serve. Among high school graduates, veterans serving during the peacetime cold war period were less likely to attain a college education than nonveterans at all levels of socioeconomic status (MacLean, 2005). This difference held even among those who reported plans to attend college. Perhaps veterans who delay college are less likely to attend or complete college because they feel they are "too old" for college, or because they have found a romantic (Hogan, 1981). It is not known whether military service reduces the likelihood of attaining a college degree or whether the military differentially selects young people who are less committed to postsecondary education (MacLean and Elder Jr, 2007). MacLean's findings are at least consistent with the idea that military service competes with higher education for young men. Similarly, Kleykamp (2010) finds that the downsizing of military jobs in the 1990s was associated with substantial increases in college attendance, especially among black men. To the best of our knowledge, no research has examined the relationship between military service and college graduation for women or whether the effects of military service found in the past remain the same today. These are important questions for future research.

Incarceration and the Gender Gap in College Completion

The IPUMS data used to report education trends in Figure 2 are representative of the entire population, including prisoners (in jail or prison). Incarceration rates in the United States held stable between 1925 and 1975 at roughly 100 per 100,000 of the resident population; but after 1975 the incarceration rate increased rapidly. By 2001 it was 472 per 100,000, nearly 5 times its historical average (Langan, 1991; Pettit and Western, 2004).

Did this statistic skew the gender-gap, or the racial-gap in college completion? It is important to distinguish between the arithmetic impact of accounting for the incarcerated population in the computation of college completion rates and the causal impact of incarceration on the size of the changing gender gap, especially for blacks [12] The addition of the prison and jail data to the CPS data has a noticeable effect on the computed rates of college graduation for black men in particular, both because a considerable number were in prison or jail in these years and because the incarcerated population had relatively low levels of education. The black gender gap is noticeably larger when the incarcerated population is taken into account (McDaniel et al., 2011). Moreover, the impact of the incarceration adjustment grows larger for blacks over time because the size of the incarcerated black population grows as a fraction of the total black population over time.

[12] The arithmetic impact can be obtained simply by comparing the year specific rates of college completion estimated only for the non-institutionalized population with the estimate of completion rates obtained for the total population. The Current Population Surveys are administered only to the non-institutionalized population. Estimates of the number of inmates in state prisons and federal correctional facilities by race, gender, education, and age were obtained from the Surveys of Inmates in State and Federal Correctional Facilities for the years 1974, 1979, 1986, 1991, 1997, and 2004. Using these data, we interpolated the results for the intermediate years. Since information for the jail population is less complete, we assumed that the jail population matched the prison population in race, gender, education, and age composition, and we scaled up the size of the prison samples to correspond to the size of the combined prison and jail population in each year. Finally, we rescaled the combined prison and jail samples so that they were the same proportion of the population as were the CPS samples and combined the data sets in order to estimate rates for the total population.

It is more difficult to determine the causal effect of the rise in incarceration of young men, especially young black men, on the growing gender gap in college completion in the 1980s and 1990s. In one respect, our adjustment understates the magnitude of the prison experience of black men because it pertains only to current inmates at the time of the survey. Many other individuals interviewed in the CPS in each of these years had been in jail or prison in the past. We do not know how much education these young men would have achieved if they had not spent time in jail or prison. However, other considerations suggest that the sharp rise in the prison population has had a relatively small impact on the gender gap. Our analysis of the prison and jails surveys confirms that the young people sentenced to jail or prison were disproportionately high school dropouts; other evidence shows that they were performing poorly in school at the time of their arrest (Laub and Sampson, 1993). In other words, if these individuals are drawn disproportionately from the bottom of the educational achievement distribution, we can conclude that very few would have gone to college even if they had never been incarcerated. From this perspective, the rising rates of incarceration contributed relatively little to the rise in the gender gap in educational attainment. As noted earlier, the gender gap for blacks is now more similar to that for whites than it was in 1960, even as young black men's experiences with incarceration diverged from those of young white men. Indisputably, incarceration has skewed the lives of young black men, affecting work, cohabitation, marriage, and, very probably, their rates of high school and post-secondary education. However, incarceration's direct effect on rates of college graduation may be relatively small. This question is difficult to answer with certainty and requires further research.

Grades and Courses in School

Despite the scientific consensus that girls and boys have similar levels of academic aptitude, women have led in college graduation. In fact, girls generally outperform boys on verbal tests and lag behind boys on math tests, especially in the population at the lower end of the test score distribution. But gender differences in mental ability as measured by test scores are too small to explain the current gender gap in college completion. Moreover, these small gender differences in test scores have remained fairly stable, while the gender gap in educational attainment has reversed from a male advantage to a female advantage that continues to grow.

In contrast to their similar performance on standardized tests, girls have outperformed boys in grades since the turn of the century. (Because course-performance is less standardized, there is less consensus on trends in gender differences in this measure.) In the middle of the 19th century, girls enrolled in coeducational schools at roughly the same rate as boys, and, for the most part, took the same classes with the same teachers. Even then, girls earned higher grades and were promoted to the next grade more readily (Clarke, 1875; Hansot and Tyack, 1988).[13] Writing in 1910, Armstrong reported that "the first three primary grades of the schools of the whole United States show that a larger number of boys than girls have to repeat grades. The census shows that the sexes are born in very nearly equal numbers and yet the boys are four per cent more numerous in the first grade" (Armstrong, 1910, p. 347-348). As early as 1870, when rates of high school completion were extremely low (only 2 percent of 17 year olds completed high school), more girls graduated (Newcomer, 1959; Solomon, 1985).

[13] Farkas et al. (1990) reported that some studies had found evidence that girls receive higher grades than their aptitude scores would predict at various points in the school career (Brophy and Good, 1974; Rehberg and Rosenthal, 1978; Alexander and Eckland, 1980), but that others had not found this to be true (Entwisle and Hayduk, 1982; Natriello and Dornbusch, 1983; Leiter and Brown, 1985).

Nevertheless, many colleges barred young women from matriculating for much of the nineteenth century. In 1837, Oberlin College – considered the first - began admitting women, "ostensibly to provide ministers with intelligent, cultivated and thoroughly schooled wives" (Graham, 1978, p. 764). When the Civil War led to a shortage of male students, more colleges became willing to enroll tuition-paying female students. By 1870, women comprised 21 percent of undergraduates in U.S. college and universities. Of course, this figure includes the many women enrolled in women's colleges or "coordinate colleges" adjacent to men's colleges (e.g., Radcliffe at Harvard, Barnard at Columbia, Evelyn at Princeton, Pembroke at Brown, Jackson at Tufts). By 1900, however, more than twice the number of women were enrolled in coeducational institutions as in women's colleges (Solomon 1985). In the first decade of the twentieth century the rapid rise of women in coeducational institutions precipitated a fear that women would take over colleges. "Chicago, Stanford, California, Wisconsin, Boston University, and even Oberlin had qualms; the impact on male enrollments was the central issue and complaints by some male students were noted. Academic achievement was held against females when they surpassed males in either sheer numbers or academic honors. Faculty members echoed the views of disgruntled or perhaps envious, male students and charged that women interfered with male academic performance" (Solomon, 1985, p. 58).[14]

Fast forward to the current era: the female advantage in academic performance at all levels of education is indisputable. As early as kindergarten, girls demonstrate more advanced reading skills than boys (West et al., 2000; Tach and Farkas, 2006), and boys have more problems with reading in elementary school (Trzesniewski et al., 2006). From kindergarten through high school and into college, girls get better grades than boys in all major subjects, including math and

[14] Goldin et al. (2006) found that the class rank of the median girl among Wisconsin high school seniors in 1957 was 21 percentile points higher than the rank of the median boy, and in 1992, the median senior girl in the NELS survey was 16 percentile points ahead of the median boy.

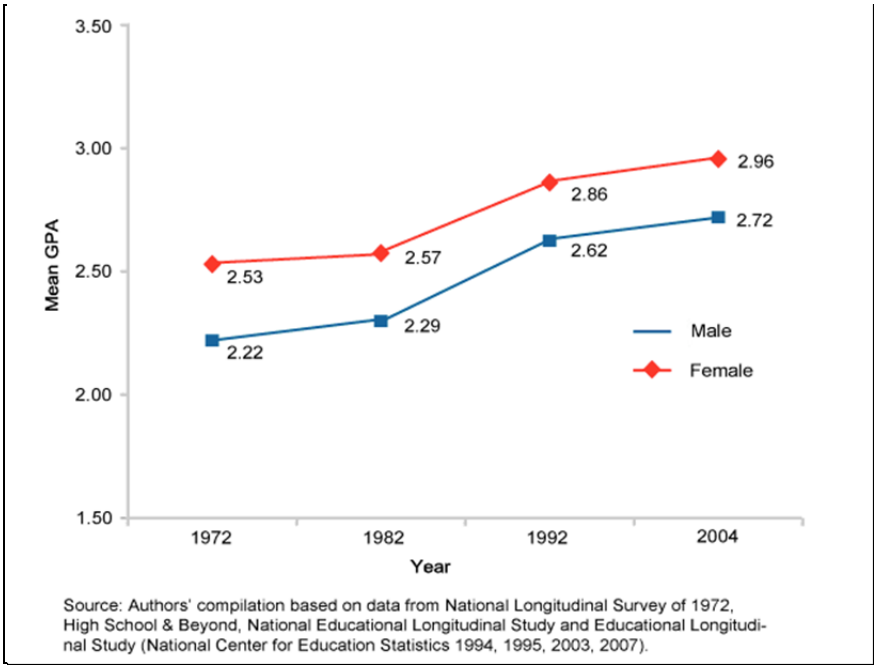
science (Perkins et al., 2004). To dig deeper into the gender gap in grades of high school students, we analyzed data from four panel data sets derived from surveys designed to study the educational, vocational and personal development of young people in the United States as they transition from high school into adulthood: the National Longitudinal Study of the high school class of 1972 (NLS72), the High School and Beyond (HSB) high school class of 1982 (first surveyed as sophomores in 1980), the National Education Longitudinal Study (NELS) of 1988, which surveyed the high school class of 1992, and the Education Longitudinal Study of 2002 (ELS), which surveyed the high school class of 2004.

We examined overall high school grade point average (GPA) for male and female high school seniors and gender gaps in GPA across the four decades represented by the surveys with data drawn from the high school transcripts included in these data sets. Because the NLS72 does not include transcript data, we relied on student-self reports of their overall high school GPA for the seniors in 1972.[15] Figure 13 reports trends in GPA over time for boys and girls in the graduating cohort from each survey. Several points are noteworthy. First, overall GPA increased between 1972 and 2004 by about 0.4 to 0.5 on a 4.0 GPA scale. This increase is in line with the rise in high school grades documented in some prior research.[16] A statistically significant female favorable grade gap exists for each time point and the size of these gaps remains relatively constant, ranging from about 0.24 to 0.30 over the period.

[15] Because students tend to inflate their GPA relative to their transcript-reported GPA, we adjusted these self-reports downward by 0.4. We use 0.4 because it is the average difference between self-reported high school grades and transcript grades in HSB.

[16] Our findings differ from those of Koretz and Berends (2001), who found only a slight increase in average grades between HSB and NELS, mainly among high income students, but their study differs in sample and GPA measure from what we use here. Koretz and Berends excluded anyone who transferred during their high school years or were missing data on the school administrator survey, the student survey or cognitive testing. We included the entire sample of original 10th graders that were 12th graders in 1982 who had valid transcript data. Also, we used the overall high school GPA (not academic GPA) provided by NCES in the HSB data. It appears that Koretz and Berends calculated their own GPA measure from the course grades in the high school transcripts.

Figure 13: Mean GPA for High School Seniors, 1972-2004.



Source: Authors' compilation based on data from National Longitudinal Survey of 1972, High School & Beyond, National Educational Longitudinal Study and Educational Longitudinal Study (National Center for Education Statistics 1994, 1995, 2003, 2007).

In the 1950s, boys had a clear advantage over girls in the average rigor of their high school math and science coursework. For example, using data from the state of Wisconsin, Goldin et al. (2006) found that boys in the 1957 high school graduating class took, on average, over a semester more math than did girls (4.02 semesters vs. 2.89 semesters) and nearly a semester more science, which was largely concentrated in physics (1.01 semesters vs. 0.30 semesters).[17]

Using the panel datasets, we compared boys and girls in their high school courses over the last four decades. Particularly striking is the clear pattern of a gender reversal from a statistically significant male advantage in mean number of math and science courses taken in 1972 to a statistically significant female advantage by 2004. In 1972 boys reported taking 0.29 more math courses and 0.19 more science courses than girls. This male advantage declined in 1982. By 1992 high school transcripts revealed virtual parity in the mean number of math and science courses.

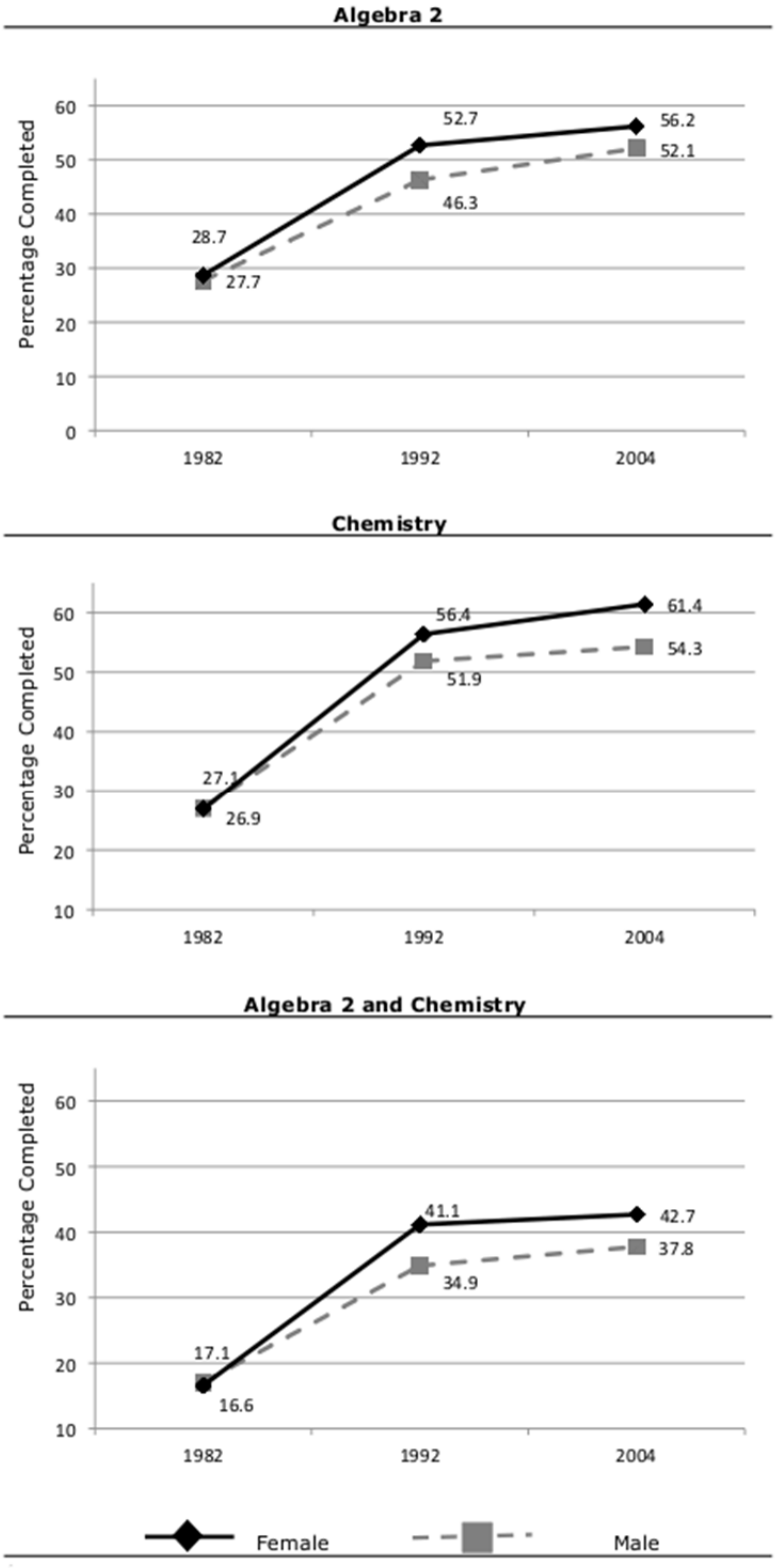
[17] Goldin et al. (2006) further showed that very little of the male advantage in college completion in the 1957 cohort could be accounted for by courses, test scores or academic performance; in other words the male advantage was statistically unrelated to the academic variables that would be expected to account for college completion rates.

Over the next 12 years, the mean number of math and science courses reported on the transcripts of girls exceeded the mean for boys - a statistically significant gap. Moreover, a female advantage in foreign language courses has persisted and appears to have grown over time (from a 0.28 female advantage in 1972 to a 0.34 female advantage in 2004).

Also, a higher percentage of students reported taking middle to advanced level math and science coursework in 2004 than in 1972 (Figure 14). In 1972, fewer than 30 percent of graduating high school students took algebra 2 or chemistry and only 17 percent completed both; by 2004 more than half of all students completed either of these courses and more than one third completed both. Crucially, more girls completed middle to advanced level coursework in math and science (see Cho, 2007).. In 2004, 56 percent of girls completed algebra 2 (compared to 52 percent for boys); 61 percent completed chemistry (54 percent for boys); almost 43 percent completed both of these advanced courses (37.8 percent for boys).

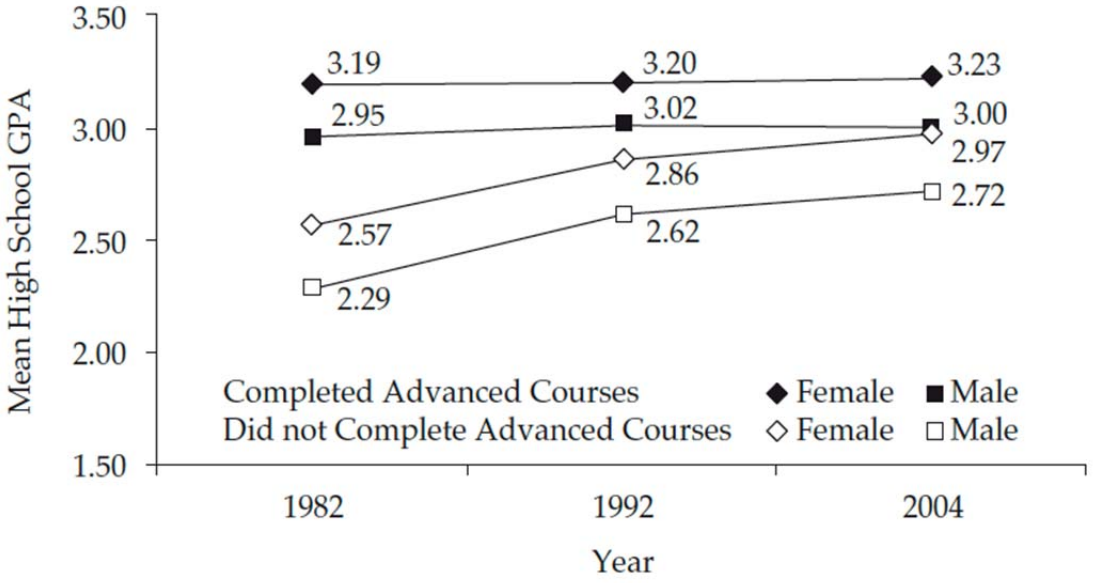
Figure 15 compares the GPAs of girls and boys in two categories: those who completed advanced courses (algebra 2 and chemistry) and those who did not. In both categories, girls earned higher average GPAs, and these gender gaps in GPA were stable over time. Among students enrolled in advanced courses, the average GPA for girls was roughly 0.20 points higher in 2004; for students not enrolled in advanced courses, the female-favorable GPA gap was slightly higher at 0.25. This finding underscores the stability of the female advantage in high school grades even when rigor of coursework is held constant. In the next section, we consider how the higher average grades of girls relate to their advantage in college graduation.

Figure 14: Percentage of Female and Male High School Students Completing Advanced Courses



Source: See Figure 13.

Figure 15: High School GPA, by Advanced Course-taking and Gender, 1982-2004



Source: See Figure 13. Note: Data are weighted and pertain to high school seniors who subsequently graduated from high school.

Male Academic Underperformance

Why do boys underperform relative to their potential? We argue that the causes lie in the socio-cultural environment rather than in anatomy, hormones, or brain structure. Three facts are salient: First, boys disengage from school more easily than girls, and their disengagement seems to be connected with their masculine identity. Second, academically richer environments – whether at home or school – benefit all students but appear to offer especially large benefits for boys. Third, the messages that parents give their children about the importance of school vary little by parental class or gender or by the gender of the student. Both boys and girls report that parents pressure them to perform well in school. Almost 99% of eighth graders in the ECLS-K reported that "good grades" were "important" to their parents; and 80% reported that "good grades" were "very important", with no significant variation by gender, parental education, or parents' educational expectations. Parents, meanwhile, overtly supported academic success for their children in their answers to ECLS-K survey questions: parents thought it more important

that their sons be "brilliant" (as opposed to school leaders, athletic stars, or most popular) than their daughters; in fact, more parents without college educations prefered for sons to be "nerdy" than did college-educated parents.

A clue to understanding male disengagement from school may lie in extracurricular activities. Boys who participated regularly in music, art, drama, and foreign languages were more similar to girls in their level of school engagement. Not coincidentally, ethnographic research finds that pre-adolescent and adolescent boys, especially those from working- or lower-class backgrounds, often denigrate these activities as unmasculine. The fact that girls' and boys' expressive attachment towards school differs so markedly even for middle schoolers with similar academic performance suggests that these differences are tied to gender identity. Ethnographic research supports survey data to the effect that at least certain aspects of the adolescent masculine culture devalues academic engagement. In *Learning the Hard Way: Masculinity, Place, and the Gender Gap in Education* (2012), E.W. Morris reported that in one rural high school "nerdy" boys, defined as those who put substantial effort into school and who participate in musical activities like band, were more likely to be labeled as "gay" or "pussies."[18] In contrast to intellectual activities like reading or cultural activities like playing a musical instrument, working class boys in Morris' ethnography perceived their fathers' activities, like woodworking or construction, as more manly, even relative to professional and office work, which these boys recognized as being more lucrative. Similarly, Kimmel (2008) reported that his male informants used "*any* taste in art and music" as an example of "stereotypically effeminate behavior."

Not all boys act this way. Masculinity takes different forms, and boys enact masculinity in different ways. This fact is key to understanding both the problem of male underachievement and

[18] Pascoe (2006) and MacLeod (2008) offer similar evidence that some adolescent males (or males in some social situations) treat "nerds" and mental work generally as unmasculine.

to policy prescriptions. The different models for masculinity in the adolescent world correspond to the models of masculinity in the adult world. On the one hand, one conception of masculine power features manual labor, strenuous team sports, and symbolically masculine pursuits like hunting and fishing, where men exert their dominance over animals and nature. On the other hand, in the workaday world of adults, successful (hence powerful) men are those who earn money and status from prestigious, well paid jobs that allow a middle or upper middle class lifestyle, especially when – as a consequence of educational homogamy – their partners also have prestigious, well paid jobs.[19] These men attained their success through education, and they provide a powerful model to adolescent boys. Boys who have adopted this model of masculinity, whether from the media, teachers, peers, or parents, can see modern masculine power emerging from academic engagement, not from disengagement or oppositional behavior. All boys do not encounter this model. Social class-related disengagement can be explained as an individual and collective determination that the promise for labor market success through academic success, like the powerball lottery, is a game where the odds of a rich payoff are against you. But class-based theories of disengagement do not imply that boys need to disengage at greater rates than girls.

Success in academics, like success in sports, requires a considerable investment of time and effort. In general, the more you practice, the better you become. Boys do not universally accept this connection. Witness the relatively low grades and the very high educational aspirations of the middle third of the boys in the academic hierarchy who expect to complete college, but are unlikely to do so. Middle school girls likewise do not fully understand the connection between performance and educational attainment. After all, they over-predict their educational attainment

[19] McManus and DiPrete (2001) were the first to show that women's incomes by the early 1990s had risen to the point that the median male suffered a lower standard of living from marital breakup.

to about the same extent as do boys. But even if their lack of understanding matches boys' (which we doubt), it is arguably less consequential because girls show greater expressive attachment to school. This attachment seems to arise more readily through the gratification they get from close relationships with their teachers and the greater satisfaction they get from pleasing their parents. Girls, in other words, probably work harder in school in part because they get greater intrinsic satisfaction from high academic performance than do boys.

Many boys, of course, succeed in school despite a deficit in expressive attachment. These boys often live in households that either attach high value to academic success, or that promote instrumental attachment to school. These households understand that school is like sports or music: one has to train for years to be a top performer as an adult. We find that boys who live in households with a biological father present and who have highly educated parents experience larger gains than girls in both their academically-relevant social and behavioral skills and in their academic performance. Research by Legewie and DiPrete (2012) demonstrates that boys receive especially large benefits from a strong academic climate at school. Boys in these environments may better understand the marathon character of education, and therefore train harder to achieve long-term goals. But enhanced short-term motivation to perform well produces long-run benefits even for those who do not fully understand the extent to which academic excellence requires years of training. In other words, engagement does not flow from an individual calculus of means and ends. Like New Year's resolutions, engagement reflects not just personal goals and strategies but the social support for these strategies.

In a changing world, the old sources of masculine power – the power that comes from physical labor – are ebbing. So why do some boys still embrace the nostalgic model of masculine power, even with its deleterious effects on academic performance? One force, we suggest, is the continuing cultural power of the gender-segregated labor market of the 1960s and before.

Historically, many American men worked in well-paid, blue-collar jobs. Some involved apprenticeship training as an entry into construction or a trade; others involved semi-skilled factory work or truck driving. Thanks in part to the once countervailing power of labor unions (Galbraith, 1956), these jobs generally paid better than the jobs available to women without a college degree and even many professional jobs held by women college graduates. This world, which flourished into the 1960s and persisted through much of the 1970s, gradually faded during the 1980s and 1990s as the baby boomers worked through their prime years and had children of their own. This world transitioned to an era of deindustrialization, globalization, and the decline of union-supported blue-collar employment. In this new era, less educated baby boomers increasingly struggled to achieve an acceptable standard of living. High school graduates could see that college graduates got the well-paying jobs. Yet even in these years, many high school graduates saw no "bright line" difference between the standard of living of those without and those with college degrees, especially degrees from local and state colleges or universities. Even when their own wages failed to keep pace, less educated men often relied on their wives' working increased hours. That extra income sustained their household standard of living, while men hoped that their future prospects would brighten through an upturn in the broader economy.

Americans tend to be optimistic about the future. In "Is this a Great Country? Upward mobility and the chance for riches in contemporary America," DiPrete (2007) analyzed Gallup survey data collected in 2003, more than two decades after the onset of a new era of deindustrialization, decline of union power, decline of real wages for high school educated men, and stagnation of market income for households at the median of the American income distribution (Burkhauser, 2012). A generation of young people had grown up during this transformative economic period. Many, especially those without a college degree, should have been pessimistic about their future standard of living. Gallup interviewers asked: "Looking

ahead, how likely is it that you will ever be rich?" The answers were surprising. Even though fewer than 30% of young American men at this time were earning bachelors or advanced degrees, 58% of 18-29 year old men thought it was somewhat or very likely that they would ever be rich." The extent of men's over-optimism was striking. As for their female counterparts, only 43% them expected to ever be rich, even though as a group they were better educated and had a greater chance than men of improving their standard of living through marriage (because husbands still make more money on average than do wives). The gender gap is even larger than these numbers imply, because the 2003 Gallup poll found that men thought one needed a higher income (a median of $150,000 vs $100,000 for women) and greater assets (a median of $1,000,000 vs. $500,000 for women) to be considered "rich." Clearly, many young men with only a high school diploma, who grew up during the decades when the wage returns to a high school diploma were falling, nonetheless believed that they had a good chance of earning a lot of money. Their misplaced optimism recalls Ely Chinoy's (1955) sample of auto workers in the 1950s who dreamed of saving enough to start a successful business, even though they rarely realized that American dream.

These Gallup poll data underscore that it can take more than one generation of durable change in the environment before parents absorb the implications and communicate them to children effectively. Why do attitudes take such a long time to catch up to reality? First, most people know less about the connection between labor markets and education than do specialists. Second, Americans know that individual outcomes can depend on many factors beyond education, making them overly optimistic. Compounding this inertia is the arguably tight connection between gender stereotypes in the workplace and the process of gender socialization in the family. Many blue-collar jobs in construction, transportation, and manufacturing have a strongly masculine identity. Fathers in these jobs convey their masculinity to their sons in part

through the physical aspects of their work lives. Sons internalize stereotypes as they develop their own masculine identity. This process can strengthen a boy's attachment to the career path of his blue-collar father, thereby slowing the rate of generational adaptation to a changing labor market that has increasingly devalued blue-collar work. And when boys of blue-collar and lower middle class fathers recognize that financial success requires a different career path than those of their fathers, these boys lack role models to chart an educational path towards occupations that would allow them to fulfill these financial goals. The regressive cultural force of the old male-dominated manufacturing economy may eventually lose its power to disengage adolescent boys from school, but we speculate that it will take at least another generation or two to die away.

4. Incentives, Performance, and Parental Investment

While girls have long gotten better average grades than boys, for much of the 20th century young women (specifically young white women) had lower levels of educational attainment than did young men. From a global perspective, this gap can be attributed to a gendered culture that associated masculinity with labor market success and femininity with domestic work. In such a world, the link between education and status for most women ran through marriage; the exceptions were the relatively small number of women who entered professional occupations like teaching, nursing, or social work. In that world, it was plausible to expect class variation in the size of the gender gap. Families with fewer resources might "rationally" concentrate their educational investment in their sons. In contrast, higher status families might spread their resources more equally among sons and daughters because their resources are greater, both because they had more resources to invest in their children and because highly educated adults have generally had more egalitarian gender-role attitudes in the second half of the 20th century (Cherlin and Walters, 1981; Thornton et al., 1983; Thornton and Freedman, 1979. The

considerations may have produced differences in the educational gender gap by parental education or socioeconomic status. This relationship, moreover, may have changed over time in response to the growing labor market opportunities for women and the continuing spread of gender egalitarian values.

To determine whether the relationship between gender differences in college gradudation and core family characteristics were changing, we analyzed data from the cumulative cross-sectional General Social Surveys from 1972 through 2008.[20] The 27 annual General Social Surveys (GSS) provide information on the educational attainment of respondents and their fathers and mothers, the socioeconomic status of the fathers, and several other measures of family background. We restricted the analysis of college completion to white respondents between the ages of 25 and 34 years who were born between 1938 and 1977 (the black GSS sample is too small to support a similar analysis). The dependent variable, college completion, is operationalized as the completion of at least 16 years of education.

We examined the relationship between parents' education, fathers' absence, and rates of male and female college completion for two specific historical periods.[21] The first period, which covers birth cohorts born between 1938 and 1965, includes people who grew up before the point at which women overtook men in their rates of college graduation. The second period, which covers birth cohorts between 1966 and 1981, includes those who grew up when women began to overtake men in their college graduation rates. These results are presented in Table **Error! Reference source not found.**.

[20] Buchmann and DiPrete (2006) analyzed GSS data through 2004. We update that analysis here with more recent data.

[21] We operationalized "mother" to mean any female guardian and "father" to mean any male guardian.

Table 4: Rates of U.S. College Completion for Males and Females by Ages 25-34, by Parents' Education, Presence of Father, and Birth Cohort

Mother's Education		Father's Education: High School or Less		Father's Education: Some College or More		Father Not Present	
		Male	Female	Male	Female	Male	Female
1938-1965 Birth Cohorts							
High School or Less	**%**	20	15	44	36	21	15
	N	1,341	1,639	325	363	193	277
Some College or More	**%**	39	26	62	66	37	31
	N	182	238	373	427	77	70
1966-1981 Birth Cohorts							
High School or Less	**%**	15	20	50	40	11	14
	N	349	416	155	171	109	130
Some College or More	**%**	34	42	67	66	32	42
	N	104	135	301	320	77	89

Source: Cumulative General Social Surveys, 1972-2008.

For cohorts born in 1965 or earlier, men were more likely than women to have completed college in all except one of the family types displayed (Table 4, top panel). Only when both parents had at least some college education were women as likely as men to have completed college. When either fathers or mothers had a high school education or less, sons were more likely to complete college than daughters. If no father was in the household when the youth were 16 years old, sons still were more likely to complete college than daughters. This pattern is consistent with the gender-egalitarian perspective. It provides little support for the gender-role socialization perspective, which predicts higher graduation rates for daughters of educated mothers. In fact, the female disadvantage is greater for families in which the mother has some college and the father has a high school education or less (39 – 26 percent = 13 percent) than it is for families in which the father has some college and the mother has a high school education or less (44 – 36 percent = 9 percent).

The 1966–1981 birth cohorts have a different pattern (Table 4, bottom panel), one that suggests the emergence of a strong gender-role socialization effect. In cases involving parents who both had at least some college education, the completion rates for men and women look

similar to those of the earlier cohorts in the top panel. But in all other cells, the changes in graduation rates are quite large, and generally to the advantage of women. Where fathers had a high school education or less, daughters increased their rates of college graduation, whereas the graduation rates of sons dropped, regardless of the mothers' level of education. The graduation rates of sons who had no father present at age 16 also dropped considerably. Only in families in which fathers have some college and mothers have a high school education or less do men maintain a considerable advantage over women. In contrast, daughters had a strong advantage in college graduation over sons in families with mothers who had some college and fathers who had a high school education or less. A shift appears to have taken place between these two periods: the mother's level of education has become more important for daughters and the father's level of education, more important for sons.

5. The Competition for College Admission

The educational system is sometimes viewed as an arena where students compete for prizes. Students with higher grades are perceived to have out-competed students who earn low grades. Those admitted to elite colleges and universities or graduate and professional programs are the winners. Contests by their nature have a zero sum character, and in the American educational system the zero sum game is most visible in the annual admissions scramble at the highly selective colleges and universities. These institutions have many more applicants than spaces, and the competition for entry has been intensifying for many years.[22] Academically elite institutions, which are prominent on the educational landscape, enroll a small fraction of the students in four-year educational institutions. Only 14% of four-year colleges accept fewer than 50% of their applicants (Hawkins and Lautz, 2007).

[22] Hoxby (2009) notes that the increased selectivity applies to the top 10% of American colleges and universities when ranked by selectivity.

To what degree are constraints on the supply of admission spaces in U.S. institutions of higher education related to gender gaps in college enrollment rates today? The answer depends on the sector of American higher education. At less-selective colleges and universities (the large majority of higher education institutions in America), the overall gender imbalance in enrollment favors women. Of course, even less-selective colleges typically reject at least some applications: only about 20% of four-year, non-profit colleges and universities in the U.S. accept more than 85% of their applicants (Hawkins and Lautz, 2007). Nonetheless, the process of admission to less-selective colleges and universities consists mainly of meeting some baseline standards for high school grades and course curricula. In fact, selectivity has fallen for colleges outside the most selective 20% of institutions (measured by the mean SAT/ACT scores of matriculants). Hoxby (2009) finds that the ratio of the number of "freshman seats" (that is, the aggregate number of first-year students in four-year colleges) to the number of twelfth grade students who score both at the relatively low "basic" level and at the higher "proficiency" level on the NAEP mathematics and reading tests increased moderately from 1970 to the present. This ratio is greater than unity even when potential supply is measured in terms of students at "basic" levels of proficiency. The implication of the supply ratio trends and of the selectivity statistics is that the increase in the college-going population has been matched by increases in supply of places. Thus, it is highly unlikely that males are being denied entry to four year colleges because of competition from female applicants at the great majority of colleges and universities today.[23]

In highly selective colleges and universities, the "college squeeze" (Alon and Tienda 2007) is very real. Indeed, colleges that comprise this most selective 10% tier have become more selective

[23] Another form of competition that may be affecting completion rates and quality at less selective universities is the competition to get into courses where the number of available "seats" in the class is lower than the number of students trying to register for the course. Students who are closed out of required or elective courses may well have lower probabilities of graduating (or of graduating within four or five years) as a consequence. Unfortunately, the necessary data are currently not available to determine the impact of supply shortages at the level of individual courses either on overall college completion rates or on the gender gap in completion rates.

than they were 30 to 40 years ago (Alon and Tienda, 2007; Hoxby, 2009; Bound et al., 2009). Aside from the early years of coeducation at formerly male institutions, when female quotas were in place (Karabel, 2005),[24] these selective institutions have sought a balanced gender mix, which they can readily achieve from their deep pool of highly qualified applicants of both genders. In the 2011 Inside Higher Ed Survey of College and University Admissions Officers, 11.1 percent of 4-year colleges and universities responded that they admit men with "lower grades and test scores than other applicants" in order to achieve gender balance, compared with 2.7% that responded similarly for women (Green, 2011). But very few selective universities are included in this survey. Other data suggest that females' acceptance rates at highly selective colleges are lower than males' acceptance rates, but any comparison of acceptance rates cannot prove either gender-based affirmative action or discrimination. Student applications are hardly submitted at random, and we do not know whether the typical male applicant to a highly selective college is "equivalent" to the typical female applicant (Heriot and Somin, 2011). It is certainly plausible that qualified female applicants are at greater risk of being denied admission at highly selective institutions because admissions offices desire gender balance, but we have no definitive analysis of this question.

6. Educational Gender Gaps: A Global Phenomenon

The striking reversal in the gender gap in higher education is not solely a U.S. phenomenon. Among the 30 member nations of the Organization for Economic Cooperation and Development (OECD), the once prevalent male advantage in college completion has disappeared

[24] Early in the twentieth century, supply constraints primarily limited the college enrollments of female students. Goldin and Katz (2010) showed that the increased number of coeducational institutions in a state increased the ratio of college-educated women to college-educated men in that state for cohorts born around the turn of the 20th century. Currie and Moretti (2003) showed that the opening of new public colleges in a county in the 1940-1996 period increased women's education by an average of .08 years, but they did not investigate whether the increase for women was larger than that for men.

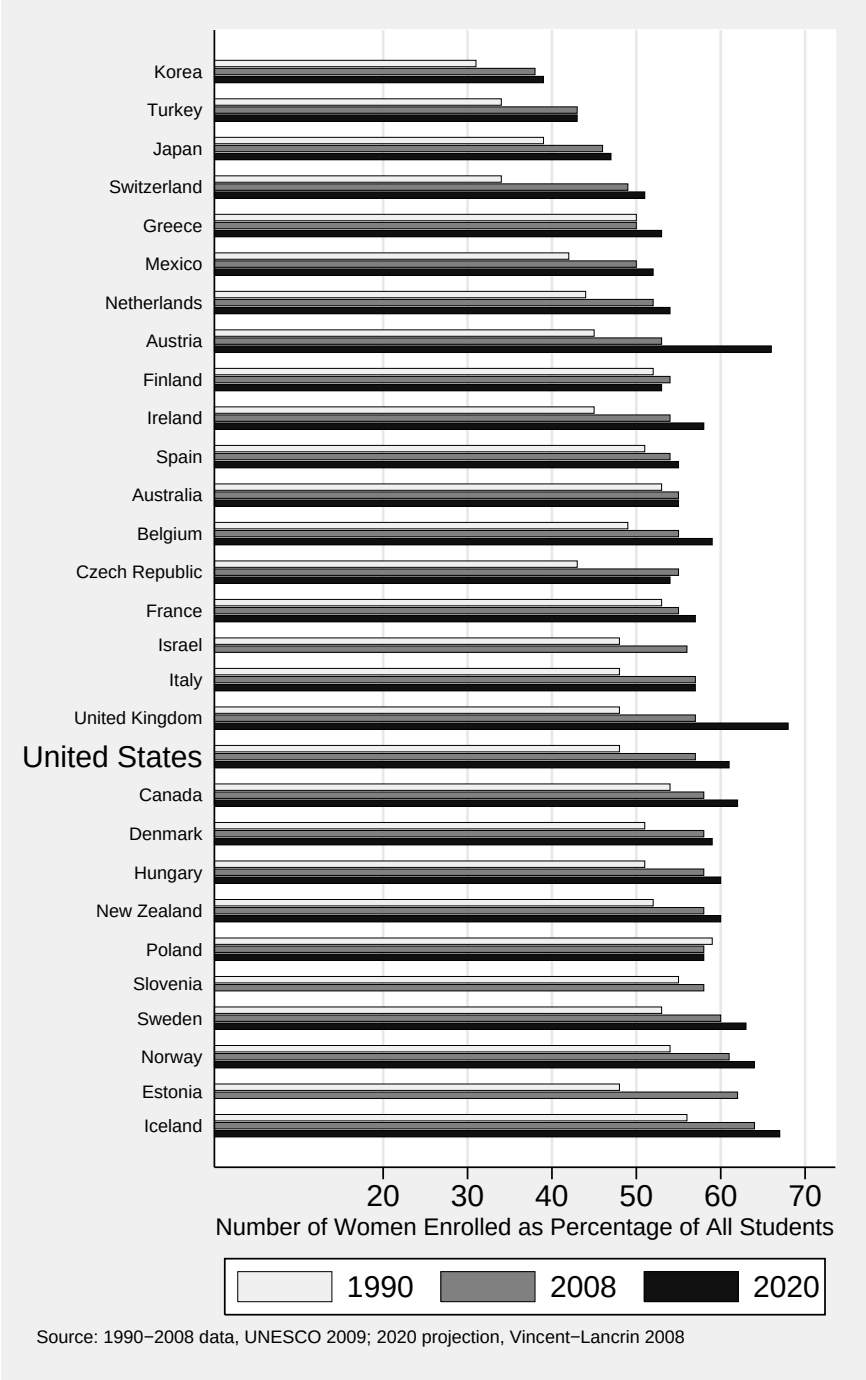
in all but four countries—Switzerland, Turkey, Japan, and Korea (OECD, 2006). Women's progress has been striking: 30 years ago women lagged behind men in completing college degrees nearly everywhere in the world. From 1965 to 1985, women's share of higher education increased, on average, from 27% to 40% across a range of countries (Bradley and Ramirez, 1996). In the 1980s, women began to reach parity with men, and in many cases surpassed men in the amount of education they received. Figure 16 shows the rise of women's share of enrollment in higher education in OECD countries between 1990 and 2008. Countries are ordered by women's share of enrollment in 2008, from women's smallest share (Korea) to largest (Iceland). Projections suggest that women's advantage will grow in most countries. By 2020, females are expected to comprise at least sixty percent of tertiary students in Austria, Canada, Hungary, Iceland, New Zealand, Norway, Sweden, and the United Kingdom.

Note that several OECD countries have higher female shares of tertiary enrollment than the U.S. This fact is related to another noteworthy comparison: after leading the world for much of the twentieth century, the U.S. has fallen behind other industrialized countries in terms of the percentage of the population attaining tertiary degrees. Figure 17 compares the fraction of the population at different age ranges who have completed a tertiary 5A degree.[25] Figure 18 shows the same data by gender. Figure 17 shows that the U.S. ranks first among the fraction of 55-64 year olds with a tertiary 5A degree, but only 11th among 25-34 year olds with this degree.

Although the U.S. remains in the upper middle of the distribution, it has dropped substantially in the rankings. Figure 18 shows that for the 1945-54 birth cohort, the U.S. had the highest rates of completion among industrialized countries for both women and men. By the

[25] The OECD defines ISCED 5A as Tertiary-type programs that "are largely theory-based and are designed to provide sufficient qualifications for entry to advanced research programmes and professions with high skill requirements, such as medicine, dentistry or architecture."

Figure 16: Women's Share of Tertiary Enrollment in OECD Countries 1990 and 2008.



1975-84 birth cohort, the percentage of U.S. women with a tertiary degree had risen dramatically, while the percentage of men who with a tertiary degree actually declined. The progress made by U.S. men across cohorts was next to last among the 34 OECD countries, and American men

ranked only tenth among these countries by 2009. However, while young American women had a much higher rate of tertiary degree completion than did older American women, the rise in other OECD countries was more dramatic; indeed, American women also ranked next to last among the 34 countries in the size of their increase in degrees across these cohorts. Women's gains in Norway, Denmark, Finland and Poland have been particularly impressive; more than 40% of all young women in these countries have a tertiary degree. Overall, American women – like American men – now rank 10th among OECD countries.

The fact that women have overtaken men in so many countries suggests a global explanation for the growing educational gender gap as well as nation-specific explanations for variation in the rate of overtaking or in the size of women's advantage. More research is needed to identify the global and local components of this trend in the United States and elsewhere.

Figure 17: Ranking of OECD Countries by Rate of Tertiary Completion

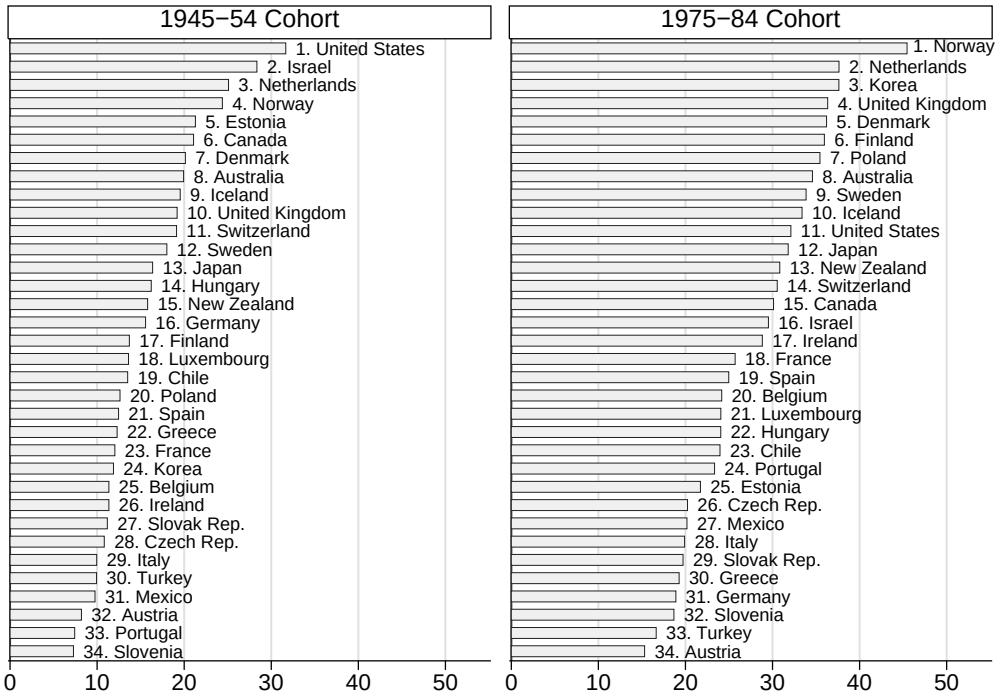
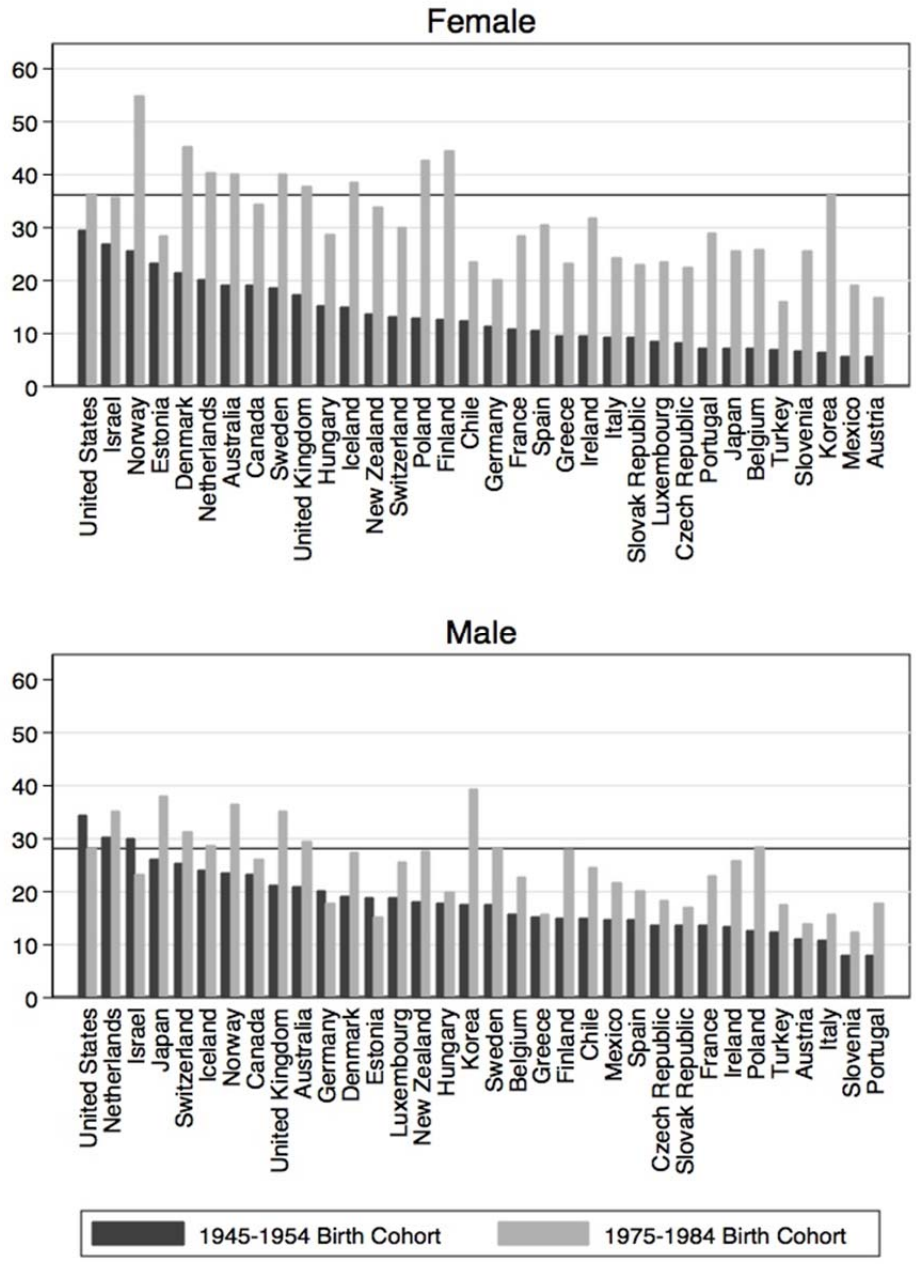


Figure 18: Percent of the Female and Male Population who btained a Tertiary Type A Degree, 1945-54 and 1975-84 Birth Cohorts, 2009



7. Conclusions and Implications

The recent reversal of the gender gap in educational attainment is a story about females' real gains, but also about stagnation in males' education that raises daunting challenges for American society. What are the best strategies to ameliorate gender gaps in educational achievement

and attainment in the United States today? We address this question in great detail in the book *The Rise of Women: The Growing Gender Gap in Education and What it Means for American Schools* (DiPrete and Buchman 2013). Here we present some of our key recommendations. If we want more American students to progress through college, we must do more than overcome gender-related barriers. First, we must lay down strong academic foundations in elementary and middle school to undergird success in high school and beyond. Second, we must provide clear pathways from secondary and post-secondary school into skilled well-paying jobs, so that students can plan their routes and are motivated to work hard to complete the educational journey. Third, we must make higher education affordable. The high cost today discourages students, especially those who do not see clear paths from education to good jobs. The problem is not with student aspirations. Many students have high aspirations, but underinvest in developing their educational skills, because they do not receive immediate rewards for high academic performance, because they do not understand the training needed to develop these educationalskills in middle and high school, and perhaps also because they are over-confident about their chances of economic success.

A key ingredient in this formula is the climate in schools. We do not favor proposals from critics such as Christina Hoff Sommers (2000) to restructure schooling around what we see as outmoded gender stereotypes that are more part of the problem than part of the solution. Instead, students require classrooms that teach academic skills and that reward them emotionally for academic success.

Very few students understand the extent to which college graduation depends on academic performance. They have a hazy knowledge about fields of study and their connection to the labor market. Knowledge can enhance motivation and discipline, but social support remains necessary. In the case of male educational performance, the social support goes beyond discipline; it allows

for forms of masculinity that align positive educational behaviors with environmental expectations and rewards. This support can come from parents (especially fathers) and peers, and it is probably strongest when it comes from multiple sources.

For much of the twentieth century, white ethnic immigrants spurred their sons to accomplish more than their fathers both to fulfill their parents' ambitions for them and, in the process, become successful themselves. In the 1970s, that pattern of generational progress began to falter for American boys. Conversely, girls once idealized middle-class adult femininity as a ritual of dating, courtship, and marriage, followed by suburban living, child-rearing, and civic volunteerism. Today girls in large numbers want careers, and see college and advanced degrees as the route to those careers. Boys almost seem weighed down by the lingering intergenerational memory of (white male) working class affluence, which colors their conception of masculinity as well as their strategies to transition into adulthood. The fading reality of a blue-collar route to masculine success still weighs on the current generation of adolescent boys.

Getting both boys and girls through four-year college is not the be-all and end-all educational policy. We agree with Rosenbaum (2001) that college is not the right goal for all students. For students struggling academically in middle and high school, a more appropriate policy is to ensure they complete high school and then follow clear pathways to good jobs. But raising college graduation rates among "the middle third" of American students, most of whom already enroll in college in large numbers, is a laudable goal. These students do not enter the work force with the skills that they could have achieved and that would have enabled them to obtain higher-paying jobs. It is the situation of these students that we seek to improve.

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