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Gender Differences Over the Span of College: Challenges to Achieving Equity

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Although educational and occupational gains made by women in recent decades have given rise to a popular notion that gender equity has been achieved, significant gender differences in the college student population exist across a variety of domains. Focusing on three major areas—(1) Financial Background; (2) Academic Self-Confidence and Engagement; and (3) Degree, Major, and Career Aspirations—this study examines historical trends in gender differences observed among entering college students over the past 4 decades and assesses changes in the gender gap occurring over 4 years of college. Results reveal significant sex differentials across all categories and show that gender differences observed at the point of college entry tend to remain steady over 4 years of college, though some narrowing and/or magnification of gender differences is observed. The implications for improving campus gender equity are discussed.

INTRODUCTION

Educational and occupational gains made by women in recent decades have given rise to a popular notion that gender equity has been achieved

(Conlin, 2003). The fact that women now have higher rates of college attendance—up to 58% of college enrollments nationwide (King, 2006)—is cited as one indicator of not only gender parity but also of women having surpassed men academically. Studies also show that women earn better grades and have higher college persistence rates than men (Astin, 1993; Guido-DiBrito, 2002; Hagedorn, Womack, Vogt, Wetebbe, & Kealing, 2002; Lindholm, Astin, Choi, & Gutierrez-Zamano, 2002). Other research has suggested that the size of the gender gap among students has generally decreased over time, particularly in the areas of degree attainment and career aspirations (Chamberlain, 1988; Astin, Oseguera, Sax, & Korn, 2002). Furthermore, the implementation of Title IX policies has also provided women with unprecedented opportunities in many areas of campus life, most notably in athletics. These gains for women have led some to conclude that what we now have is a national “crisis” for men, as women’s achievements are oftentimes perceived to come at a loss for men in a zero sum game (Martino & Meyenn 2001; Hoff Sommers, 2000; Pollack, 1999).

While there is growing evidence that male undergraduates are at risk in certain areas, the recent focus on boys and men often neglects to acknowledge that gender inequity persists. In particular, gender gaps continue in undergraduates’ choice of major, their career aspirations, certain areas of graduate degree attainment, and their postcollegiate salaries (Astin, 1993; Christian, 2002; Eccles, 1994; Flowers, Osterlind, Pascarella, & Pierson, 2001; Jacobs, 1996). For example, research continues to document how college men are more likely than women to select majors in lucrative fields such as engineering and computer science, while women still tend to choose majors in the lower-paying fields of education, health, and psychology (U.S. Department of Education, 2004; Margolis & Fisher, 2003).

Studies also show gender differences to persist in the affective domain, with college women reporting less confidence in their self-assessments (Clark & Zehr, 1993; Smith, Morrison, & Wolf, 1994), struggling more with developing autonomy and separating from their parents (Josselson, 1987), and reporting more emotional distress (Sax, Bryant, & Gilmartin, 2004; Sax, Lindholm, Astin, Korn, & Mahoney, 2001) than college men.

Though there is evidence of longstanding differences between college women and men, research on this topic typically takes a “snapshot” approach by reporting on gender gaps among individuals at a given point in time. This study, however, uses nationwide data on students attending

4-year colleges and universities to address the *stability* of the gender gap over the past 4 decades as well as the extent to which the magnitude of the gender gap changes during the college years. The latter question is of particular importance to campus practitioners because it addresses the extent to which male-female differentials change during the pivotal college years. While others have reported gender differences in some areas that have either narrowed or widened during college (Astin, 1993; Smith, Morrison, & Wolf, 1994), such research has not reported on whether the convergence or divergence of the gender gap is statistically significant. It is important to distinguish between gender differences that truly narrow (or widen) from those where changes in the gender gap may be marginal.

Drawing on data from two different surveys on a wide range of topics, this study examines men's and women's responses across three main themes: (1) Financial Background; (2) Academic Self-Confidence and Engagement; and (3) Degree, Major, and Career Aspirations. These particular areas were selected because collectively they tell a story of the progress toward gender equity as well as the persistence and lasting influence of sex differentials among college students. In addition, the gender differences observed in these areas have important implications for campus programming and services, as discussed in this article. Other aspects of students' experience measured on the surveys—such as physical and psychological health, political and social values, and community engagement—are examined in other publications emanating from these data (Sax, forthcoming), but are beyond the scope of this article.

METHODS

DATA

This study relies on two databases maintained by the Higher Education Research Institute at UCLA: (1) long-term trend data on successive cohorts of college freshmen collected between 1966 and 2006; and (2) a 4-year longitudinal study of students who were surveyed when they entered college in 1994 and again in 1998.

The database used in trend analysis includes more than 8 million students who participated in the Cooperative Institutional Research Program (CIRP) Freshman Survey between 1966 and 2006. The Freshman Survey, typically administered during orientation or during the first week of classes, asks students about their background characteristics, attitudes,

values, educational achievements, and future goals. The data from 1966 to 2006 represent the responses of students attending more than one thousand 4-year colleges and universities nationwide. The institutional sample reflects the diversity of baccalaureate institutions nationwide in terms of size, type (4-year colleges vs. universities), control (public vs. private), and selectivity. Within each year, students' responses are weighted so as to reflect the responses we would expect if students at all 4-year colleges and universities responded to the survey. See Astin et al. (2002) for details on sampling and weighting procedures.

For the longitudinal database, all subjects completed the fall 1994 Freshman Survey and a spring 1998 follow-up survey known as the College Student Survey (CSS). The CSS is similar in format to the Freshman Survey, and it includes information on students' college experiences and their perceptions of college, as well as posttests of items that appear on the Freshman Survey. The longitudinal sample includes a total of 17,637 students (10,901 women and 6,736 men) who completed both instruments at 204 4-year colleges and universities across the United States. Data included in this longitudinal file are weighted to correct for over- or underrepresentation of certain institutional types as well as for the overrepresentation of high-achieving women among follow-up respondents.

ANALYTICAL METHODS

Within each of the three broad categories (Financial Background; Academic Self-Confidence and Engagement; Degree, Major, and Career Aspirations), we examined long-term trends for women and men dating back to 1966. Most of the trends are current through the 2006 Freshman Survey, though occasionally it was necessary to use other years as the most recent source of data, as noted in the text and figures. Though not all trends could be included in this article, there is discussion of selected trends that reflect: (a) convergence of the gender gap, (b) widening of the gender gap, (c) reversal of the gender gap, or (d) persistent gender gaps over the past 4 decades. Understanding relative changes in the characteristics and experiences of college women and men is critical for campus practitioners, as their ability to enact policies and make decisions depends on knowledge about the unique qualities of any campus subgroup, whether defined by gender, race, family background, or other factors.

Using the longitudinal sample (1994 to 1998), this study reports on gender differences observed for women and men as they entered college

and the extent to which those differences became larger or smaller over 4 years. Specifically, cross tabulations were conducted by gender and year to address whether significant differences existed: (a) between women and men at college entry (1994); (b) between women and men as college seniors (1998); and (c) between the gender gap in 1994 and the gender gap in 1998. Tests of significance were employed depending on the type of comparison being made. To test gender differences in 1994 or 1998, we performed independent sample *z*-tests of the standard error of the gender gap. To test whether there is a significant change in the gender gap over 4 years, we conducted the McNamara test for dependent proportions (Agresti & Finlay, 1997). A *p* level of .001 was used to assign significance (whether between men and women at a single point in time or between the gender gap in 1994 and the gender gap in 1998).

LIMITATIONS

The primary limitation of this study is that it is entirely descriptive in nature. It examines the sheer magnitude of the gender difference on selected survey items without testing for other factors that may be related to this difference, either as a cause or consequence. The focus on the descriptive differences is intentional, as it provides a “big picture” snapshot of the status of the gender gap across the domains examined in this study. However, a related article (Sax & Harper, 2007) uses the same database to examine, from a multivariate perspective, the extent to which gender differences observed during college are attributable to aspects of the college experience or whether they are due to precollege gender differences. That study finds that gender differences at the end of college are largely unrelated to the college experience and are attributable to gendered patterns of education and socialization prior to college.

A second limitation to the present study is that change during college is examined for students who attended college a decade ago. Reliance on data from the 1990s was necessary as the dataset represents the most recent longitudinal follow-up of freshman survey respondents from a comprehensive set of 4-year colleges and universities. Institutions in this study represent the population of 4-year colleges and universities in terms of size, type, and selectivity; more recent follow-up surveys have not achieved the same institutional representation, though current efforts aim to generate such data for students attending college in the 2000s. Although

the longitudinal data may be slightly outdated, the trends do include freshman responses up through 2006.

A related limitation is that 2-year colleges are not included in the present study. Unfortunately, participation in the freshman survey among 2-year colleges is fairly low and the small number of institutions that do participate cannot be used to generalize to the experiences of all 2-year college students. Future research on gender differences should make efforts to include students from 2-year colleges, especially since the population of students at these institutions is often quite different from 4-year institutions. In particular, women comprise an even greater share of students at 2-year colleges, especially among nontraditional-age college students, and they are more likely than women at 4-year colleges to be working full-time and raising children. These factors may account for different results from those observed in this study.

RESULTS

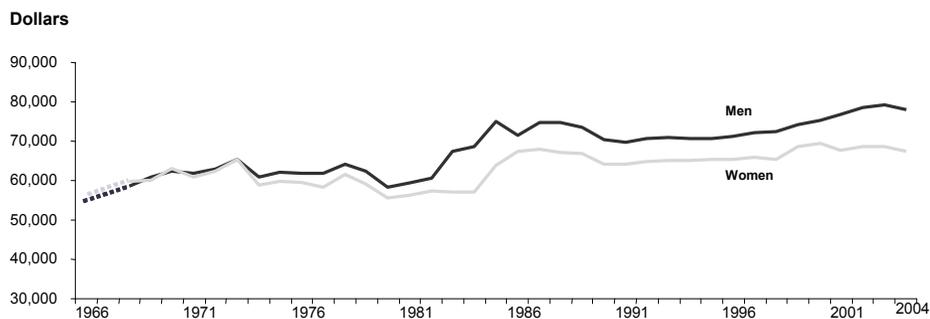
Findings are organized into the three broad categories introduced earlier: Financial Background; Academic Self-Confidence and Engagement; and Degree, Major, and Career Aspirations. Long-term trends analyses are examined first, followed by 4-year longitudinal changes.

LONG-TERM TRENDS: 1966–2006

Financial Background

Discussion on the changing demographics of the college student population often centers on gender or race, but less so on socioeconomic status. Yet one of the most important student trends is the emergence of an economic gender gap. Over 40 years ago—when the CIRP Freshman Survey was initiated—college-going men and women reported similar financial backgrounds. Since 1966, however, median family incomes for male students have increased by approximately 40%, relative to a 17% increase among the women (see Figure 1). By 2004, family income for male students was approximately \$10,000 higher than for female students. These results extend and highlight findings reported by Lindholm et al. (2002), who found that “the greatest growth in enrollments for women has occurred among low-income women” (p. 34). Their study documented that women are overrepresented among low- and middle-income college students, and underrepresented among students from high-income families.

FIGURE 1. Median family income of entering freshmen (1966–2004) (in constant 2004 dollars).



Data unavailable for the year 1967

Women's socioeconomic status relative to men's also can be seen by examining trends in parental education. Although women attending college in the 1960s were more likely than men to have college-educated mothers and fathers, this trend reversed in the late 1970s and the gap continues to widen. Among students who entered college in 2006, 56.4% of men and 50.1% of women have fathers who had graduated from college, and 55.5% of men and 50.5% of women have mothers who had graduated from college. In other words, just as we have witnessed a growing gender gap in family income that now favors men, we have also seen emerging disparities in levels of parental education, with men more likely than women to report that their parents graduated from college.

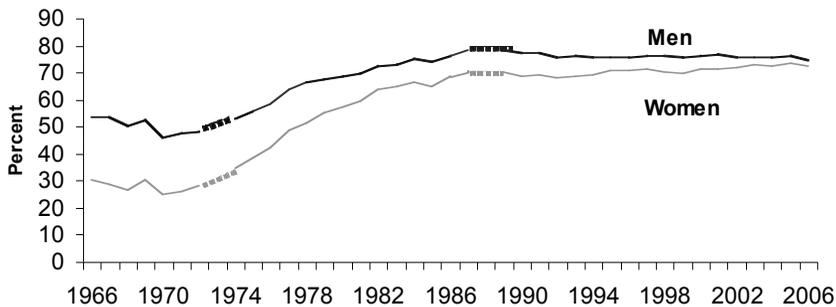
Given their lower family incomes, it is not surprising that the women express greater concern than men about their ability to finance their college education. A full 69.5% of women have "some" or "major" concerns about their ability to pay for college (versus 57.55% among men). Gender differences on this item have widened over the years, as trends since 1966 reveal net increases in financial concern among women and net decreases among men. Further, women are slightly more likely than men to consider the following factors as "very important" in selecting a college: low tuition (22.2 versus 18.5%), offers of financial assistance (37.2 versus 30.7%), or because graduates of that college "get good jobs" (51.8 versus 46.1%).

Also consistent with their greater financial concerns and their family's socioeconomic status relative to men, women are more likely than men to anticipate employment during college. The expectation to seek employment during college has produced one of the more interesting trends in the history of the Freshman Survey. When first asked on the 1976 survey,

women and men were equally likely to anticipate employment during college. Since that time, while the expectation to work has fluctuated for both women and men, the overall increase in anticipated employment has been substantially higher for women, resulting in a widening of the gender gap since the mid-1970s. Presently, 50.2% of women and 36.5% of men believe there is a very good chance that they will seek employment while in college. Although one might easily attribute this to women's lower family income, gender differences are readily apparent across *all* income levels, such that regardless of family income, women are notably more inclined than men to report a "very good chance" that they will work to help offset college costs.

Despite women's lower incomes and greater financial concerns relative to men, historically they have expressed less interest than men in the long-term accumulation of wealth. However, this gender gap has converged significantly over time, with 72.4% of women and 74.6% of men reporting that "being very well off financially" is a "very important" or "essential" goal for them (see Figure 2). When it comes to entrepreneurial aspirations, a sizeable gender gap remains, with only 37.9% of women entering college with a commitment to "becoming successful in a business of my own," compared to 46.7% among men.

FIGURE 2. Freshman goal: being well-off financially (1966–2006) (% of reporting "very important" or "essential").



Data unavailable for the years 1973, 1988

Academic Self-Confidence and Engagement

As women have come to dominate enrollments on campuses nationwide, they are often portrayed as an academic success story. Indeed, numerous survey items point to a stronger academic orientation among the women. When it comes to motives for attending college, women are more likely than men to rate the following as “very important” reasons for attending college: to gain a general education and appreciation of ideas (69.9 among women versus 57.5% among men), to learn more about things that interest them (80.6 among women versus 72.1% among men), and to improve their study skills¹ (43.7 among women versus 36.8% among men). Further, women place more importance on a college’s academic reputation than do the men, with 61.4% rating this as a “very important” reason for selecting a particular college, versus 52.4% among men.

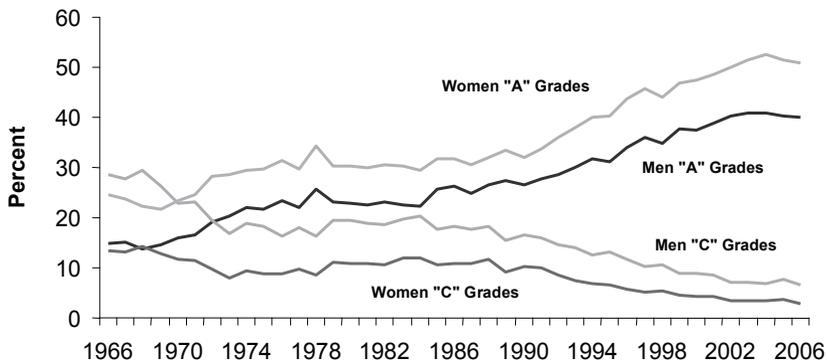
In addition, women’s precollege levels of academic engagement are considerably higher than men’s, as women report spending significantly more time studying or doing homework in the last year of high school than do the men (37.6% of women studied 6 or more hours per week, compared to 26.9% among the men). It is worth noting, however, that study time for both genders has decreased significantly over time. Women are also more likely than men to talk with their high school teachers outside of class (51.1% among women versus 43.8% among men) and to participate in student clubs and groups at least 3 hours per week (37.0% among women versus 25.8% among men).

Women’s higher levels of time-on-task appear to pay off in terms of their high school grades, with significantly greater proportions of women entering college with “A-” or higher high school grades (50.9% among women versus 40.0% among men) (see Figure 3). The gender gap in high school GPAs has a long history on the survey, even as grades have risen dramatically for all students. Clearly, men and women are equal beneficiaries of “grade inflation,” a phenomenon witnessed at both the high school and college levels (Rosovsky & Hartley, 2002; Sax, 2003).

Despite women’s stronger academic orientation relative to the men, they report a comparatively low academic self-concept. For example, women rate themselves significantly lower than men on nearly all self-ratings related to academic or intellectual confidence. For example, just over half of the women (52.2%) consider themselves to be “above average”

1. Percentages for “study skills” come from 2003, the last time this item was included on the survey.

FIGURE 3. High school grade inflation for women and men (1966–2000).



or “highest 10%” in intellectual self-confidence, compared with more than two thirds (68.8%) of the men. Women also are less likely than men to consider themselves to be at least above average mathematical ability (35.9 among women versus 53.1% among men) and academic ability (65.9 among women versus 71.9% among men). Only in the area of writing ability do women report higher levels of confidence than do men (49.3 among women versus 45.7% among men).

These results are consistent with decades of research on gender and self-confidence. While it is clear that women tend to underestimate their skills and abilities, it is less clear *why* this is the case. Do women actually view themselves as less academically capable than the men, or are they simply more modest in their self-assessments? Prior research, for example, has shown women to indicate lower levels of mathematical confidence, even when their *demonstrated* math abilities are equal to or greater than men’s (Marsh, Smith, & Barnes, 1985; Sax, 1994a; Sherman, 1983). Sadker and Sadker (1994) also discuss a phenomenon by which “girls, especially smart girls, learn to underestimate their ability” (p. 95) and more often attribute their intelligence to hard work than innate ability. Conversely, adolescent boys have been shown to exhibit a sometimes outsized sense of self not always commensurate with their academic achievement (Sadker & Sadker, 1994).

Perhaps women’s lower self-ratings stem from the way these questions are posed on the survey, where students are asked to rate their abilities as “compared to the average person your age.” Women may be more reluctant

to report their skills as “higher” than others, as that denotes a competitive orientation that may be unappealing to many women. In fact, women do not view themselves as “competitive” as men, as indicated by the fact that 45.2% of women and 69.1% of men view themselves as “above average” or “highest 10%” on this trait.² Thus, while we are not sure of the reason, the fact is that women enter college reporting lower confidence in their academic skills than do men. This alone is important for faculty and practitioners to be aware of, as they will encounter students whose outward image may not be the best reflection of their actual talents.

Degree, Major, and Career Aspirations

Despite their reported lack of self-confidence and reluctance to admit high academic ability, college women have become just as likely as men to aspire to graduate degrees. Furthermore, they increasingly aspire to nontraditional majors and careers. Historically, college students’ major choices and degree aspirations have been closely related to the career opportunities available to them. Gendered patterns in career choice were accentuated during the 1950s and 1960s, but the wide disparities in choice of major, degree attainment, and career aspirations began to narrow dramatically during the 1970s and 1980s. This was due in no small part to federal legislation regarding equal pay as well as Title IX and affirmative action. Today, with more women pursuing graduate and professional degrees and nontraditional occupations, the public perception seems to be that the gender gap between college men and women has all but disappeared. But the data tell a more complex story. While there has been a significant convergence of the gender gap when it comes to level of degree aspiration, notable gender gaps persist in specific academic and career fields that students plan to pursue.

Degree Aspirations

Marking a significant shift over the past few decades, women are now more likely than men to plan to attend graduate or professional school. The most notable gender difference is in aspiration for doctoral degrees, with 32.3% of women and 29.0% of men planning to earn a Ph.D., an M.D., or a J.D. Aspiration for master’s degrees is fairly similar between

2. Percentages for “competitiveness” come from 2001, the last time this item was included on the survey.

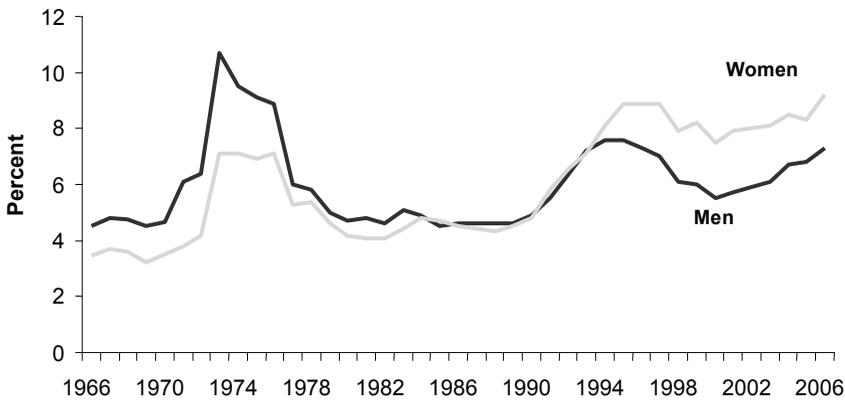
the two genders, with 42.3% of women and 41.7% of men aspiring to the master's as their highest degree. Given women's greater interest in attending graduate school, it is not surprising that women are more likely than men to indicate that they were attending college in order to prepare for graduate or professional school (63.1% of women consider this a "very important" reason for college attendance, versus 51.0% of men). Similarly, greater proportions of women than men say that they selected their college because the school's graduates are admitted into top-ranked graduate and professional schools (33.3% among women versus 26.3% among men).

Intended Major

The Freshman Survey includes a list of 82 academic majors, which have been grouped into 18 different categories for the purpose of analysis. At the point of college entry, women are significantly more likely than men to plan to major in education (12.5% among women versus 5.7% among men), psychology (6.6% among women versus 2.6% among men), and fields in the health professions (11.8% among women versus 3.8% among men). However, women are less likely than men to major in engineering (2.4% among women versus 14.6% among men), business (13.5% among women versus 23.5% among men), and history/political science (4.5% among women versus 5.7% among men). In particular, education and engineering stand out as two major areas from our study that have had an enduring gender gap over the years. For the most part, these results reflect longstanding sex differences in major selection that are well documented in other studies (Astin et al., 2002; Gati, Osipow, & Givon, 1995; Jacobs, 1986, 1996; Little, 2002; Morgan, Isaac, & Sansone, 2001; Sax, 1996; Stickel & Bonett, 1991). And, given women's reported low confidence in their mathematical abilities, it comes as no surprise that women tend to choose less math-intensive fields.

However, in some cases, choice of major signals a reversal of historical patterns. For example, in the 1960s and 1970s, the biological sciences were dominated by male students. Interest in biology converged among the sexes in the 1980s, and during the 1990s a new pattern of female predominance in the biological sciences emerged (see Figure 4). Indeed, by 2000 U.S. women earned over 80% of master's degrees in the health professions and related sciences, and over 40% of degrees in medicine (U.S. Department of Education, 2004).

FIGURE 4. Entering freshmen who intend to major in biological science (1966–2006).



Career Aspirations

Gender differences in career choice mirror those found for major preferences. Upon entering college, women are more likely than men to plan to become elementary school teachers (7.9% versus 1.0%), health professionals (7.2% versus 4.0%) and nurses (6.8% versus 0.8%). Men are more likely than women to aspire toward careers in engineering (11.7% versus 2.0%), business (18.3% versus 10.0%), and computer programming (3.4% versus 0.3%). These differences generally reflect historical trends in men and women's relative career aspirations.

However, it is important to point out areas in which sex differences in career choice have been eliminated or have reversed direction. For example, interest in the historically male-dominated careers of law and medicine converged in the 1980s and 1990s respectively (see Figures 5 and 6). These trends reflect the dramatic narrowing of the gender gap in law and medical degrees conferred in the United States over the past several decades (U.S. Department of Education, 2003).

In one instance, the genders have converged on a career choice that was once dominated by women: secondary education. When the survey began in 1966 women were approximately twice as likely as men to express interest in secondary education, a gap that has since converged completely, with 4.9% of women and 4.6% of men planning to become secondary school teachers. Incidentally, gender differences in interest in elementary education have also narrowed over the history of the survey, but women remain far more likely to aspire toward this career than men (7.9% versus

FIGURE 5. Entering freshmen who aspire to become lawyers (1966–2006).

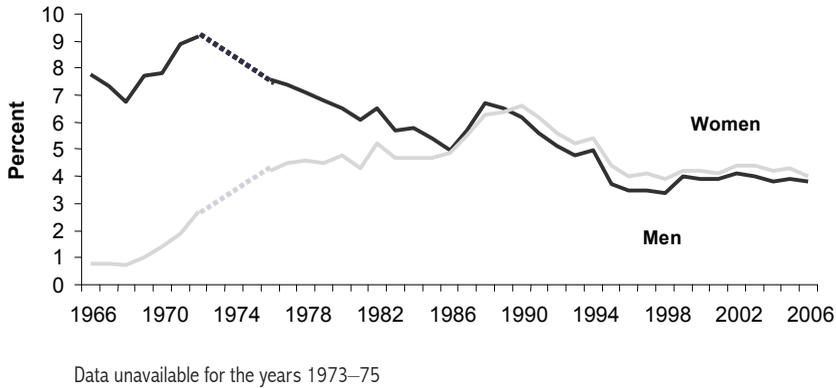
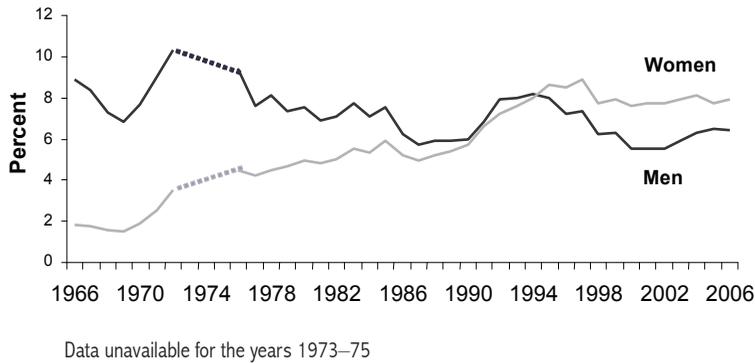


FIGURE 6. Entering freshmen who aspire to become medical doctors (1966–2006).



1.0%). The narrowing of the gender gap in teaching aspirations is almost entirely due to the significant decline in women's interest in this field, as evidenced by the shift of women into law, medicine, and business.

CHANGE DURING COLLEGE: 1994–98

The long-term trends described in the prior section provide clear evidence that numerous longstanding gender gaps continue to be evident among students entering college, though some differences between women and men have disappeared over time. What the trends do not reveal is how the gender gap changes over the span of students' college years. Thus, this section describes changes in the gender gap occurring over 4 years of college. As noted earlier, this section relies on longitudinal data on students

attending college in the 1990s; thus, freshman year percentages will differ from the more current percentages reported in the prior section. Future studies will need to address whether changes in the gender gap observed for these students in the 1990s are observed for more recent cohorts.

Financial Background

The long-term trends described above reveal a growing economic gender gap among entering college freshmen, with women coming from lower-income families and experiencing greater financial concerns relative to the men. Though the follow-up survey does not reassess students' financial standing after 4 years, it does indicate which students actually sought employment to pay for college expenses. Specifically, after 4 years of college, women in the longitudinal sample are only slightly more likely than the men to hold part-time jobs (58.1 versus 53.8%). Further, men are slightly more likely than women to work full-time while attending college (11.4 versus 9.0%). Thus, the gender gap in actual employment is much smaller than the gender gap in anticipated employment. Perhaps this reflects the fact that although women report greater financial worries, the costs of college are just as high for the men as the women. Future research should investigate why women's employment rates during college are similar to men's, especially at a time when women tend to come from lower-income families.

Academic Self-Confidence and Engagement

As indicated by trends over the past 40 years, women enter college with significantly higher levels of academic engagement, but consistently lower levels of academic self-confidence. What happens to women and men's intellectual self-confidence over the span of college? The results are not favorable to women, as the differential between women and men either remains stable or becomes more pronounced over time (see Table 1). For example, while both women and men experience gains in intellectual self-confidence during college, these gains are larger for men, resulting in a significant widening of the gender gap. Similarly, in the realm of mathematical abilities, both groups become less confident during college, with the decline greater among women, again resulting in a significantly larger gender difference 4 years after college entry. This latter result is consistent with findings reported on students attending college in the 1980s (Sax, 1994a, 1994b), in which the decline in math confidence that is observed among all students is generally not witnessed among students

TABLE 1. Gender differences in academic self-confidence and engagement.

	1994			1998			Significant Change ^a in Gender Difference?
	Women	Men	Diff.	Women	Men	Diff.	
	(%)	(%)	(W-M)	(%)	(%)	(W-M)	
Self-Ratings (above average or highest 10%):							
Intellectual self-confidence	48.8	63.1*	-14.3	59.4	78.1*	-18.7	Widens
Math ability	43.6	54.6*	-11.0	37.3	51.4*	-14.1	Widens
Academic ability	68.2	73.9*	-5.7	70.5	75.9*	-5.4	
Writing ability	47.1*	40.5	+6.6	58.2	56.8	+1.4	Widens
Competitiveness	44.4	69.8*	-25.4	48.7	71.8*	-23.1	
Studying or homework 6+ HPW	50.1*	38.6	+11.5	76.5*	66.6	+9.9	
Student clubs/groups 3+ HPW	45.4*	30.4	+15.0	34.8*	32.4	+2.4	Narrows
Talking with instructors 1+HPW	49.6*	45.5	+4.1	56.3*	53.3	+3.0	
Activities (frequently or occasionally):							
Didn't complete homework on time	59.5	69.7*	-10.2	52.1	64.4*	-12.3	
Overslept/missed class or appointment	24.7	27.1*	-2.4	49.9	60.9*	-11.0	Widens
Grades							
A or A+	22.1*	16.7	+5.4	11.4*	9.1	+2.3	Narrows
B+ or A-	42.1*	37.9	+4.2	37.4*	30.0	+7.4	Widens
B	26.4	30.5*	-4.1	34.9	37.0	-2.1	Narrows
B- or C	8.7	13.2*	-4.5	13.3	18.4*	-5.1	Widens
C or less	0.6	1.6	-1.0	2.3	4.4*	-2.1	Widens
*Percentage is significantly larger ($p < .001$) for that group.							
^a Only changes significant at $p < .001$ are designated as widening or narrowing.							

majoring in math-intensive fields (e.g., engineering, physical science, mathematics, statistics, and computer science). In fact, persisting in a math-intensive curriculum—in fields typically dominated by men—promotes women's confidence in their abilities as well as their willingness to admit that confidence. For women in other fields, who are likely to have minimal exposure to mathematics during college, their sense of math confidence falls even further behind men's during college.

In college, although grades decline relative to those earned in high school, women continue to earn higher grades than men, as shown in Table 1. Further, women continue to spend more time than men studying and doing homework in college. The small gender gap in time spent talking with instructors also persists from high school to college, with women spending more time interacting with their professors than did the men. Further, as another sign of greater academic disengagement, men become significantly more likely than the women to oversleep and miss class or an appointment. In fact, a full 60.9% of men and 49.9% of women report oversleeping in college. Finally, one area of initial gender differences in academic engagement narrows significantly during college: student clubs and groups. Although women spend more time than men on these extracurricular activities in high school, gender differences are nearly nonexistent during college (due primarily to a decline in involvement in clubs and groups among the women). Quite possibly, women elect to tone down their extracurricular activities in order to adjust to the greater studying demands in college.

Degree, Major, and Career Aspirations

Over 4 years of college, gender differences in degree aspirations shift only slightly. Aspirations for terminal bachelor's degrees increase among men, while plans to earn master's degrees grow more common among women. Thus, gender gaps in aspiration for these degrees grow wider over time. However, gender differences in students' aspirations for doctoral degrees (Ph.D., M.D., J.D.) remain significant over 4 years.

What happens to men's and women's major choice and career aspirations during college? As seen in Table 2, in some majors gender differences observed at the point of college entry are observed again 4 years later (business, psychology, and education), although for both sexes, interest in psychology grows while interest in education declines. Initial gender differences that are observed in engineering and the health professions majors narrow significantly during college as men's interest in engineering declines more so than women's, and as women's interest in the health professions declines more so than men's.

Among intended careers, initial gender differences observed in the fields of business and nursing are maintained over 4 years (see Table 3). For one career choice—social work—gender differences that are seemingly nonexistent in the freshman year emerge 4 years later as significantly more women than men aspire to careers in social work. Just as was observed with choice of major field, gender differences narrow (but remain significant)

TABLE 2. Gender differences in major field.

	1994			1998			Significant Change ^a in Gender Difference?
	Women	Men	Diff.	Women	Men	Diff.	
	(%)	(%)	(W-M)	(%)	(%)	(W-M)	
Engineering	3.3	12.5*	-9.2	2.6	9.3*	-6.7	Narrows
Business	12.5	18.8*	-6.3	12.4	17.7*	-5.3	
History or Political Science	3.4	5.5*	-2.1	3.2	6.2*	-3.0	
Computer Science	1.0	2.2*	-1.2	1.0	2.6*	-1.6	
Agriculture or Forestry	1.2	2.0*	-0.8	1.6	2.5*	-0.9	
Architecture/Urban Planning	0.9	1.7*	-0.8	0.5	0.9*	-0.4	
Mathematics or Statistics	0.9	1.6*	-0.7	1.2	1.1	+0.1	Reverses
Technical/Applied Majors	1.2	1.0	0.2	1.1	1.0	+0.1	
Physical Sciences	1.9	2.4	-0.5	1.3	3.4*	-2.1	Widens
Fine Arts	2.6	3.1	-0.5	2.8	2.6	+0.2	
Undecided	9.0	8.8	+0.2	0.4*	0.0	+0.4	
Humanities/English	3.5	3.1	+0.4	6.5*	4.3	+2.2	Widens
Journalism/Communications	3.5*	2.4	+1.1	3.6	3.8	-0.2	Reverses
Social Sciences	3.1*	1.9	+1.2	7.3*	5.0	+2.3	
Biological Sciences	8.6*	7.2	+1.4	8.2	8.2	0.0	Narrows
Psychology	5.5*	2.1	+3.4	6.5*	3.5	+3.0	
Health Professional	15.6*	7.4	+8.2	5.5*	1.5	+4.0	Narrows
Education	15.1*	6.8	+8.3	13.4*	5.0	+8.4	

*Percentage is significantly larger ($p < .001$) for that group.
^aOnly changes significant at $p < .001$ are designated as widening or narrowing.

in the career categories of engineering and the health professions. Finally, the gender gap becomes notably wider over 4 years in one field—computer programming—as the influx of men into that field is nearly four times that of women. This reflects a national trend of male dominance in computing that is well documented by Margolis and Fisher (2003).

SUMMARY AND CONCLUSION

The data presented in this study paint a picture of both dynamic changes and perplexing stasis among U.S. college students. Today's college student population is much different than it was 40 years ago, with women

TABLE 3. Gender differences in career aspirations.

	1994			1998			Significant Change ^a in Gender Difference?
	Women	Men	Diff.	Women	Men	Diff.	
	(%)	(%)	(W-M)	(%)	(%)	(W-M)	
Engineer	3.3	11.8*	-8.5	2.2	8.0*	-5.8	Narrows
Business	11.6	16.5*	-4.9	16.0	21.1*	-5.1	
Computer Programmer	0.9	3.4*	-2.5	1.9	7.3*	-5.4	Widens
Law Enforcement	0.4	2.2*	-1.8	0.7	2.6*	-1.9	
Doctor/Dentist/Physician	6.8	7.9	-1.1	2.7	4.1*	-1.4	
Farmer/Forester	0.8	1.9*	-1.1	0.6	1.0	-0.4	Narrows
Lawyer	3.5	4.4	-0.9	2.7	3.5	-0.8	
Clergy	0.2	1.0*	-0.8	0.3	1.2*	-0.9	
Military	0.3	1.0*	-0.7	0.5	1.6*	-1.1	
Education (Secondary)	4.8	5.5	-0.7	4.8	4.7	+0.1	
Artist	4.9	5.6	-0.7	5.3*	4.2	+1.1	Reverses
Architect	1.0	1.6*	-0.6	0.9	1.1	-0.2	
Research Scientist	2.0	2.5	-0.5	3.2	3.0	+0.2	
College Teacher	0.4	0.6	-0.2	1.2	1.8*	-0.6	
Homemaker	0.2*	0.0	+0.2	0.3*	0.0	+0.3	
Business Clerk	1.2*	0.4	+0.8	0.5	0.3	+0.2	Narrows
Social Worker	1.7*	0.7	+1.0	6.5*	1.0	+5.5	Widens
Undecided	13.7	12.6	+1.1	3.9	3.5	+0.4	
Psychologist	2.2*	0.7	+1.5	1.7*	0.5	+1.2	
Nurse	3.2*	0.4	+2.8	3.2*	0.3	+2.9	
Health Professional	11.7*	4.7	+7.0	5.9*	2.2	+3.7	Narrows
Education (Primary)	10.7*	2.8	+7.9	11.9*	2.8	+9.1	Widens

*Percentage is significantly larger ($p < .001$) for that group.
^aOnly changes significant at $p < .001$ are designated as widening or narrowing.

now comprising nearly 60% of all undergraduate college students. And their strength is not only in their numbers. College women today earn higher grades and, overall, are more academically engaged when compared to male college students. Women also increasingly aspire to traditionally “male” majors and careers such as medicine and law. But despite these gains

in access and opportunity for women, there continue to be fundamental differences in values, beliefs, attitudes and, most importantly, outcomes between men and women. Simply put, there remains a significant gender gap on U.S. college campuses.

Focusing on three major domains—Financial Background; Academic Self-Confidence and Engagement; and Degree, Major, and Career Aspirations—this article reports on gender differences observed for women and men as they enter college and the extent to which those differences become larger or smaller over 4 years. At the point of college entry, significant gender differences are observed across all categories. Some of the most significant gaps are found in the area of self-confidence, with women rating their intellectualism, mathematical ability, and competitiveness all at much lower levels than do the men. Women entering college also come from families with lower socioeconomic status and parental education levels than those of college men, and they are more concerned than men about how they will pay tuition; thus, women anticipate spending more time than men working in college (though actual employment rates during college are more equivalent).

Gender differences observed at the point of college entry tend to remain steady over 4 years of college. In other words, if women and men differ in certain ways when they begin college, it is likely that they differ in those same ways at the end of college. However, there are a number of items in which gender differences grow larger, and an equivalent number of items in which differences narrow. For example, women and men move closer together in several ways that differentiate them as freshmen: interest in engineering, mathematics/statistics, and the health professions. But the sexes grow farther apart in key aspects of self-confidence—intellectual, mathematical, and academic—and in their orientation toward certain gender-imbalanced careers, such as elementary education, social work, and computer programming.

What implications do these gender differences have for campus personnel? After all, many of these differences exist well before students set foot on campus and are simply maintained as students move through their undergraduate years. One may argue that institutions are not in a position to eradicate gender differences that exist prior to college matriculation, as these differentials result from years of gender-based socialization occurring in homes, schools, peers, the media, and other major sources of influence (Anderson, 2000; Barnett & Rivers, 2004; Sax & Harper, 2007).

However, college and university practitioners can utilize the information presented here to better understand their students and to create opportunities to maximize the success of all students. For example, this study documents socioeconomic shifts over the last 40 years that have resulted in a generation of college women who have significantly more financial concerns than their predecessors, and more than their male counterparts. Importantly, this growing population of women “at risk” may not be readily apparent to campus practitioners, especially since women’s achievement levels are higher than men’s. Through vehicles such as financial aid, work-study, and other assistance, campuses can help to minimize the financial burden carried by many women. Further, campuses should expand opportunities for on-campus employment for women (and for men as well) given research documenting the benefits that students accrue—both academically and socially—when they are afforded part-time employment on campus. In fact, Astin’s (1993) research has shown that working on campus yields more benefits to students than not working at all.

In addition, campuses must address the gender disparities in the academic realm. Though college women spend more time than men studying, completing assignments, attending class, and meeting with faculty, they suffer from comparatively low academic and intellectual self-confidence—differences that grow larger during college. Clearly, campus practitioners must be attuned to the differential needs and experiences of both genders. For women, there is a need to encourage a stronger sense of self-confidence. Getting good grades does not guarantee that women will make favorable academic or intellectual self-assessments. In other words, competence does not always translate into confidence. Thus, faculty and practitioners should not discount the concerns of female students who, despite a string of academic successes, doubt their ability to do well in their classes, thrive in their major, or pursue graduate school. Of particular concern is women’s low confidence in their mathematical abilities and their reluctance to pursue math-intensive majors and careers. Both of these factors have severe economic consequences for women who still face a lifetime of lower wages than men.

Awareness of shifting career interests of women and men is vital for campus personnel, most notably academic advisors, career counselors, and faculty. Students should be advised that no career is inappropriate for their gender, but that they ought to be prepared for the realities that they may face in their chosen field. In computer science and engineering, for example,

though women increasingly possess the interest and academic preparation to succeed, they often are not prepared for the unwelcome or “chilly” climate that often exists in these fields (Margolis & Fisher, 2002; Seymour & Hewitt, 1997). By the same token, men should be encouraged to keep an open mind regarding careers traditionally dominated by women, such as education—a field that faces a teacher shortage and stands to benefit from increased interest among both genders.

Furthermore, campuses should regularly evaluate their policies and programs with an eye toward differential outcomes experienced by women and men. Presently, there is little evidence on whether student experiences and collegiate environments yield differential effects for the two genders. The vast majority of research on college impact examines men and women in the aggregate, typically using gender as an independent variable to address whether being female (versus male) makes a difference in predicting a particular college outcome. However, as suggested by numerous scholars, the next generation of research on college impact must be attuned to “conditional” effects of college; that is, the ways in which certain college environments and experiences (e.g., classroom climate, peer culture, extracurricular activities, and so on) differentially affect students on the basis on gender, race, ethnicity, or other characteristics (Pascarella & Terenzini, 2005). While some studies have addressed gender differences in the impact of college on certain outcomes, the field of higher education has not yet developed an understanding of whether there exist gender-based patterns in the influence of college. Such an examination is presently underway by examining, separately for women and men, the impact of a wide range of college environments and student experiences on more than two dozen college outcomes (Sax, forthcoming). That study aims to put this paper’s findings in context by addressing whether the differential changes experienced by women and men during college are actually the result of exposure to differential college environments, differential reactions to similar college environments, or to differential patterns of human development that may not be dependent on college attendance at all.

REFERENCES

- Agresti, A., & Finlay, B. (1997). *Statistical methods for the social sciences* (3rd ed.). New Jersey: Prentice Hall.
- Anderson, M. L. (2000). *Thinking about women: Sociological perspectives on sex and gender* (5th ed.). Boston: Allyn and Bacon.

- Astin, A. W. (1993). *What matters in college? Four critical years revisited*. San Francisco: Jossey-Bass.
- Astin, A. W., Oseguera, L., Sax, L. J., & Korn, W. S. (2002). *The American freshman: Thirty-five year trends, 1966–2001*. Los Angeles: Higher Education Research Institute, UCLA.
- Barnett, R., & Rivers, C. (2004). *Same difference: How gender myths are hurting our relationships, our children, and our jobs*. New York: Basic Books.
- Baxter Magolda, M. B. (1992). *Knowing and reasoning in college: Gender-related patterns in students' intellectual development*. San Francisco: Jossey Bass.
- Chamberlain, M. K. (1988). *Historical background and overview*. In M. K. Chamberlain (Ed.), *Women in academe* (pp. 3–12). New York: Russell Sage Foundation.
- Christian, P. M. (2002). Graduate students. In A. M. Martínez Alemán & K. A. Renn (Eds.), *Women in higher education: An encyclopedia* (pp. 309–312). Santa Barbara, CA: ABC-CLIO.
- Chodorow, N. (1978). *The reproduction of mothering*. Berkeley, CA: University of California Press.
- Clark, J., & Zehr, D. (1993). Other women can: Discrepant performance predictions for self and same-sex other. *Journal of College Student Development*, 34, 31–35.
- Conlin, M. (2003). The new gender gap. *Business Week*, May 26, 2003.
- Eccles, J. S. (1994). Understanding women's educational and occupational choices: Applying the Eccles et al. model of achievement-related choices. *Psychology of Women Quarterly*, 18, 585–609.
- Erikson, E. H. (1968). *Identity: Youth and crisis*. New York: W. W. Norton.
- Flowers, L., Osterlind, S. J., Pascarella, E. T., & Pierson, C. T. (2001). How much do students learn in college? Cross-sectional estimates using the College BASE. *Journal of Higher Education*, 72, 565–583.
- Gati, I., Osipow, S. H., & Givon, M. (1995). Gender differences in career decision making: The content and structure of preferences. *Journal of Counseling Psychology*, 42, 204–216.
- Gilligan, C. (1982). *In a different voice: Psychological theory and women's development*. Cambridge, MA: Harvard University Press.
- Guido-DiBrito, F. (2002). Women students: Overview. In A. M. Martínez Alemán & K. A. Renn (Eds.), *Women in higher education: An encyclopedia* (pp. 249–260). Santa Barbara, CA: ABC-CLIO.

- Hagedorn, L. S., Womack, F. I., Vogt, C., Westebbe, S., & Kealing, J. (2002). Persistence. In A. M. Martínez Alemán & K. A. Renn (Eds.), *Women in higher education: An encyclopedia* (pp. 339–343). Santa Barbara, CA: ABC-CLIO.
- Hoff Sommers, C. (2000). *The war against boys: How misguided feminism is harming our young men*. New York: Simon and Schuster.
- Jacobs, J. A. (1986). The sex-segregation of fields of study: Trends during the college years. *Journal of Higher Education*, 57, 134–154.
- Jacobs, J. A. (1996). Gender inequality and higher education. *Annual Review of Sociology*, 22, 153–185.
- Josselson, R. (1987). *Finding herself: Pathways to identity development in women*. San Francisco: Jossey-Bass.
- King, J. (2006). *Gender equity in higher education*. Washington, DC: American Council on Education.
- Kohlberg, L. (1975). The cognitive-developmental approach to moral education. *Phi Delta Kappan*, 56, 670–677.
- Lindholm, J. A., Astin, H. S., Choi, J. Y., & Gutierrez-Zamano, E. (2002). *The educational paths of recent high school graduates: College, work, and future plans*. Los Angeles: Higher Education Research Institute, UCLA.
- Little, C. A. (2002). Curricular and professional choices. In A. M. Martínez Alemán & K. A. Renn (Eds.), *Women in higher education: An encyclopedia* (pp. 292–294). Santa Barbara, CA: ABC-CLIO.
- Margolis, J., & Fisher, A. (2002). *Unlocking the clubhouse: Women in computing*. Massachusetts: MIT.
- Margolis, J., & Fisher, A. (2003). Geek mythology. *Bulletin of Science, Technology & Society*, 23(1), 17–20.
- Marsh, H. W., Smith, I. D., & Barnes, J. (1985). Multidimensional self-concepts: Relations with sex and academic achievement. *Journal of Educational Psychology*, 77(5), 581–596.
- Martino, W., & Meyenn, B. (Eds.). (2001). *What about the boys?* Buckingham, England: Open University Press.
- Morgan, C., Isaac, J. D., & Sansone, C. (2001). The role of interest in understanding the career choices of female and male college students. *Sex Roles*, 44, 295–320.
- Mortenson, T. (2005). College continuation rates for recent high school graduates: 1959–2004. *Postsecondary Education Opportunity*, 154.
- Pascarella, E. T., & Terenzini, P. T. (2005). *How college affects students: A third decade of research*. San Francisco: Jossey-Bass.

- Perry, W. G. (1970). *Forms of intellectual and ethical development in the college years: A scheme*. Troy, MO: Holt, Rinehart, & Winston.
- Pollack, W. (1999). *Real boys: Rescuing our sons from the myths of boyhood*. New York: Henry Holt.
- Rosovsky, H., & Hartley, M. (2002). *Evaluation and the academy: Are we doing the right thing?* Cambridge, MA: American Academy of Arts and Sciences.
- Sadker, M., & Sadker, D. (1994). *Failing at fairness: How America's schools cheat girls*. New York: Charles Scribner's Sons.
- Sax, L. J. (1994a). Predicting gender and major-field differences in mathematical self-concept during college. *Journal of Women and Minorities in Science and Engineering*, 1, 291–307.
- Sax, L. J. (1994b). Mathematical self-concept: How college reinforces the gender gap. *Research in Higher Education*, 35, 141–166.
- Sax, L. J. (1996). The dynamics of “tokenism”: How college students are affected by the proportion of women in their major. *Research in Higher Education*, 37, 389–425.
- Sax, L. J. (2003). Our incoming students: What are they like? *About Campus*, 8(3), 15–20.
- Sax, L. J. (in press). *The gender gap in college*. San Francisco: Jossey-Bass.
- Sax, L. J., Bryant, A. N., & Gilmartin, S. K. (2004). A longitudinal investigation of emotional health among male and female first-year college students. *Journal of the First Year Experience and Students in Transition*, 16(2), 39–65.
- Sax, L. J., & Harper, C. (2007). Origins of the gender gap: Pre-college and college influences on the differences between men and women. *Research in Higher Education*, 48(6), 669–694.
- Sax, L. J., Lindholm, J. A., Astin, A. W., Korn, W. S., & Mahoney, K. (2001). *The American freshman: National norms for fall 2001*. Los Angeles: Higher Education Research Institute, UCLA.
- Sherman, J. (1983). Factors predicting girls' and boys' enrollment in college preparatory mathematics. *Psychology of Women Quarterly*, 7(3), 272–281.
- Smith, D. G., Morrison, D. E., Wolf, L. E. (1994). College as a gendered experience: An empirical analysis using multiple lenses. *Journal of Higher Education*, 65, 696–725.
- Stickel, S. A., & Bonett, R. M. (1991). Gender differences in career self-efficacy: Combining a career with home and family. *Journal of College Student Development*, 32, 297–301.

- U.S. Department of Education (2003). *Degrees and other formal awards conferred*. Washington, DC: National Center for Education Statistics.
- U.S. Department of Education, (2004). *Trends in educational equity of girls & women*. Washington, DC: National Center for Education Statistics.