





# Better Educating Our New Breadwinners

Creating opportunities for all women  
to succeed in the workforce

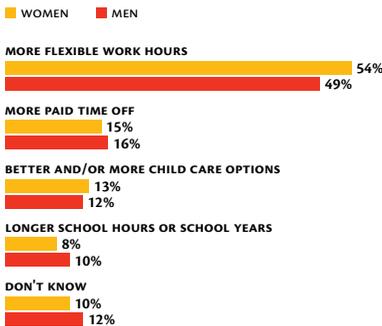
By *Mary Ann Mason*

**M**ore and more American women are taking on the role of breadwinner, both for themselves and for their families, with many of them looking to education as a bridge to opportunity and to a heftier paycheck. The good news is that women's overall participation in postsecondary education today is remarkable. Consider these facts: Women today receive 62 percent of college associate's degrees, 57 percent of bachelor's degrees, 60 percent of all master's degrees, half of all professional degrees, and just under half of all Ph.D.s.<sup>1</sup> That's a stunning advance. In 1970, women received fewer than half of undergraduate degrees, fewer than 40 percent of all graduate degrees, and fewer than 10 percent of all professional degrees and doctoral degrees.<sup>2</sup>

But here's the not-so-good news. While these overall numbers are inspiring, once we dig a little deeper it becomes clear that many women receiving post-secondary education are not investing in degrees that will lead to society's highest-paying jobs. Women throughout the educational system either choose or are steered toward traditionally female careers. Even though the fastest growing careers are in traditionally female-dominated fields such as health care, the highest paying careers remain in male-dominated fields, including engineering, technology and other science-related industries and services—all fields in which women still lag very far behind men in educational degrees.

THE LATEST FROM THE AMERICAN PEOPLE

Q: Which of these things, in particular, would need to change in order for working parents to balance evenly their job, their marriage, and their children?



Source: Rockefeller/TIME poll, 2009.

As more women take on breadwinning roles, the educational system must prepare women for jobs that can support a family rather than the jobs our grandmothers were allowed to hold. This means our postsecondary educational institutions—community colleges, four-year colleges and universities and their many graduate school programs alike—will need to take further proactive steps to ensure women pursue and complete degrees that allow them to bring home the same-size paychecks and benefits from the same array of professions as men. For this to happen, these educational institutions must seek parity between the genders in all majors and concentrations from first-year postsecondary education to post-doctoral research. But this is not enough. They also need to provide family-friendly support and child care as well flexible class scheduling so that women (and men) can attain successive levels of education in order to boost their earnings in today’s economy while juggling shared responsibilities in life.

Here’s why. Despite reaching college in greater numbers, women still cluster largely in traditional female majors when they choose their course of study. They receive 86 percent of the bachelor’s degrees in the health professions, which includes nursing, 79 percent in education, and 78 percent in psychology.<sup>3</sup> These professions, often called the “helping professions” or “women’s professions,” have always attracted women and were once the only professions open to them. Men, in the era when they were typically the sole breadwinners of their families, were less attracted to these professions in large part because they offered lower wages and less career advancement, as they do today.

There are encouraging signs this dynamic is shifting in some academic arenas. The significant trend in college toward business degrees, the most popular major

for both men and women over the past 20 years, means that women now receive 50 percent of all undergraduate business degrees. Similarly, 62 percent of biological and medical science undergraduate degrees are awarded to women, doubling their participation over the past 20 years.<sup>4</sup> But the distribution among the doctoral disciplines is not even close to parity in most fields. While women now receive 49 percent of the doctorates in the biological sciences, in the physical sciences women are still struggling to enter a male bastion. In 2006, women received 30 percent of the doctorates awarded in the fields of physical science and math, and only 22 percent of computer science degrees and 20 percent of engineering degrees.<sup>5</sup>

---

*Women with the same degrees still lag behind men's pay and almost never catch up. Education raises women's pay, but the gender gap remains at all educational levels.*

---

Consider the impact of women's education degree choices on their jobs and their wages. Women with degrees remain segregated in lower-paying occupations. Nearly all registered nurses (91.7 percent), elementary and middle school teachers (81.6 percent), and preschool and kindergarten teachers (97.8 percent) are women, but women comprise smaller percentages of the highest-paying occupations, such as lawyers and judges (36.5 percent), physicians and surgeons (31.8 percent), dentists (25.4 percent), civil engineers (11.8 percent), electrical and electronics engineers (7.8 percent), aircraft pilots and flight engineers (3.4 percent).<sup>6</sup>

What's more, women with the same degrees still lag behind men's pay and almost never catch up. Education raises women's pay, but the gender gap remains at all educational levels. In 2008, the ratio of women's to men's median hourly wages was about 77 cents on the dollar for those with college degrees as well as those with only high school degrees. Women who make significant investments in college education earn more than they would otherwise, but they don't earn as much as men, often because they remain in lower-paying female-dominated occupations. While the gap has narrowed in recent decades, we still have a long way to go to get to earnings parity (see Figures 1 and 2).

It is not new news that women do not receive equal pay for equal work, but what is depressing is that education, the much-touted engine for economic opportunity,

fails to provide gender equality. Even with the increased numbers of women in higher education and in the workforce, the wage and power gaps remain large and stagnant at all educational levels. Women who are breadwinners simply cannot bring home a family income equal to a man with the same educational background (see Figures 1 and 2).

One reason that women may be encouraged or even choose not to enter male-dominated educational fields and occupations is that once female graduates enter the workforce, they find inflexible workplace policies that can exacerbate gender inequalities (policies that are often inflexible across the board, but may be exacerbated in male-dominated fields). Knowing this, students choose jobs they perceive to be more family friendly.

Most workplaces still maintain the structure established in the late 19th century, when husbands worked full time to support their families and never needed to consider taking time off to care for their a family member because most had a wife at home to attend to such matters. In this environment, workers are penalized for working less than full time, or for taking a break from their jobs to care for their family. In short, simply opening the door to higher education does not necessarily allow women to achieve true equality in the workforce.

FIGURE 1

### Equal education, unequal pay

Median hourly wages by gender and educational attainment, 2008



Source: Center for American Progress analysis of the Center for Economic and Policy Research Extracts of the Current Population Survey Outgoing Rotation Group Files.

Notes: Data include all workers ages 25 to 64. Wages are adjusted for top-coding and do not include overtime.

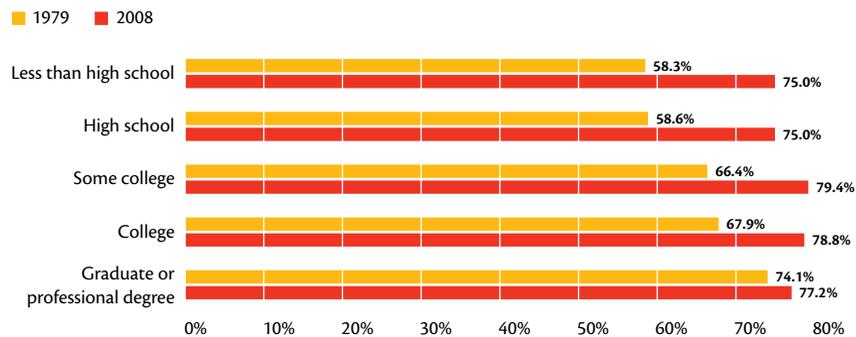
Still, the educational system may finally be poised for change. First, women are now half of U.S. workers. As women become equal in numbers and take more leadership positions, traditional workplace policies may be revised to allow for alternate career ladders. Second, our existing gender equity laws, particularly Title IX of the Education Amendments of 1972, which prohibits discrimination based on sex in educational programs and activities that receive federal financial assistance,<sup>7</sup> are being looked at in new ways to level the playing field for women in science, technology, math and engineering much as it has done successfully in sports.<sup>8</sup>

This chapter will first describe the current state of the U.S. educational system for women and girls, with special emphasis on how education often thwarts rather than advances the economic opportunities of women, beginning with community colleges, then four-year educational institutions, then graduate and post-graduate programs (see box “The forgotten third” that examines gender stereotypes in career training programs for young women and men without college degrees). We will then explore the achievements nonetheless made by women despite these obstacles. We will then conclude with several suggestions for how American post-secondary education can be reformed to ensure that women are able to function as equal partners in the future workplace.

FIGURE 2

## Gaining ground

*Gender pay ratio, by education, 1979 and 2008*



Source: Center for American Progress analysis of the Center for Economic and Policy Research Extracts of the Current Population Survey Outgoing Rotation Group Files.

Notes: Data include all workers ages 25 to 64. Wages are adjusted for top-coding and do not include overtime.

## The first career gateway: Community colleges

Community colleges provide opportunities for women to earn educational credentials that can help them increase their earnings potential through accessible, flexible, and low-cost academic programs. Today, community colleges are serving 37 percent of all students enrolled in postsecondary education.<sup>9</sup> And the majority of these students are women: 62 percent.<sup>10</sup> What's more, our community colleges educate single parents at nearly three times the rate of four-year colleges.<sup>11</sup> And community college students are more likely to be older and independent of their parents—61 percent are not claimed as dependents by their parents compared to only 34 percent of students at public four-year colleges.<sup>12</sup>

Originally, these educational institutions were structured to provide high school seniors an affordable first two years of college before they transferred into a baccalaureate program. Today, however, many community colleges have expanded their mission in order to accommodate the economy's increased demand for graduates with specific career skills in disciplines such as information technology and home health care.

Community colleges offer nearly everyone a chance—95 percent of community colleges offer an open admissions policy and the annual tuition and fees are less than half that at private four-year institutions and one-tenth those at private four-year colleges and universities. For many older students they offer a second or third chance. Nearly half of all students at community colleges are over 25. Because of their accessibility and low cost, community colleges enroll a diverse group of students, including larger percentages of nontraditional, low-income, and minority students than four-year colleges.

Clearly, a community college degree is a good step forward for women, both to gain higher earnings and as a step toward a four-year degree. However, women often start, but fail to complete their degrees at community colleges.<sup>13</sup> At community colleges, women were less likely to complete a degree or transfer to a four-year college within six years than men—41 percent of women compared to 48 percent of men.<sup>14</sup>

The influx of students with significant family responsibilities presents new challenges not traditionally faced by younger students. Community colleges and universities found that mothers especially needed additional help to be successful at



**NEW OPPORTUNITIES FOR CAREGIVERS.** Community colleges increasingly offer flexible schedules for working moms. {TYRONE TURNER, *THE NEW YORK TIMES*}

school, whether for financial aid, counseling, or esteem building. They also often needed child care on campus.<sup>15</sup> All major educational institutions offer some type of program for students with families, but the role of integrating students with families into the mainstream of educational programs has traditionally fallen predominantly to two-year community colleges.<sup>16</sup>

In the past decade, however, more colleges have taken inspiration from the type of opportunity offered by community colleges and sought to integrate low-income students with families into their educational programs. One case in point is Hamilton College's ACCESS project, which creates a pathway to educational

## Excluding poor women

*Some states make it hard to attend community college*

Often, very poor women are excluded from attending community college. In 1996, national welfare reform included a provision requiring recipients to receive no more than five years of aid and to work or attend school while receiving aid. Only two states, Maine and Wyoming, allow recipients to pursue postsecondary education and receive welfare without exhausting their five-year lifetime limit on welfare. Although studies consistently show that postsecondary education is instrumental in helping people leave welfare, education has been treated as a luxury in the work-or-else approach to welfare reform.<sup>17</sup>

A few other states give work credit for postsecondary education, but it must take place within the five-year lifetime limits of federal law. Still other states provide educational support for those who work part time. In Pennsylvania, for example, women can now receive some scholarship support while working for pay half time and attending classes. The New Choices/New Options

programs are designed to help low-income women and other nontraditional students get training for careers in well-paying jobs. For these students and most others around the country, the federal time limits still apply.

In most states, according to advocates, students are pushed into short-term training programs and discouraged from choosing their own course of study.<sup>18</sup> However, innovative new programs are trying to reach low-income women. The Center for Women and Work at Rutgers University, for example, has spearheaded an effort to introduce Internet-based distance learning into community colleges, aimed especially at low-income mothers. Their program, the Sloan Center for Innovative Training and Workforce Development, works to advance online training programs for the working poor. The access to training matters. In a New Jersey pilot program, 92 percent of participants completed the training and they achieved a 14 percent wage increase through the program.<sup>19</sup>

opportunity for very low-income parents in New York. The project provides academic supports for a liberal arts education in conjunction with comprehensive social services.<sup>20</sup> Within the first three years of operation, the ACCESS project achieved a 95 percent retention rate and movement of participating students from being 98 percent dependent on social services and income supports to being less than 10 percent dependent on social services.<sup>21</sup> The project attributes its successful student retention and outcomes to the integration of liberal arts educational opportunities with basic services such as child care and transportation, supports for domestic violence survivors, and interventions to ameliorate homelessness and hunger.<sup>22</sup>

Despite the openness and flexibility of community colleges, traditionally gendered career choices remain the norm. Women predominate in traditional female majors such as education (80.2 percent) and health sciences (83.4 percent all students), which includes nursing, while men predominate in computer and information sciences (73.1 percent) and manufacturing construction, repair and transportation (92.3 percent).<sup>23</sup> These choices certainly influence potential earning power, but there are also fundamental concerns about how much earning power an associate's degree from a community college will bring.

Indeed, community colleges often aren't doing enough to get women on the path toward the highest-paying careers. Increasingly, many of the popular career choices pursued by community college students are requiring a four-year bachelor's degree or specialized training. This is true for both men and women as more careers, including computer technology and science, education, and health, rely on higher-educated workers.

---

### **Community colleges often aren't doing enough to get women on the path toward the highest-paying careers.**

---

In the high-tech occupations that are growing most rapidly—computer engineering, computer science, and systems analysis—workers must have four-year degrees and women are severely underrepresented.<sup>24</sup> In the health field, most workers have a job that requires less than a four-year degree, though the profession is highly divided in that the higher ranks of health care professions include some of the most highly educated workers in the country. Lacking a four-year degree, and even more so, lacking any sort of postsecondary specialized training, severely limits the advancement and income potential of health care workers, most of whom are women.<sup>25</sup>

All other things equal, however, an associate's degree generally provides workers with a wage boost of about 20 percent to 30 percent over a high school diploma and the returns are generally higher for women (even though the wage gap persists). The boost is much higher for workers who pursue a career track rather than a technical track. In the few studies that have been done on certificate holders who do not attain an associate's degree, few positive wage effects were found.<sup>26</sup>



**WOMEN TEACHING WOMEN.** It happens all the time in traditional female occupations such as nursing, but not enough in all technical fields. {TOM GANNAM, AP}

Despite the more accessible environment of community colleges, large strides still need to be made toward assisting nontraditional students with degree and certificate persistence. Unfortunately, most of our educational institutions are not set up to offer the flexibility that is required in order to deal with the challenges presented by students who are older, more likely to work while attending school, and often have family obligations as well. According to a report by the Center for American Progress, budget cuts, when combined with antiquated regulations and systems that were designed to meet the needs of a different era's students, have created institutions of higher education that cannot adequately deal with today's students. According to the CAP report, "as suppliers, postsecondary institutions are not fully ready to deliver quality, flexible education that leads to college and career success."<sup>27</sup>

But barriers to advancement beyond community college remain.<sup>28</sup> Thirty-nine percent of students come from minority backgrounds, compared to only 24 percent at the four-year college level. The difference is particularly strong for Hispanic students: They represent only 7 percent of four-year college students, but 16 percent of community college students.<sup>29</sup> Poor women, especially poor minority women, face particular challenges (see box "Excluding poor women").

## Reclaiming the American Dream through colleges and universities

One of the most significant social phenomena of the last third of the 20th century and the beginning years of the new millennium is the steady rise of women in undergraduate, and more spectacularly, in graduate and professional education. Many factors, including gender equity laws, birth control, and recognition that women are now important players in the economy all contributed to this trend.

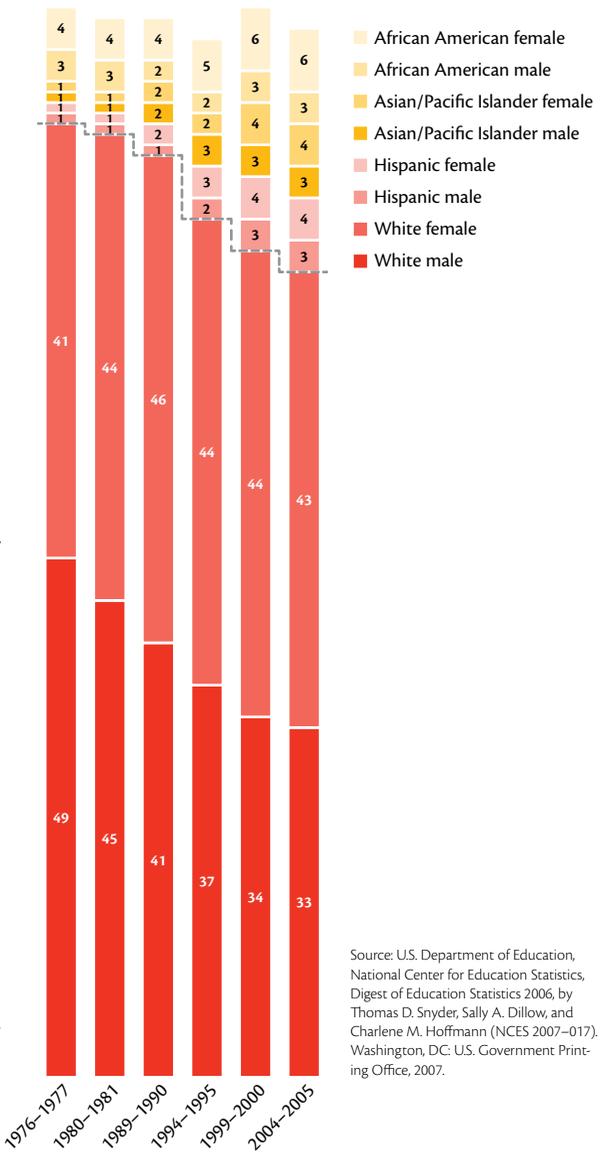
Much has been made of the fact that women now receive about 57 percent of all college degrees, and indeed across all ethnic and racial groups women significantly outpace men in receiving degrees. Closer inspection, however, reveals a more complex story. What is not usually acknowledged is that men and women enter college after high school at about the same rate. But it is the latecomers—the independents not sent by their parents, 2-to-1 of whom are women, some already with families—that tilt the final degree count. One-third of African American women who eventually graduate from college enroll when they are age 25 or older.<sup>30</sup>

These so called re-entry women, many of them single mothers and some of whom are welfare recipients, realize that a college degree is necessary to support their

FIGURE 3

### Closing the degree gap

Percentage of bachelor's degrees deferred by gender, race, and ethnicity between the 1976–77 and 2004–05 school years



Source: U.S. Department of Education, National Center for Education Statistics, Digest of Education Statistics 2006, by Thomas D. Snyder, Sally A. Dillow, and Charlene M. Hoffmann (NCES 2007–017). Washington, DC: U.S. Government Printing Office, 2007.

## The forgotten third

*Many young adults never go to college, and training programs to help them favor men*

Many young adults never go on to a community college, a university, or even a technical training program. Who are they and what are their prospects for thriving in a 21st-century economy that relies on women and men to be the main breadwinners?

In 1988, two groundbreaking studies on young people in the United States called attention to the dismal economic prospects of the nearly one-half of American young people who did not go on to any postsecondary education following high school, the “Forgotten Half.”<sup>31</sup> In 2008, the American Youth Policy Forum revisited the Forgotten Half to update statistics on key indicators of the condition of young people in the United States.<sup>32</sup> Importantly, the “Forgotten Half” is now more accurately the “Forgotten Third,” with high school dropout rates falling and greater numbers of high school graduates beginning postsecondary education and training programs.<sup>33</sup> This represents a major achievement for community and school reforms.

Yet for those left behind the future is bleak because their economic prospects have grown dimmer in the past 20 years. Employment rates among those not continuing on to postsecondary education are lower for the current generation than in 1989, and full-time employment rates for minority youth are 20 percent to 30 percent lower than for their white peers.<sup>34</sup> Those among the Forgotten

Third who are employed are earning less money. For male high school graduates, inflation-adjusted earnings have fallen 16 percent over the past three decades; for their female counterparts, earnings actually grew by 4 percent.<sup>35</sup> Of course, women started well below men, so while their wages have not fallen in recent decades the ratio of women’s to men’s pay among those with only a high school degree still remains at 75 percent.<sup>36</sup>

For the Forgotten Third, training matters. Whether training comes through career pathway programs, community college degree curriculums, or four-year colleges, new educational opportunities can meet the needs of these young adults, but for women gender stereotypes need to be addressed. Research shows that the benefits of some types of career transition programs accrue disproportionately to young men, and may actually be harmful to young women due to their tendency to reinforce gender stereotypes.<sup>37</sup>

A career pathway program is a series of connected education and training programs and support services that enable individuals to secure employment within a specific industry or occupational sector, and to advance over time to successively higher levels of education and employment in that sector. Each step on a career pathway is designed explicitly to prepare the participant for the next level of employment and education. Career

pathways target jobs in industries of importance to local economies. They are designed to create both avenues of advancement for current workers, job seekers and new and future labor market entrants, as well as a supply of qualified workers for local employers.<sup>38</sup>

Career pathway programs can include job shadowing (observing particular occupations in the workplace), mentoring (matching students with an individual in their chosen occupation), internships, and apprenticeships. But nearly all of the programs have a greater positive impact for male participants than female. Research shows that men who participate in a career-focused program are likely to have higher employment rates overall and shorter periods of idleness when unemployed.<sup>39</sup> For women who participate, there is less evidence that the programs are effective. One national study of Career Academies (a popular high school reform that combines academic instruction in core subjects such as math with career development opportunities) found that labor market success was concentrated among young men.<sup>40</sup>

Why is this? The most common career pathway programs often reinforce negative gender stereotypes about “women’s work” and “men’s work,” which may well be why participation has a negative effect on employment outcomes for some groups of young women. One study

found that career pathway programs do reduce the risk of unemployment, but that white men receive the majority of the benefit compared to black females, who are more likely to be persistently unemployed than their counterparts without this education. The same study found that Hispanic and Asian females who participate “are more likely to be persistently unemployed than their White counterparts.”<sup>41</sup>

These poor results may be because of persistent gender stereotypes, which career pathway programs often reinforce. Girls are significantly more likely to take courses focused on low-wage service sector work where women have typically been overrepresented.<sup>42</sup> Indeed, in high school technical training programs that often lead to career pathway programs, the National Women’s Law Center found that girls were most likely to take courses in fields like cosmetology, child care, and health professions, while boys were much more likely to be in traditional male fields of construction, automotive repair, and engineering.<sup>43</sup>

This persistent channeling of young women into traditionally female career paths can be an insidious barrier for women trying to attain high-paying jobs to support their families over the course of their careers.

families. Some colleges and universities provide special services and support for re-entry students. But this important trend has not received the attention and support it deserves (see Figure 3).

Still, women have advanced in both numbers and in proportion over the whole college degree-holding population in every racial and ethnic group over the past thirty years. This is good news, but more for some groups than others. The distribution of college degrees can be explained in large part by the size of the group in the general population. Many of these groups, Hispanics and Asians in particular, have swelled on the new immigration wave. But are the new immigrants receiving their fair share of the degrees? No. Smaller percentages of Hispanic women and men earn degrees according to their population. This corresponds with the group's disproportionate share of high school dropouts—there are fewer Hispanics prepared to enter the college pipeline.

---

*Like their counterparts at community colleges, women pursuing bachelor's degrees still cluster largely in traditional female majors when they choose their course of study.*

---

In contrast, white and Asian women are overrepresented in college compared to their respective percentages in the population. African American women and white men earn bachelor's degrees in approximate proportion to their representation in the general population. African American men are seriously underrepresented, and have not increased their participation in 30 years.<sup>44</sup>

Like their counterparts at community colleges, women pursuing bachelor's degrees still cluster largely in traditional female majors when they choose their course of study. In 2006, women received 86 percent of the degrees in education, and 79 percent of the degrees in the health professions, which includes nursing, and 78 percent of the degrees in psychology.<sup>45</sup>

Yet there also are very positive signs, including the increase of women majoring in business and in the biological sciences. Women now receive 50 percent of all undergraduate business degrees. The biological sciences have captured the

imagination of the public and the pocketbooks of drug companies and the government, creating many new jobs. Today, 62 percent of biological and biomedical science undergraduates degrees go to women—women now earn twice the number of degrees in these fields that they did 20 years ago.<sup>46</sup>

### *The door not open: Physical sciences and technologies*

The discouraging news is that women are still a small presence among those receiving degrees in engineering, where a large percentage of high-paying jobs have been and are predicted to increase in the future. In 2006, women earned 18 percent of engineering degrees, only a minor improvement over the dismal 14 percent they earned in 1990.<sup>47</sup> Distressingly, among computer sciences graduates, women are a declining share, falling from 29 percent to 21 percent over the past 15 years.<sup>48</sup>

Yet these are the areas of technological innovation where a large percentage of high-paying jobs are predicted to increase in the future. Even in math and statistics, where women once represented close to half of the undergraduates, the past two decades have shown a decline in female participation.<sup>49</sup> There is no easy explanation for this trend, but it rings an alarm bell, which calls for investigation.

---

*Women are still a small presence among those receiving degrees in engineering, where a large percentage of high-paying jobs have been and are predicted to increase in the future.*

---

The only bright spot is a positive trend in the share of women in the physical sciences and science technologies, up from 32 percent to 42 percent over 15 years.<sup>50</sup> Again, there is no easy explanation, but there has been a concerted move by professional societies, in particular federal agencies to attract and retain women in this field. While too many women are taking themselves out of the high-tech pipeline at the undergraduate level, the women who graduate from college are more likely to begin graduate studies than they once were. Among computer science doctoral candidates, the percentage of women has increased in



**STILL TEACHING, STILL EARNING LESS.** Women continue to dominate primary and high school classrooms and are still dedicated to their profession even though society doesn't pay equitably for their efforts. {BRENDAN HOFFMAN, AP}

the past two decades, from 14 percent to 22 percent. Slightly larger changes can be seen among engineering doctoral students, where female participation has increased from 9 percent to 20 percent over the same period.<sup>51</sup>

Despite these gains, women remain far less likely than men to pursue the highest graduate degrees and ultimately careers in cutting edge scientific research—careers that bring status power and higher salaries. This lack of women scholars at the top of the science and technologies pyramid boasts enormous implications for future generations of women.

### *Missing at the top: Women as role models*

The presence of a successful role model to inspire a career in any field is critical. In law and medicine there are a substantial number of women professionals working in the field, and a steady diet of popular media featuring women characters



**BREAKING INTO THE LABORATORY.** Women are now entering traditionally male-dominated fields such as chemistry in record numbers. {NINA BERMAN, REDUX}

litigating in the courtroom or curing patients of deadly diseases. But there are many fewer role models for women in engineering or the computer sciences.

Overall, women make up less than 30 percent of full professors at four-year educational institutions.<sup>52</sup> In engineering and the physical sciences the numbers are far smaller; in 2005, the American Institute of Physics found that only 10 percent of faculty members in physics were women.<sup>53</sup> There are many physics departments in this country where women faculty number in single digits or are not present at all.

There are some innovative success stories of programs to attract and retain women in the sciences. In 2009, the fourth annual Conference for the Undergraduate Women in Physics sponsored by NASA, the Department of Energy, and three participating research universities attracted more than 350 young female students from across the country. They came to network and to hear the dazzling





I don't know how many of you around the table are first-generation college graduates but that's my reality, and so I don't have those networks or the mom or dad who maybe are an attorney, right, who can pull in a special partner favor for us. We don't have the moms and dads who can get us those great internships every summer.

*Delores in Los Angeles*

research talks of distinguished female physicists from places such as NASA's Jet Propulsion Laboratory and the University of California Berkeley.<sup>54</sup> Many of these students were from small colleges where there were no women on the faculty. Preliminary results from the early years indicate that the conferences were influential in encouraging young women physicists to continue in graduate school.

## Professorial gains—graduate and professional degrees

Gender parity in graduate and professional education is one of the most remarkable accomplishments of the last third of the 20th century. In 1966, only 10 percent of all American doctorates were awarded to women. By 2008 that number had soared to about 50 percent. The same story holds for the professions, particularly law and medicine, which began with an even lower proportion of women students.<sup>55</sup>

Minority students, particularly women, are also earning doctorates at a historic pace, though the numbers do not match their proportionate representation in the U.S. population. Today, minority students represent 24 percent of all graduate students, more than doubling their representation over the past 30 years. Female students of color have made the most significant gains.<sup>56</sup>

But once again, the distribution among the doctoral disciplines is not even. Women now receive half of the doctorates in the biological sciences but in the physical sciences, women are still struggling to enter a male bastion. In 2006, women received 30 percent of the doctorates awarded in the fields of physical science and math, and only 22 percent of computer science degrees and 20 percent of engineering degrees.<sup>57</sup>

### *Science and engineering: Still a man's world*

The most troubling numbers show that while women earned 30 percent of the doctorates in the physical sciences in 2006, women still make up just 16.1 percent of the assistant professors on campuses, 14.2 percent of the associate professors and only 6.4 percent of the full professors. A 2009 survey by the National Research Council of the National Academy of Sciences found that women who receive Ph.D.s in the sciences, including the very popular biological sciences, are far less likely than men to seek academic research positions—the path to cutting-edge discovery—and are more likely to drop out early if they do take on a faculty post.<sup>58</sup>

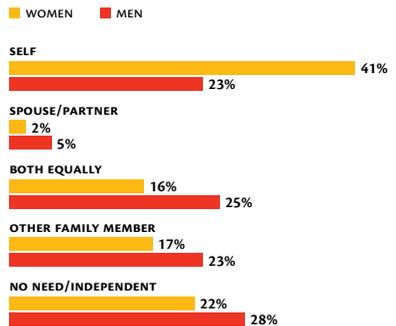
Unfortunately, the National Research Council report says its survey could not shed light on why women drop out at these critical transitions, but other new research clearly makes the connection between women's concerns about the lack of family accommodation in scientific careers and the decision to leave. Data collected by the National Science Foundation, for example, show that family formation—most importantly marriage and childbirth—account for the largest leaks in the pipeline between receiving a Ph.D. and the acquisition of tenure for women in the sciences.<sup>59</sup> Women who are married with children in the sciences have 37 percent lower odds of entering a tenure track position after receipt of their Ph.D. than married men with children. And they are 27 percent less likely than their counterparts to achieve tenure upon entering a tenure-track job (see Figure 4).<sup>60</sup>

In contrast, single women without children are about as likely to attain a tenure track position as men. These findings illustrate that family formation, particularly marriage and childbirth together, is the most important reason why women with Ph.D.s in the sciences do not begin academic careers with tenure-track jobs. What is surprising is that while marriage and childbirth often derail the tenure plans of women, they actually have a positive effect on the tenure of men. Close to 80 percent of men who have a child within five years of receiving their Ph.D. receive tenure within 14 years, compared with about 70 percent of tenure-track faculty overall.<sup>61</sup>

The decision not to continue in a research science career often begins in graduate school. Family balance weighs heavily on the minds of students in considering their career choices. In a survey of 8,000 University of California graduate students in all fields, 84 percent of women and 74 percent

THE LATEST FROM THE AMERICAN PEOPLE

Q: Who in your household has the most responsibility for caring for your elderly parents?



Source: Rockefeller/TIME poll, 2009.

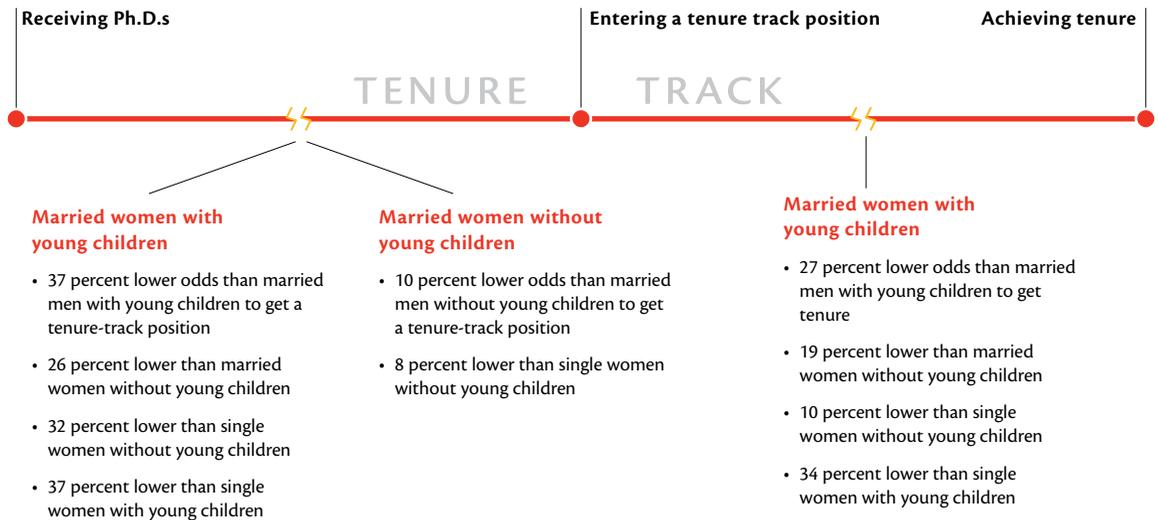
of men registered the family friendliness of their future workplace as a serious concern. But they do not see their own universities meeting that goal. More than 70 percent of women in the survey, and more than half of the men, did not consider research universities to be family friendly.<sup>62</sup>

The number of young women who want to pursue careers in academic science decreases by 34 percent over the course of their doctoral study, and the number of men decreases by 20 percent.<sup>63</sup> Most women offer family balance concerns as a major component of their decision-making process. Graduate student women in all disciplines indicate that having a female role model in their department is critical in how they perceive the university as a family-friendly workplace. In the sciences, there are generally few women faculty, and even fewer who have children. Role

FIGURE 4

### Falling off the tenure track

*In academia, women Ph.D.s struggle to gain tenured positions at colleges and universities*



Results are based on Survival Analysis of the Survey of Doctorate Recipients (a national biennial longitudinal data set funded by the National Science Foundation and others, 1979 to 1999) in all sciences, including social sciences. The analysis takes into account disciplinary, age, ethnicity, Ph.D. calendar year, time-to-Ph.D. degree, and National Research Council academic reputation rankings of Ph.D. program effects. For each event (Ph.D. to TT job procurement, or TT job to Tenure), data are limited to maximum of 16 years.

Note: The use of NSF data does not imply the endorsement of research methods or conclusions.

models affect life decisions. In departments where women faculty with children are common, 46 percent of female respondents agreed that research universities were family friendly. Where they were uncommon, only 12 percent of women agreed.<sup>64</sup>

Women scientists who do have children in graduate school are very unlikely to continue. The competitive race to achieve scientific breakthroughs and prove oneself offers little respite for childbirth or child-rearing. The effect of parenthood on the choices of female doctoral students supported by federal grants (the source of support for most students in the sciences) is undeniable. Only a fraction of universities provide paid maternity leave or any other family accommodation for graduate students. They must often return to work in a very few weeks.<sup>65</sup>

---

*Women scientists who do have children in graduate school are very unlikely to continue. The competitive race to achieve scientific breakthroughs and prove oneself offers little respite for childbirth or child-rearing.*

---

The consequences are telling. Forty-six percent of female respondents began their graduate studies working toward a faculty position in a research university, but babies changed that, resulting in only 11 percent of new mothers saying they now want to continue on that path.<sup>66</sup> And once again, fatherhood for men similarly situated in graduate studies appears to have less impact. Fifty-nine percent began their doctoral programs planning to pursue a research-intensive academic career and 45 percent still plan to do so.<sup>67</sup>

Men and women scientists who wish to pursue a scientific research career are usually expected to spend from one to five years as a postdoctoral fellow to enhance their research skills and number of publications following the receipt of the Ph.D. before they take a professorial position. The women who have taken this step are usually already in their thirties and are serious about their research careers. This also is the optimal age for childbearing in the United States and many will have children during their post doctoral years.



**LEARNING AND CARING.** Juggling children and the quest for a college degree is difficult but rewarding, as this young woman would tell you. {OLIVIA BARRIONUEVO}





But, as with graduate students, childbirth often derails the scientific ambition of postdoctoral students. Forty-one percent of women graduate student scientists who have babies in the University of California system while working in a post doctoral position decide not to pursue an academic research career.<sup>68</sup> This drastic shift by mothers away from a research science career following childbirth may be explained in part by the fact that only a handful of the major research universities offer any paid leave for graduate students and postdocs, and some have no leave policy at all.<sup>69</sup> Unfortunately, students and postdocs are also sometimes openly discouraged from having children by their mentors, who explain that, as mothers, they will not be considered “serious scientists.”

---

*Only a handful of the major research universities offer any paid leave for graduate students and postdocs, and some have no leave policy at all.*

---

This story is not just true for women scientists. It appears to be true across the board for highly educated women who prepare for careers that were previously dominated by men. Law and medicine are the most populous and, one might argue, the most esteemed of the male-dominated professions. Women now attend law school and medical school in fairly equal numbers to men. They train for and enter these male enclaves of power and privilege in large numbers, but, like women scientists, most are not reaching leadership positions and lag behind men in salary.

All male-dominated fields show a similar pattern. Based on a male workplace model, they are most demanding of their new employees during the first years when they must prove that they have the “right stuff.” These testing years usually involve focused commitment and grueling hours. Since these professions require a fairly long training period after colleges, women are usually in their thirties, their prime child-bearing years during these same trial years. Without support from their employer and the culture, they are far more likely than men to drop out or drop down to a less demanding level in the profession. For those who remain in the profession, their salaries are significantly lower: Female lawyers make 77 cents on the dollar of their male counterpart, female doctors 59 cents.<sup>70</sup>

## Where do we go from here?

While women have made tremendous progress in gaining access to all levels of education in the past 30 years, there remain several persistent problems that policymakers need to focus on in order to ensure that women have full access to all fields within education and to ensure that their education degrees will pay off:

- While women overall have dramatically increased their access to education, there are still some groups of women that lag far behind. Too few Hispanics, for example, are entering our four-year colleges. Hispanics represent only 7 percent of four-year college students compared to 16 percent of community college students.
- At all levels of postsecondary education, women are still highly concentrated in the low-paying “helping” professions of health and education and not encouraged to enter the high-paying fields of the future, including mathematics, engineering, and computer science.
- When women do receive degrees in fields that could lead to high-paying professions such as academia, law, or business, they face inflexible workplaces that do not allow them to combine work with family responsibilities, and thus too many of our highly educated women dropoff the career track for which they trained. When they do stay, they often earn less than their male counterparts because they are in less “prestigious” positions—they are primary care physicians instead of surgeons, biologists instead of physicists, and government attorneys instead of corporate law partners.

What can be done about these three persistent problems? Our government has already started to tackle the first two problems, which is heartening. Initiatives that work to address the high rate of high school dropouts and the lack of academic preparation for women who are underrepresented in education, particularly Hispanics, will go a long way. And our government has begun to focus real attention on increasing representation of women in all fields, particularly science, engineering, mathematics, and technology. Congress has been investigating the problem and holding hearings on potential solutions. President Obama and others have urged equitable enforcement of Title IX as a tool to level the playing field for women in the sciences, just as it has done successfully for sports.<sup>71</sup>

Title IX of the Education Amendments Act of 1972 prohibits discrimination based on sex in educational programs and activities that receive federal financial assistance.<sup>72</sup> Congress modeled Title IX based on Title VI of the Civil Rights Act of 1964, which prohibits discrimination on the basis of race, color, or national origin in programs or activities that receive federal funds.<sup>73</sup> The law conditions federal funding “on a promise by the recipient not to discriminate, in what is essentially a contract between the government and the recipient of funds.”<sup>74</sup>

Title IX has been used with great success to attract and retain women in athletic pursuits. Forty years ago it was assumed that more men participated in sports because women were disinterested. With the passage of Title IX, the number of women in high school sports grew 904 percent as these women saw an opportunity to participate competitively at the college level and perhaps even at a pro level. Of course, not all high school athletes achieve success in college, but even still, the number of women participating in sports at the college level increased 456 percent over the same period.<sup>75</sup>

A Title IX strategy could be applied to the currently sex-segregated and sex-stereotyped patterns of education, beginning with high school education and continuing through community colleges all the way to advanced degrees. Title IX makes clear that gender stereotyping is prohibited, yet too few schools have the know-how or the resources to break down these historic patterns. And our government is only just beginning a serious effort to look at whether postsecondary education institutions are complying with Title IX when it comes to the science, technology, and math fields.<sup>76</sup>

But Title IX isn't the only answer. Women with family responsibilities need to be supported at all levels of education and once they enter the workforce. To support women scientists, federal agencies providing research grants, for example, could offer financial incentives to universities and colleges to include family accommodations, among them child care to attend conferences and paid family leave to encourage young graduate students in particular to continue their scientific careers. Similarly, more should be done to replicate the good work of community colleges and four-year colleges providing family-friendly support and child care as well as flexible class scheduling so that women (and their partners) can attain successive levels of education to boost their earnings in today's economy.



**GETTING DOWN TO BUSINESS.** Women now match men in the pursuit of business degrees.  
{EDLABDESIGNER, FLICKR}

But the real answer may lay in the next chapter authored by Brad Harrington and Jamie Ladge on how businesses have and should respond to women's entry into the workplace. Without businesses to support women's rise to the top and support the everyday struggle of combining work and care, receiving a good education will never be enough.

## ENDNOTES

- 1 National Center for Education Statistics, "Digest of Education Statistics 2007" (2007), Table 177.
- 2 Catherine Freeman, "Trends in Educational Equity of Girls and Women: 2004" (Washington: National Center for Education Statistics, 2004).
- 3 Michael Planty and others, "The Condition of Education 2008" (Washington: National Center for Education Statistics, 2008), Table 27-1.
- 4 Ibid.
- 5 Ibid.
- 6 Center for American Progress analysis of Center for Economic and Policy Research Extracts of the Current Population Survey Outgoing Rotation Group files (2008).
- 7 20 U.S.C. § 1681, et seq.
- 8 The White House, Office of the Press Secretary, "Valerie Jarrett and Education Secretary Arne Duncan Hold White House Roundtable on Title IX" (June 23, 2009), available at [http://www.whitehouse.gov/the\\_press\\_office/Valerie-Jarrett-and-Education-Secretary-Arne-Duncan-Hold-White-House-Roundtable-on-Title-IX/](http://www.whitehouse.gov/the_press_office/Valerie-Jarrett-and-Education-Secretary-Arne-Duncan-Hold-White-House-Roundtable-on-Title-IX/). See also Association for Women and Science and Society of Women Engineers, "Campaign Responses to Questions from the Association of Women in Science and the Society of Women Engineers" (October 13, 2008), available at <http://www.researchresearch.com/media/pdf/Obama-McCain3080.pdf>.
- 9 Laura Horn and Thomas Weko, "On Track to Complete? A Taxonomy of Beginning Community College Students and Their Outcomes 3 Years After Enrolling: 2003–04 Through 2006," (Washington: National Center for Education Statistics, 2009).
- 10 Mary Lufkin, Mary Wiberg and others, "Gender Equity in Career and Technical Education." In Susan Klein, ed., *Handbook for Achieving Gender Equity Through Education*, Second Edition (Mahway, NJ: Lawrence Erlbaum, 2007).
- 11 National Center for Education Statistics, "Special Analysis 2008: Community Colleges" (Washington: 2008) p. 40.
- 12 Ibid.
- 13 Lutz Berkner, Shirley He, and Emily Forrest Cataldi, "Descriptive Summary of 1995–96 Beginning Postsecondary Students: Six Years Later" (Washington: National Center for Education Statistics, 2002).
- 14 Ibid at Table 2.1-C.
- 15 Linda M. Erickson, "Historical Dictionary of Women's Education in the United States" (New York: Greenwood Press, 1998), p. 342.
- 16 Miriam K. Chamberlain, "Women in Academe" (New York: Russell Sage Foundation, 1991), p. 366.
- 17 Marie Tessier, "Welfare + Education Leads to Jobs, Higher Pay," *Women's eNews*, September 17, 2009, available at <http://www.womensenews.org/article.cfm/dyn/aid/592>.
- 18 Ibid.
- 19 Mary Gatta and Kevin McCabe, "The Poor Need Training that Works for Them," *The Star-Ledger*, January 24, 2006, available at [http://www.itwd.rutgers.edu/news/poor\\_need\\_training.htm](http://www.itwd.rutgers.edu/news/poor_need_training.htm).

- 20 Nolita Clark, Shannon Stanfield, and Vivyan Adair, "Remarkable Journeys: Poor, Single Mothers Accessing Higher Education," *On Campus With Women* 33 (3–4) (Spring/Summer 2004), available at [http://www.aacu.org/ocww/volume33\\_3/fromwhereisit.cfm?section=1](http://www.aacu.org/ocww/volume33_3/fromwhereisit.cfm?section=1).
- 21 Vivyan Adair, "The ACCESS Project at Hamilton College 2003 Year End Report" (Clinton, NY: Hamilton College, 2003).
- 22 Ibid.
- 23 National Center for Education Statistics, "Career/Technical Education Statistics" (2003–2004), Table P51.
- 24 U.S. Department of Labor, Women's Bureau, "Facts on Working Women: Women in High-Tech Jobs," (2002), available at <http://www.dol.gov/wb/factsheets/hitech02.htm>.
- 25 Bureau of Labor Statistics, "Career Guide to Industries, Health Care, 2008–09 Edition" (2008), available at <http://www.bls.gov/oco/cg/cgs035.htm>.
- 26 Anthony P. Carnevale and Donna M. Desrochers, "Help Wanted...Credentials Required: Community Colleges in the Knowledge Economy" (Annapolis, MD: Community College Press, 2001), p. 57.
- 27 Louis Soares and Christopher Mazzeo, "College Ready Students, Student Ready Colleges" (Washington: Center for American Progress, 2008).
- 28 National Center for Education Statistics, "Special Analysis 2008: Community Colleges" (2008).
- 29 Christianne Corbett, Catherine Hill, and Andresse St. Rose, "Where the Girls Are: The Facts about Gender Equity in Education" (Washington: American Association of University Women Educational Foundation, 2008), p. 62.
- 30 Ibid., p. 60.
- 31 William T. Grant Foundation Commission on Work, Family and Citizenship, "The Forgotten Half: Non-College-Bound Youth in America" (1988); William T. Grant Foundation Commission on Work, Family and Citizenship, "The Forgotten Half: Pathway to Success for America's Youth and Young Families" (1988).
- 32 Samuel Halperin, "The Forgotten Half Revisited: American Youth and Families, 1988–2008" (Washington: American Youth Policy Forum, 1998).
- 33 Ibid.
- 34 Ibid.
- 35 Bureau of Labor Statistics, "Highlights of Women's Earnings in 2007" (Department of Labor, 2008) p. 5, chart 3.
- 36 Bureau of the Census, "Income, Earnings and Poverty Data from the 2007 American Communities Survey" (Department of Commerce, 2008), p. 15, table 7.
- 37 David Neumark and Donna Rothstein, "Do School-to-Work Programs Help the 'Forgotten Half?'" Working Paper 11636 (National Bureau of Economic Research, 2005).
- 38 Davis Jenkins, "Career Pathways: Aligning Public Resources to Support Individual and Regional Economic Advancement in the Knowledge Economy" (New York: Workforce Strategy Center, 2006), available at [http://www.workforcestrategy.org/publications/WSC\\_pathways8.17.06.pdf](http://www.workforcestrategy.org/publications/WSC_pathways8.17.06.pdf).
- 39 James W. Ainsworth and Vincent J. Roscigno, "Stratification, School-Work Linkages and Vocational Education," *Social Forces*, 84 (1) (2005): 257–284.
- 40 James Kemple and Cynthia J. Willner, "Career Academies: Long-Term Impacts on Labor Market Outcomes, Educational Attainment, and Transitions to Adulthood" (New York: MDCR, 2008).
- 41 For example, for "low service students" where all ethnic/gender parings except Asian males are sufficiently represented, the persistent unemployment rate among the women students was 20.3 percent for white women, 45.8 percent for black women, 27.7 percent for Hispanic women, and 47.3 percent for Asian women. See Ainsworth and Roscigno, "Stratification, School-Work Linkages and Vocational Education."
- 42 Ainsworth and Roscigno, "Stratification, School-Work Linkages and Vocational Education."
- 43 National Women's Law Center, "Title IX and Equal Opportunity in Vocational and Technical Education: A Promise Still Owed to the Nation's Young Women" (2002).

- 44 Corbett, Hill and St. Rose, “Where the Girls Are,” p.62.
- 45 Michael Planty and others, “The Condition of Education 2008,” (Washington: National Center for Education Statistics, 2008), Table 27-1.
- 46 Ibid.
- 47 Ibid.
- 48 Ibid.
- 49 Ibid.
- 50 Ibid.
- 51 Ibid.
- 52 Martha West, John Curtis, “AAUP Faculty Gender Equity Indicators 2006,” (Washington: American Association of University Professors, 2006), p. 10.
- 53 American Institute of Physics, “New Report on Women in Physics and Astronomy” (2005), available at <http://www.aip.org/fyi/2005/035.html>.
- 54 American Institute of Physics, “New Report on Women in Physics and Astronomy” (2005), available at <http://www.aip.org/statistics/trends/reports/women05.pdf>.
- 55 National Center for Education Statistics, “Integrated Postsecondary Education Data System, Completions Survey” (2008); Freeman, “Trends in Educational Equity of Girls and Women: 2004.”
- 56 National Center for Education Statistics, “Table A-11-2: Graduate and Professional Education,” available at <http://nces.ed.gov/programs/coe/2009/section1/table-gre-2.asp> (last accessed September 2009).
- 57 Michael Planty and others, “The Condition of Education 2008,” (Washington: National Center for Education Statistics, 2008), Table 27-1.
- 58 The National Academies, “Gender Differences at Critical Transitions in the Careers of Science, Engineering, and Mathematics Faculty” (2009), p. 24.
- 59 Mary Ann Mason and Marc Goulden, “Do Babies Matter: The Effect of Family Formation on the Lifelong Careers of Academic Men and Women,” *Academe* 88 (6) (November–December 2002).
- 60 Marc Goulden, Karie Frasch, and Mary Ann Mason, “Staying Competitive: Patching America’s Leaky Pipeline in the Sciences” (University of California Berkeley Center on Health, Economic, and Family Security, forthcoming), p. 5.
- 61 Mary Ann Mason and Marc Goulden, “Do Babies Matter?”
- 62 Mary Ann Mason, Marc Goulden, and Karie Frasch, “Why Graduate Students Reject the Fast-Track,” *Academe* 95 (1) (January–February 2009), available at <http://ucfamilyedge.berkeley.edu/Why%20Graduate%20Students%20Reject%20the%20Fast%20Track.pdf/>.
- 63 Results from Mary Ann Mason, Marc Goulden, and Karie Frasch, “UC Postdoctoral Career Life Survey” (2008), available at <http://ucfamilyedge.berkeley.edu/grad%20life%20survey.html>.
- 64 Mason, Goulden, and Frasch, “Why Graduate Students Reject the Fast-Track.”
- 65 Goulden, Frasch and Mason, “Staying Competitive,” p. 7.
- 66 Goulden, Frasch and Mason, “Staying Competitive,” p. 25.
- 67 Goulden, Frasch and Mason, “Staying Competitive,” p. 25.
- 68 Mary Ann Mason, “Do Babies Matter in Science?” (2008), p. 20, available at [http://sdbonline.org/Re-BootCamp09/Mason\\_ReBootSDB09.pdf](http://sdbonline.org/Re-BootCamp09/Mason_ReBootSDB09.pdf).
- 69 Mason, “Do Babies Matter in Science?” p. 23, figure 11.
- 70 U.S. Bureau of Labor Statistics, “Highlights of Women’s Earnings in 2007” (October 2008), table 2, available at <http://www.bls.gov/cps/cpswom2007.pdf>.

- 71 The White House, Office of the Press Secretary, "Valerie Jarrett and Education Secretary Arne Duncan Hold White House Roundtable on Title IX" (June 23, 2009), available at [http://www.whitehouse.gov/the\\_press\\_office/Valerie-Jarrett-and-Education-Secretary-Arne-Duncan-Hold-White-House-Roundtable-on-Title-IX/](http://www.whitehouse.gov/the_press_office/Valerie-Jarrett-and-Education-Secretary-Arne-Duncan-Hold-White-House-Roundtable-on-Title-IX/). See also Association for Women and Science and Society of Women Engineers, "Campaign Responses to Questions from the Association of Women in Science and the Society of Women Engineers" (October 13, 2008), available at <http://www.researchresearch.com/media/pdf/Obama-McCain3080.pdf>.
- 72 Title IX of the Education Amendments of 1972, 20 U.S.C. §§ 1681-88 (2006).
- 73 "Title IX Legal Manual," available at <http://www.usdoj.gov/crt/cor/coord/ixlegal.php#l.%20Overview%20of%20Title%20IX:%20Interplay%20with%20Title%20VI,%20Section%20504,%20Title%20VII,%20and%20the%20Fourteenth%20Amendment> (last accessed March 20, 2009).
- 74 Ibid.
- 75 Women's Sports Foundation. "2008 Statistics- Gender Equity in High School and College Athletics: Most Recent Participation & Budget Statistics," available at <http://www.womenssportsfoundation.org/Content/Articles/Issues/General/123/2008-Statistics--Gender%20Equity-in-High-School-and-College-Athletics-Most-Recent-Participation-Budge.aspx> (last accessed August 2009).
- 76 United States Government Accountability Office, "Gender Issues: Women's Participation in the Sciences has Increased, but Agencies Need to do More to Ensure Compliance with Title IX" (July 2004).