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ABSTRACT

The source of data for analysis of earning differences between men and women was the High School and Beyond (HS&B) study that tracked the 1980 sophomore class from high school to postsecondary education and the labor market. Analyses indicated that in 1992, 10 years after most of the students who were the subjects in the study graduated from high school, women were less likely than men to work consistently after they left school--one-third compared to 46 percent. Men with no more than a high school diploma or General Educational Development certificate earned $25,601, whereas women earned $19,333 in the last full year after highest degree attainment. Men who earned certificates or associate's degrees earned $22,410 in the first year of work; women earned $19,446. In the last year of work, the men earned $26,969; women earned $21,868. Female workers with Bachelor's degrees earned $22,602 the year after graduation compared to $26,778 earned by men. By the last year of work, men were earning $34,104 compared to $27,259 for women. The gender dominance of the major field of study for students who earned any postsecondary degree or certificate was related to their earnings. Workers who graduated in female-dominated fields started work earning $20,855; those in male-dominated fields earned $26,170. By their last full year of employment studied, workers in female dominated field earned $24,307 compared to those in male dominated fields who earned $31,292. Men who graduated with Bachelor's degrees in gender-neutral fields earned more than women in the same fields. (Appendixes contain a glossary, technical notes, and a 24-item bibliography.) (YLB)

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FOREWORD

The National Education Longitudinal Studies (NELS) program of the National Center for Education Statistics (NCES) was established to study the educational, vocational, and personal development of young people beginning with their elementary or high school years, and following them over time as they begin to take on adult roles and responsibilities. Thus far, the NELS program consists of three major studies: the National Longitudinal Study of the High School Class of 1972 (NLS-72), High School and Beyond (HS&B), and the National Education Longitudinal Study of 1988 (NELS:88).

The HS&B survey included two cohorts: the 1980 senior class, and the 1980 sophomore class. Both cohorts were surveyed every two years through 1986, and the 1980 sophomore class was surveyed again in 1992.

This descriptive report uses HS&B to discuss the educational attainment, employment consistency, gender dominance of major field of study for those who attained a postsecondary certificate or degree, and annual earnings of the 1980 sophomore class in 1992, ten years after most of the students in that cohort graduated from high school. The report explores in some detail the relationships between characteristics of the 1980 sophomores, their work consistency, educational attainment and gender dominance of their major field of study, family formation characteristics and earnings.

Martin Orland
Associate Commissioner
Data Development and Longitudinal Studies Group

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The reviews provided by Robert Burton, Kristin Perry, and Chris Chapman of NCES and David Goodwin of Planning and Evaluation Service improved the final product.

HIGHLIGHTS

In 1993, more women than men continued their education after high school: 55 percent of all postsecondary degrees and certificates were awarded to women (table 2). Women have also become more likely to work outside of the home. In 1981, 51 percent of married women participated in the labor force. By 1995, 61 percent of married women participated in the labor force.[1] However, at every level of education, from high school dropout to postgraduate degree earner, women earned less than men.[2]

This analysis considers two factors that might have contributed to the earnings gap between men and women. Women were more likely than men to interrupt their careers for an extended period of time to take care of young children,[3] and women were also more likely than men to prepare for jobs that historically have lower income potential.[4]

This report examines earnings of men and women who worked consistently by their education level and the gender dominance of major field of study. A consistent worker was defined as one who worked at least 91.67 percent of the total months in the labor force after attaining his or her highest level of education.[5] Further, respondents who earned postsecondary certificates or higher were assigned to categories based on the dominant gender of graduates in their major fields of study. Gender dominance was based on the proportion of women or men in a major field of study. A major field of study was declared gender dominant if 65 percent or more of the program's graduates were male or female.

- Women were less likely to work consistently than men after they left school. One-third of the women worked consistently after they left school compared to 46 percent of the men (table 5).

[1] U. S. Department of Commerce. *Statistical Abstract of the United States, 1996.* (Washington, D.C.: Bureau of the Census, 1996), p. 399.
[2] *Ibid*, p. 471.
[3] U. S. Department of Labor, Women's Bureau. *1993 Handbook on Women Workers: Trends and Issues.* (Washington, D.C.: author, 1993), p. 74.
[4] Jerry Jacobs. *Revolving Doors: Sex Segregation and Women's Careers.* (Stanford, CA: Stanford University Press, 1989).
[5] Care should be taken in using these results as the data did not allow identification of part- and full-time workers.

- Having children had different effects on the probability of working consistently for males and females. Seventeen percent of the women with two children worked consistently compared to 45 percent of those with no children (table 6). Men, on the other hand, were more likely to work if they had two children instead of none. One-half of the men with two children worked consistently compared to 44 percent of those with no children.

- Nine percent of the women who dropped out of high school worked consistently compared to one-half of the women with a bachelor's degree (table 7). One-half of the men with a bachelor's degree worked consistently compared to 37 percent of those who dropped out of high school.

- Men with no more than a high school diploma or GED earned $25,601 while women earned $19,333 (in constant 1992 dollars) in the last full year after highest degree attainment (table 8). However, first year annual earnings of men and women who started work immediately after high school did not differ significantly.

- Men who earned certificates or associate's degrees earned $22,410 in the first year of work while women earned $19,446, a difference of $2,964. In the last year of work, these men earned $26,969 while women earned $21,868, a difference of $5,101.

- Female workers with bachelor's degrees earned $22,602 the year after they graduated compared to $26,778 earned by men. By the last year of work, men were earning $34,104 compared to $27,259 for women.

- The percentile ranking of income change indicates that men's average income increased more than women's from the first year to the last year of work (table 12). This was true at all levels of education.

- The gender dominance of the major field of study for students who earned any postsecondary degree or certificate was related to their earnings. Workers who graduated in female dominated fields started work earning an average of $20,855 while those in male dominated fields earned $26,170 (table 9). By their last full year of employment studied, workers in female dominated fields earned $24,307 compared to those in male dominated fields who earned $31,292.

- Men who graduated with bachelor's degrees in gender-neutral fields earned more than women in the same fields in their first year out of college and in the last year of the study (table 11). Significant differences did not exist between the earnings for men and women for the first year after graduation for those who majored in male or female dominated majors. By the last full year of employment, however, men earned more than women in male and female dominated majors.

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INTRODUCTION

The cultural roles of women have altered over the last several decades. An increasing number of women have selected careers outside of the home, and more women have attended college and other postsecondary institutions than ever before. Nevertheless, as recently as 1992, after a generation of social evolution, women's economic rewards in the workplace continued to lag behind those of men. This report documents the status of young women as they entered the labor market in the late 1980s and early 1990s. Women's earnings are compared to those of men with equal education and experience in the workplace. Factors are also presented that were associated with the differences between incomes of women and men.

The report investigates two possible contributing factors for the income differences between men and women. First, women may have been more likely than men to leave their jobs for extended periods while they raised their children. Second, women may have prepared themselves for jobs that are traditionally held by women. These jobs have typically paid less than those held by men. The income differences between men and women at three levels of education are examined: those who entered the job market with no more than a high school diploma or general equivalency diploma (GED), those with a certificate or associate's degree, and those who completed a bachelor's degree.

BACKGROUND

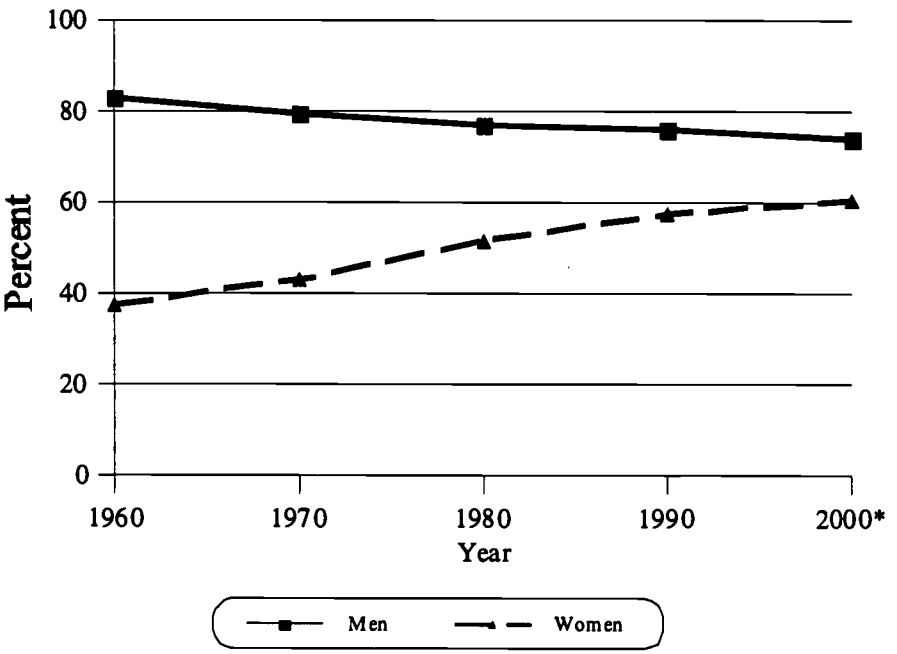
Women increased their enrollment in postsecondary education and their numbers in the workforce

In the last few decades, a larger percentage of women enrolled in postsecondary education and earned certificates and degrees than in the past. In 1960, 38 percent of the female high school graduates enrolled in college compared to 54 percent of the males. By 1995 the rates were nearly equal, with 61 percent of the female and 63 percent of the male high school graduates entering college.[6] In 1994, women comprised 55 percent of the undergraduate enrollment in postsecondary institutions.[7]

[6]U. S. Department of Education. *Digest of Education Statistics, 1996.* (Washington, D.C.: author, 1996), p. 187.
[7]*Ibid.*, p. 182.

The number of women working outside the home also increased over the past several decades. According to the U.S. Department of Labor, the most important labor market development between 1965 and 1992 was the dramatic increase in the number and proportion of working women. In 1970, women comprised 38 percent of the civilian labor force.[8] By 1994, the share had increased to 45 percent.[9] The U.S. Department of Labor projects the female share of the labor force will increase to 47 percent by 2005.[10] Females will comprise nearly two-thirds of the new entrants into the labor force over the next few years.[11]

Figure 1--Percentage of population participating in the labor force by gender: 1960-2000*



*Data for 2000 are projected.

SOURCE: U.S. Department of Commerce. *Statistical Abstract of the United States, 1996.* (Washington, D.C.: Bureau of the Census, 1996), p. 394-395.

[8]Hudson Institute. *Workforce 2000, Work and Workers for the 21st Century.* (Indianapolis: author, 1987), p. 85.

[9]U. S. Department of Labor. *Civilian Labor Force, 1982, 1993, and 1994 and Projected 2005, and Entrants and Leavers 1982 and Projected 1994-2005.* (Washington, D.C.: Bureau of Labor Statistics, 1997), www.stats.bls.gov/emptab03.htm.

[10]U. S. Department of Labor, Women's Bureau. *1993 Handbook on Women Workers: Trends and Issues.* (Washington, D.C.: author, 1993), p. 231.

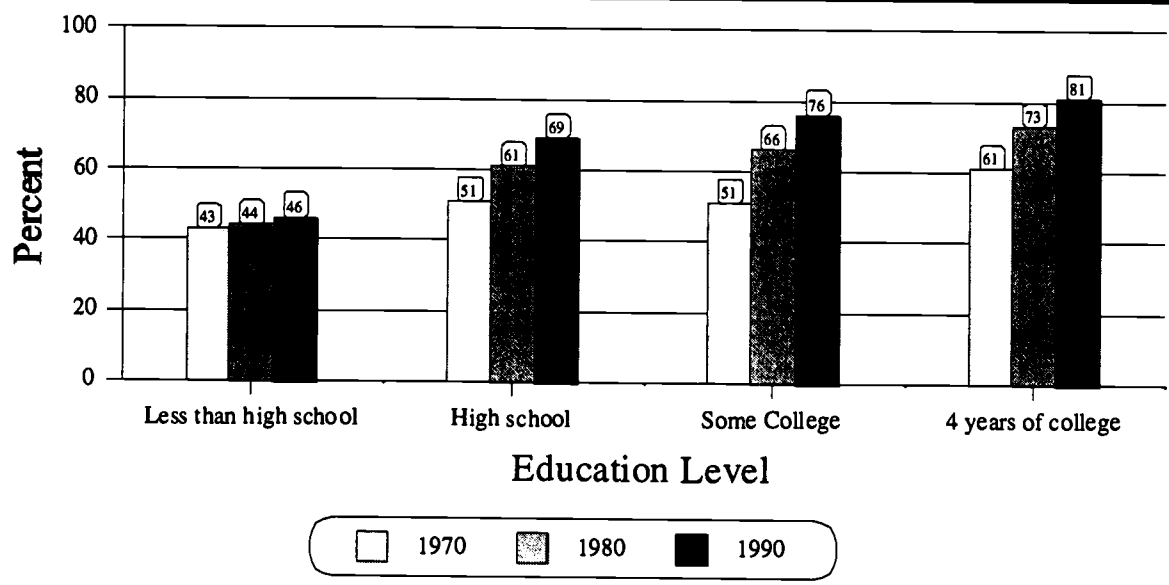
[11]Hudson Institute. *Workforce 2000, Work and Workers for the 21st Century.* (Indianapolis: author, 1987), p. 85.

The labor force participation rate of women rose rapidly between 1960 and 1995. In 1960, 38 percent of adult women and 83 percent of adult men were in the labor force. By 1995, the share of men in the labor force had declined to 75 percent and the share of women increased to 59 percent (see figure 1).[12]

Higher proportions of educated women entered the labor force

Attaining higher levels of education is related to increases in the likelihood that women will work. Figure 2 displays the percentage of women who worked by their educational level for the past twenty years. This chart illustrates two points. First, women without a high school education were less likely to work than those who earned a high school diploma or higher. Second, among women who did not earn a high school diploma, the percentage who worked changed by 3 percentage points over time, increasing from 43 percent in 1970 to 46 percent in 1990. However, among women who earned a high school diploma or higher, the percentage working increased more over the same twenty years: 18 percentage points for women with a high school diploma (51 to 69 percent), 25 percentage points for women with some college (51 to 76 percent), and 20 percentage points for women with four years of college (61 to 81 percent).

Figure 2--Percentage of women working by education level: 1970-90



SOURCE: U.S. Department of Commerce. *Statistical Abstract of the United States, 1996.* (Washington, D.C.: Bureau of the Census, 1996), p. 395.

[12]U. S. Department of Commerce. *Statistical Abstract of the United States, 1996.* (Washington, D.C.: Bureau of the Census, 1996), p. 394.

THE EARNINGS GAP

A gap between men's and women's earnings existed in 1970. Although women made educational and employment advances, the gap persisted in 1995. Adelman studied young women entering the labor market in the 1970s. He found that compared to men, women:

- experienced more unemployment,
- worked in lower paying and traditionally female occupations, and
- had lower incomes when all relevant educational and experience variables were considered.[13]

Table 1 shows that the historical inequalities between women's and men's earnings still existed in 1995. On average, women earned two-thirds of men's earnings in 1995. Thus, although more women persisted to higher levels of education, they still earned less than men with the same level of education. Women's earnings as a share of men's earnings varied between 70 percent for those with some college but no degree to a low of 64 percent for those with a bachelor's degree. Further, a woman with a bachelor's degree could expect to make $327 more annually than a male who achieved an associate's degree ($39,271 compared to $38,944, respectively), but $21,737 less than a man with a bachelor's degree in 1995 ($39,271 compared to $61,008, respectively).

Table 1--Average earnings of year-round, full-time workers age 25 and older according to gender, and female to male earnings ratio, by level of education: 1995

	Males	Females	Female earnings/ male earnings x 100
Total	$41,118	$27,162	66.1
Level of education			
Less than 9th grade	20,461	13,349	65.2
9th to 12th grade, no diploma	24,377	16,188	66.4
High school graduate, includes equivalency	31,081	21,383	68.8
Some college, no degree	35,639	24,787	70.0
Associate's degree	38,944	26,903	69.1
Bachelor's degree or higher	61,008	39,271	64.4

SOURCE: U. S. Department of Commerce. *Statistical Abstract of the United States: 1996.* (Washington, D.C.: Bureau of the Census, 1996), p. 471.

[13]Clifford Adelman. *Lessons of a Generation: Education and Work in the Lives of the High School Class of 1972.* (San Francisco: Jossey-Bass, 1994), p. 57.

Possible reasons for the earnings gap

Several factors may have caused this earnings gap. First, although more women have achieved higher levels of education, they have been more likely than men to enter fields of study and occupations traditionally dominated by females.[14] These pay less than those traditionally held by males.[15] Second, married women and women with children may have been more likely than men to take time off from a career for family. Women who leave the labor market for family reasons often return to wages lower than those of women who did not leave. Further, women who leave the labor market lose seniority and are less likely to receive on-the-job-training, their job skills may depreciate, and their employers may believe they will take another leave.[16]

Women pursued different educational and career interests than men

In 1994, females received more degrees than males at nearly all education levels. Table 2 shows that in 1994 women were more likely than men to receive a postsecondary degree or certificate at all educational levels, except doctoral and first professional.

Table 2--Percentage of postsecondary degrees and certificates awarded to women, by degree level: 1993-94

	Percent of degrees awarded to women
Total	55.4
Degree level	
Certificate of less than one year programs	51.6
Certificate of one, but less than two year programs	58.2
Associate's degree	59.2
Bachelor's degree	54.5
Master's degree	54.5
Doctorate	38.5
First professional	40.7

SOURCE: U. S. Department of Education. *Digest of Education Statistics, 1996.* (Washington, D.C.: National Center for Education Statistics, 1996).

Often, men and women graduated in different majors. Women continued to earn the highest proportion of degrees in fields traditionally dominated by females, such as education and nursing,

[14] Jerry Jacobs. "Long Term Trends in Occupational Segregation by Sex," *American Journal of Sociology.* vol. 95, (1989), p. 160-173.

[15] Donald J. Treiman and Heidi I. Hartmann. *Women, Work and Wages.* (Washington, D.C.: National Academy Press, 1981).

[16] Joyce P. Jacobson & Laurence M. Levin. "Effects of Intermittent Labor Force Attachment on Women's Earnings," *Monthly Labor Review.* vol. 118, n. 9, (Sept. 1995), p. 4-19.

while males dominated technology and engineering fields.[17] These areas of educational interest lead to jobs with different income potentials. As will be seen later, the choice of a male- or female-dominated major was associated with income.

Men's and women's chosen occupations influenced their earnings level. In 1991, the frequently occupations traditionally held by women included secretary, cashier, bookkeeper, nurse and nursing aide, elementary school teacher and child care worker. Historically, careers traditionally held by women paid less than those held by men. In 1991, 11 of the 20 frequently held occupations for women were in the traditionally female held list. Further, 14 of the 20 frequently held occupations for women paid less than the average weekly pay for all women employed. This translates to 69 percent of women in the 20 frequently held occupations earning less than the average weekly pay for all women.[18]

Family formation

Women's participation in the work force varies by age and number of children in the family. Women age 35 to 44 display the highest labor force participation, 77 percent. The share drops to 73 percent for women between 45 and 54 years of age and declines to 47 percent for women between 55 and 64.[19] In 1991, the labor force participation rate for married women with no children was 53 percent. However, for their single counterparts the labor force participation rate was 70 percent.[20] Several contributing factors exist that may explain this phenomenon. Among these contributing factors are: older married women with grown children may not have been as likely to work as younger single women, or married women with no children may have interrupted their careers to move when a husband was transferred.

The most dramatic increase in the labor force participation between 1981 and 1995 was for married women with children (table 3). The labor force participation rate for married women with a child less than 18 increased by 14 percentage points, from 56 to 70 percent, over the 14 year period. The labor force participation rate for married women with no children less than 18 increased 7 percentage points during the same period, from 46 to 53 percent.

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[17] Jerry Jacobs. *Revolving Doors: Sex Segregation and Women's Careers.* (Stanford, CA: Stanford University Press, 1989).

[18] U. S. Department of Labor. *1993 Handbook on Women Workers: Trends and Issues.* (Washington, D.C.: Women's Bureau, 1993), p. 17.

[19] U. S. Department of Labor. *Facts on Working Women.* Number 93-2. (Washington, D.C.: Women's Bureau, 1993), p. 2.

[20] U. S. Department of Labor. *1993 Handbook on Women Workers: Trends and Issues.* (Washington, D.C.: Women's Bureau, 1993), p. 75.

Although more women with children worked in 1995 than 1981, they still interrupted their careers for the care of the very young and returned to the labor force as their children grew older. In 1995, the labor force participation rate for women with children under the age of 6 was 64 percent, while 75 percent of the women with children age 6 to 13 were in the labor force, and 80 percent of women with children age 14 or older worked.[21]

Table 3--Percentage of married women with a husband in the household who worked, by age of youngest child: 1981-95

	1981	1991	1995
Total	51.0	58.5	61.1
Presence and age of youngest child in household			
No child less than 18	46.3	51.2	53.2
With a child less than 18	55.7	66.8	70.2
Child less than 6	47.8	59.7	63.5
Child 6-13	62.1	72.8	74.9
Child 14-17	63.3	75.7	79.6

SOURCE: U. S. Department of Commerce. *Statistical Abstract of the United States: 1996.* (Washington, D.C.: Bureau of the Census 1996), p. 400.

DATA AND METHODOLOGY

Data source

The source of data for this analysis was the High School and Beyond (HS&B) study. HS&B collected data from sophomores in 1980--the high school class of 1982--twelve years, with the final data collection in 1992. HS&B tracked sophomores in 1980 from high school to postsecondary education and the labor market. The data collected allowed for identification of the amount and type of education received by individuals, calculation of their annual earnings, and identification of their work consistency after school.

Analytic approach

This analysis considered men's and women's education levels, the gender dominance of their major field of study, time spent in the labor force and their consistency of work. The report begins by describing the characteristics of men and women who worked consistently and inconsistently. It then examines the earnings of consistent male and female workers. The highest level of education and gender dominance of their major field of study were considered in the earnings analysis. The difference between men's and women's earnings is included in the analysis. Finally, a discussion

[21] *Ibid.*

of the factors associated with the probability of achieving earnings in the highest income quartile within gender groups is included.

The first step was to sort individuals into one of three groups for each year: respondents whose predominant activity was work, those whose primary activity was postsecondary education, and those who did not fit in either group. For example, respondents who did not fit in a work or education group may have stayed home to raise a family or been unemployed for several months.

Family formation was also considered in this analysis. Marriage and birth of children may have been associated with women leaving their jobs or working less than full-time. These factors could have depressed women's earnings. It was expected that family formation would have less relationship to men's participation in the labor market than women's because men's rate of labor force participation has historically not varied across the period of family formation.[22]

The postsecondary degree level or certificate an individual received was determined. Postsecondary levels included certificate programs of less than 2 years (certificate), degrees of 2 but less than 4 years (associate's degree), and baccalaureate degrees (bachelor's degree).[23] Individuals with no more than a high school diploma or general equivalency diploma (GED) were sorted into two groups: those who enrolled in a postsecondary institution but did not receive a degree, and those who never enrolled in a postsecondary institution.

Respondents who earned certificates, associate's degrees and bachelor's degrees were assigned to a category based on the gender dominance of their major field of study. Gender dominance was based on the proportion of women or men in a major field of study. A major field of study was declared gender dominant if 65 percent or more of the program's graduates were male or female.[24] This provided a basis to analyze the relationship between the gender dominance of the major fields and earnings. Only respondents who earned a postsecondary certificate or higher were assigned to a dominant gender category. High school graduates were not assigned a gender

[22] David C. Bloom and Adi Brender. "Labor and the Emerging World Economy," *Population Bulletin.* (1993).
[23] For purposes of this analysis, the 3.1 percent of respondents who earned post-baccalaureate degrees by 1992 were excluded. These respondents were not in the labor force long enough to produce reliable employment and earnings patterns. The average number of months employed for this group was 23, and average number of months in the labor force was 30. Thus, this group was employed, on average, 76.7 percent of the time. Since this group was so small and had such relatively low work consistency, it was not included in the balance of the analysis. The low work consistency of graduate students may be the result of a relatively short amount of time elapsed since degree completion.
[24] The major field of study categories were derived using the U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System, 1990-91 Completions Survey. By defining a major field of study gender dominant if 65 percent or more of the program's graduates were male or female, degree recipients were divided into thirds for the program gender dominance variable (one-third in female dominated programs, one-third in male dominated programs and one-third in gender-neutral programs). Also, using this

dominance for a major field of study. These individuals were usually in general programs not specific to one gender. Appendix A includes a complete listing of the major fields of study and their respective dominant gender.

Nearly two-thirds of the HS&B students who received a postsecondary degree or certificate completed a program defined as gender dominant. A degree is defined as *gender dominant* if 65 percent of the graduates were female or male. This definition divided the population evenly: one-third of 1994 graduates were in a male dominated program, one-third in a female dominated program, and the remaining one-third in a gender-neutral program. In sub-baccalaureate programs, women dominated fields such as business (70 percent) and health professions (86 percent) while men tended to complete engineering technology (89 percent) and auto technician (93 percent) programs. At the baccalaureate level, women dominated education (79 percent) and health fields (84 percent) while men comprised most of the engineering (86 percent) and computer science (71 percent) graduates. Appendix A includes a complete list of major fields of study organized by gender dominance.

Once an individual received his or her highest degree, he or she was assigned to one of two categories: employed consistently or employed inconsistently. Consistent employment was defined as working at least 91.67 percent of the total months in the labor force after attaining the highest level of education, or 11 out of 12 months for each year in the labor force.[25] The months an individual was not in the labor market before graduating were not considered in the definition of work consistency.

Individuals' time unemployed may have been distributed across the years, or occurred all at once. For example, someone who was in the labor force for ten years could have been unemployed for nine months at one time and be defined as a working consistently. Or, an individual who missed one month of work each year for ten years would also be defined as working consistently. On the other hand, an individual with five years in the labor market and nine months of unemployment would be working inconsistently. [26]

An individual could have been out of work for many reasons. He or she could have been laid-off and seeking work, or have voluntarily left employment. Non-graduating students who

definition, resulting groups in the HS&B data were large enough to analyze.

[25] Employment data was collected on a monthly basis on the HS&B survey. Thus, to derive the consistent employment variable, 11 months of work in a year was determined to be the mark of consistent work; 10 out of 12 months would have resulted in an extremely lenient definition of consistent work, while 12 out of 12 months would have been too strict.

[26] To take into account differences in the length of time working due to education, only the earnings of those respondents with degrees or diplomas of the same level were compared.

worked while enrolled were considered working consistently. If they received the degree, the employment status determination started three months after graduating. This provided enough time for most graduates to find a job.[27]

Annual earnings were measured twice. First, earnings were measured during the first full year of employment after attainment of highest degree. If one individual took four years to achieve a bachelor's degree and another took six years, their incomes were compared for their first full year after earning the degree. Second, earnings were measured in the last full year reported. All earnings were adjusted for inflation using the consumer price index (CPI) and reported in 1992 dollars. The annual earnings of consistent male and female workers who achieved the same level of education in fields of the same gender dominance were compared in their first and last years. If someone did not qualify as working consistently, he or she was not included in the earnings comparisons.

Several tables display percentage distributions across earnings categories. The earnings categories in these tables were calculated to approximate earnings quartiles and were rounded to the closest $50. Earnings categories were developed separately for men and women at each educational level.

Change in income between the first and last earning periods was calculated as a percentile ranking of the dollar amount of change. First, earnings for each worker in the first full year of employment were subtracted from the earnings in the last full year reported. The result is a dollar value of change in earnings. Next, the changes in earnings values were ranked from smallest to largest within each educational attainment group. A percentile ranking of the change values in each educational level was calculated. This ranking provides a relative measure of respondents' change in earnings.

Data constraints

There were several constraints on the HS&B data. Throughout the 1980s, approximately two-thirds of all part-time workers were women.[28] Further, women with children, especially those with children under the age of 6, were more likely to be part-time workers than other women.[29] However, because of the way the HS&B information was collected and reported, it was not possible

[27] In 1990, the average unemployment duration was 12 weeks. (U.S. Department of Commerce. *Statistical Abstract of the United States, 1996.* (Washington, D.C.: Bureau of the Census, 1996), p. 413.
[28] U. S. Department of Labor. *1993 Handbook on Women Workers: Trends and Issues.* (Washington, D.C.: Women's Bureau, 1993), p. 8.
[29] *Ibid.*

to determine directly whether a respondent was working full- or part-time. It could only be determined whether he or she worked regularly. In an attempt to estimate the percentage of respondents who worked part-time, the percentage of those working consistently and earning less than $8,000 in the last full year reported was calculated. Based on a 40 hour week at minimum wage, it would not be possible to work full-time and earn less than $8,000. Table 4 shows, overall, 3 percent of males and 4 percent of females earned less than $8,000 in the last year they worked. Although women were generally more likely than men to earn less than $8,000, within each of the educational levels, the difference between the percent of consistent male and female workers who earned less than $8,000 was not significant.[30]

Table 4--Percentage of 1980 high school sophomores working consistently[1] who earned less than $8,000 in the last full year of employment after attainment according to highest level of education, by gender

	All	High school degree or GED[2]	Certificate or associate's degree	Bachelor's degree[3]
Total	3.3	4.2	3.2	1.6
Gender				
Male	2.6	3.4	1.9	1.1
Female	4.3	5.5	4.4	2.0

[1]Consistent employment was defined as working 91.67 percent of the total months in the labor force after highest degree attainment to the end of the data collection period.
[2]Includes high school degree or GED recipients who had some postsecondary experience and no certificate or degree, as well as those who had no postsecondary experience.
[3]Includes respondents who obtained a bachelor's degree as highest degree by 1992.

SOURCE: U. S. Department of Education, National Center for Education Statistics, 1992 High School and Beyond: Sophomore Cohort 1980-1992 (HS&B:92), Data Analysis System.

The second data constraint was the lack of ability to determine the type of job a respondent obtained. Although respondents were categorized by gender dominance of their major field of study, the type of job obtained was not determined. Therefore, a man and a woman, both in male dominated majors, could have taken jobs with different income potentials. For example, a man and a woman could have both attained a bachelor's degree in engineering; however, they may have obtained different types of engineering jobs, or never obtain an engineering job. Although the

[30] This analysis was used to indirectly estimate the portion of consistent workers who worked part-time in the sample. According to the Bureau of Labor Statistics (FTP address: stats.bls.gov/pub/special.requests/lf/aa8.txt), in 1996, 12 percent of working men worked part-time, while 37 percent of working women worked part-time. These statistics include consistent and inconsistent workers. Also, HS&B does not allow identification of higher paid part-time workers, or those who, for example, work only four days, or five short days per week. These two factors explain the higher percentage of part-time workers BLS reported than was found in the HS&B sample.

magnitude is unknown, job type differences account for some of the pay differentials between men and women.[31]

[31] For an analysis of job types held by men and women see Barbara H. Wootton, "Gender Differences in Occupational Employment," *Monthly Labor Review*. vol. 120. N. 4, (April 1997), p. 15-34.

WORK CONSISTENCY OF MEN AND WOMEN

Women were less likely than men to work consistently after they left school. One-third of women worked consistently after they left school, compared to 46 percent of men (table 5). This means that two-thirds of women and 54 percent of men were not working, on average, for more than one month per year after they attained their highest degrees.

DEMOGRAPHICS

Race/ethnicity was associated with work consistency for both men and women. White, non-Hispanic and Asian/Pacific Islander women were more likely to be employed consistently than black, non-Hispanic and Hispanic women. Thirty-five percent of the white, non-Hispanic women and 40 percent of the Asian/Pacific Islander women were employed consistently compared to 22 percent of the black, non-Hispanic women and 26 percent of the Hispanic women.

Table 5--Percentage of 1980 high school sophomores working consistently* according to gender, by race/ethnicity and family socioeconomic status, 1980

	Women	Men
Total	32.8	45.7
Race/ethnicity		
American Indian/Alaskan Native	26.8	32.9
Asian/Pacific Islander	40.0	36.7
Black, non-Hispanic	21.5	33.0
White, non-Hispanic	35.4	48.4
Hispanic	26.1	44.0
Family socioeconomic status, 1980		
Lowest third	25.5	41.6
Middle third	37.4	50.5
Highest third	38.6	45.4

*Consistent employment was defined as working 91.67 percent of the total months in the labor force after highest degree attainment to the end of the data collection period.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School & Beyond: Sophomore Cohort 1980-1992 (HS&B:92), Data Analysis System.

White, non-Hispanic men were more likely to be employed consistently than black, non-Hispanic men. Forty-eight percent of the white, non-Hispanic men worked consistently compared to 33 percent of the black, non-Hispanic men.

For women, family background was also related to the probability of working consistently after leaving school. Females from families with high or middle socioeconomic status (SES) were more likely to work consistently than those from families with low SES. Twenty-six percent of the lowest SES women compared to 37 percent of the middle SES and 39 percent of the highest SES women were employed consistently.

FAMILY FORMATION

Marital status was related to work consistency for both males and females. Men who had never been married by June 1992 were less likely to work consistently than men who were either married or were no longer married, 39 percent compared to 54 and 49 percent, respectively (table 6). Women who were either married or had never been married by June 1992 were more likely to work consistently than women who were no longer married by June 1992 (33 and 36 percent compared to 26 percent, respectively).

Table 6--Percentage of 1980 high school sophomores working consistently* according to gender, by marital status and number of children, June 1992

	Women	Men
Total	32.8	45.7
Marital status, June 1992		
Married	33.3	54.1
Never married	36.0	38.6
No longer married	26.3	48.9
Number of children, June 1992		
None	45.1	43.6
One	35.3	48.7
Two or more	17.1	49.7

*Consistent employment was defined as working 91.67 percent of the total months in the labor force after highest degree attainment to the end of the data collection period.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School & Beyond: Sophomore Cohort 1980-1992 (HS&B:92), Data Analysis System.

Having children was a predictor of work consistency for both men and women. Women with multiple children were less likely to work consistently than those who did not have children. In June

1992, 17 percent of women with two or more children worked consistently, while 35 percent of those with one child, and 45 percent of those with no children worked consistently. On the other hand, having more than one child was associated with increased probabilities that men worked consistently. In June 1992, 44 percent of men with no children worked consistently, while 50 percent of those with two or more children worked consistently.[32]

LEVEL OF EDUCATION

For both men and women, education was positively associated with work consistency after leaving school. Women who earned a high school diploma, certificate, associate's or bachelor's degree were more likely to be employed consistently than those who earned either a general equivalency diploma (GED) or no diploma or degree (table 7). Nine percent of the women who dropped out of high school worked consistently. Further, comparing women with a GED or equivalent to those without a high school diploma or equivalency, achievement of a GED or equivalent was not associated with the chance that a woman would work consistently.

Table 7--Percentage of 1980 high school sophomores working consistently* according to gender, by highest level of education completed and gender dominance of major field of study

	Women	Men
Total	32.8	45.7
Highest degree the respondent received		
No diploma/degree	8.5	36.5
GED/Certificate	10.2	36.4
High school diploma	30.0	47.7
Certificate	38.1	46.8
Associate's degree	40.9	50.9
Bachelor's degree	49.6	49.9

*Consistent employment was defined as working 91.67 percent of the total months in the labor force after highest degree attainment to the end of the data collection period.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School & Beyond: Sophomore Cohort 1980-1992 (HS&B:92), Data Analysis System.

Men who did not earn a high school diploma or degree were less likely to be employed consistently than those who earned a bachelor's degree. Thirty-seven percent of men who did not earn a diploma or degree were employed consistently, compared to 50 percent of those who earned a bachelor's degree. When compared to men who did not achieve a high school diploma or GED,

[32] Work consistency was not significantly different between men having one child compared to having no children.

achieving a GED did not improve the chances of working for men, but achieving a high school diploma was significantly related to work consistency.

EARNINGS OF CONSISTENT WORKERS

Annual earnings represent a measure of the value assigned by employers to a job. As noted earlier, consistent workers' earnings were measured three ways: in the first full year of employment after graduating, in the last year of work reported, and as a change from the first to the last year. All income is reported in 1992 dollars, and income is reported exclusively for respondents who worked consistently after they left school.

At all levels of education, men either enjoyed an earnings advantage over women in both the first and last full years reported, or no significant difference existed. Women never experienced an earnings advantage over men, nor did their increase in annual earnings out-rank that of men from the first to last year.

Attaining a bachelor's degree was compensated with higher earnings for both men and women. Women with a high school diploma and no postsecondary education earned $13,452 in their first year of work. Women who attained an associate's degree or certificate[33] earned $19,446, which was not significantly different from the earnings of high school graduates with no postsecondary education (table 8). Women who went to work with a bachelor's degree started work at $22,602 per year, which was more than those with less education. Male high school graduates also earned less than those with a bachelor's degree. Male high school graduates with no postsecondary education earned $14,106 in their first year of work, those with some postsecondary education earned $11,357, while men who attained a bachelor's degree started at $26,778.

WORKERS WITH HIGH SCHOOL DIPLOMAS OR GEDS

In the last full year of employment reported, male workers who had worked consistently earned $6,268 more than female workers, $25,601 compared to $19,333, respectively. Time on the job did not account for the income difference in 1991. Both men and women had been in the work force for nearly 10 years (117 months). However, earnings in the first year of employment for male and female workers who earned a high school diploma or GED did not differ significantly. Men earned $14,106 and women earned $13,452 immediately after graduating from high school.

[33] Associate's degree recipients were combined with certificate attainers because neither group by itself was large enough to report meaningful data.

Earnings in the last full year reported differed by $6,693 for men and women with a high school diploma or GED and some postsecondary education who worked consistently; women earned $20,106 and men, $26,799. However, earnings for the groups did not differ significantly in the first full year.

Table 8 shows that the first full year of earnings for both male and female workers with a high school diploma or GED and no postsecondary experience were higher than their counterparts with some postsecondary experience. Women who did not pursue any postsecondary education earned $13,452 in their first year versus $10,711 earned by women who enrolled, but did not complete a postsecondary degree or certificate. Men who did not continue their education earned $14,106 in the first full year compared to $11,357 for those who did continue, but did not complete any postsecondary certification.

By their last full year reported, the earnings of men and women with a high school diploma and some postsecondary education caught up with that of men and women with no postsecondary education. No significant difference existed in the last year earnings of men who graduated from high school and those who continued and did not receive a degree. Annual earnings for men with a high school diploma or GED and no postsecondary experience were $25,601, while earnings of those with some postsecondary experience were $26,799. Women who continued their education after high school, but did not graduate, did not have an income advantage over those who did not proceed with education beyond a high school diploma by the last year reported. Last year earnings for women with a high school diploma or GED and no postsecondary experience was $19,333, compared to $20,106 for women with some postsecondary experience.

These results suggest that attempting postsecondary education, but dropping out, may not improve earnings significantly compared to not enrolling in postsecondary education. Most of the respondents were in their late twenties in the final year earnings were reported. Thus, income differences attributable to education might possibly appear later in their career. Or, it may be the case that those attempting some postsecondary education and not completing were not enrolled long enough to make an earnings difference in their careers.

Table 8--Mean annual earnings in the first and last full year of employment after attainment, number of years in the labor force and number of months employed among 1980 high school sophomores working consistently,[1] by highest level of education and gender

	Annual earnings			
	First full year	Last full year	Years in labor force	Months employed
		High school diploma or GED, no postsecondary experience		
Total	$13,886	$23,523	10.0	117.0
Gender				
Male	14,106	25,601	10.0	117.0
Female	13,452	19,333	10.0	116.9
		High school diploma or GED, some postsecondary experience		
Total	11,075	23,873	10.0	117.0
Gender				
Male	11,357	26,799	10.0	117.0
Female	10,711	20,106	10.0	116.9
		Certificate or associate's degree		
Total	20,854	24,270	6.7	78.2
Gender				
Male	22,410	26,969	6.5	76.0
Female	19,446	21,868	6.9	80.1
		Bachelor's degree[2]		
Total	24,733	30,749	5.5	63.1
Gender				
Male	26,778	34,104	5.4	62.0
Female	22,602	27,259	5.6	64.2

[1]Consistent employment was defined as working 91.67 percent of the total months in the labor force after highest degree attainment to the end of the data collection period.
[2]Includes respondents who obtained a bachelor's degree as highest degree by 1992.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School & Beyond: Sophomore Cohort 1980-1992 (HS&B:92), Data Analysis System.

WORKERS WITH CERTIFICATES OR ASSOCIATE'S DEGREES

Men with an associate's degree or certificate possessed an earnings advantage over women in their first and last full year reported. Consistent female workers with a certificate or associate's degree earned $19,446, while their male counterparts earned $22,410 in their first full year, a $2,964 difference. Consistent male workers with a certificate or associate's degree earned $5,101 more than their female counterparts, $26,969 compared to $21,868, respectively, in the last year reported.

Women worked more months after graduating than men; therefore, difference in length of employment does not explain the earnings advantage of men over women. Women with an associate's degree or certificate were in the workplace for 80 months compared to 76 months for men.

WORKERS WITH BACHELOR'S DEGREES

Male workers who received a bachelor's degree earned more, on average, than females in both the first and last full year reported. Consistent female workers with a bachelor's degree earned $4,176 less in the first full year than their male counterparts. Female workers with a bachelor's degree earned $22,602, while their male counterparts earned $26,778. The earnings differential for men and women in the same groups during the last full year was $6,845; men earned $34,104 compared to $27,259 earned by women.

The difference between the earnings of men and women with a bachelor's degree cannot be attributed to women spending less actual time on the job. On average, consistent female workers who obtained a bachelor's degree spent more time in the labor force after earning their degree than their male counterparts. Consistent female workers spent 5.6 years working after college while their male counterparts spent 5.4 years.

These results suggest that education did not eliminate the earnings differential between men and women. On average, employers paid men more than women with the same level of education. Time spent in the labor market also did not eliminate these differences. In these comparisons, women either worked the same, or more time than men.

CONSISTENT WORKERS' EARNINGS BY GENDER DOMINANCE OF MAJOR FIELD OF STUDY

GENDER DOMINANCE OF MAJOR FIELD OF STUDY

The gender dominance of major field studied by students earning a postsecondary degree or certificate was related to earnings. On average, graduates in male dominated majors earned more than graduates in female dominated majors. Table 9 displays the annual earnings of all students, regardless of gender or degree level. During their first full year of employment, workers in female dominated majors earned an average of $20,855 while those in male dominated majors earned $26,170, a $5,315 difference. Workers who graduated in female dominated fields earned an average of $24,307 in the last year reported while those in male dominated fields earned $31,292. The difference between the last year earnings of men and women was $6,985.

Table 9--Mean annual earnings in the first and last full year of employment after attainment among 1980 high school sophomores working consistently,[1] by gender dominance of major field of study[2]

	First full year	Last full year
Total	$23,373	$27,917
Gender dominance of major field of study, highest degree/certificate[2]		
Male	26,170	31,292
Female	20,855	24,307
Gender neutral	24,486	30,125

[1]Consistent employment was defined as working 91.67 percent of the total months in the labor force after highest degree attainment to the end of the data collection period.
[2]A program is gender dominant if 65 percent or more of the graduates were of the same sex.

SOURCE: U. S. Department of Education, National Center for Education Statistics, 1992 High School and Beyond: Sophomore Cohort 1980-1992 (HS&B:92), Data Analysis System.

Workers with certificates or associate's degrees

Male workers who received postsecondary certificates or associate's degrees in female dominated majors had an earnings advantage over women who graduated with degrees in female dominated major programs. Male graduates with certificates or associate's degrees in female dominated programs earned $20,357 in the first full year of employment compared to $18,635 for

women. This was an advantage of $1,722 for men (table 10). The earnings difference persisted in the last full year reported. Male workers with certificates or associate's degrees in female dominated fields earned $26,065 compared to $21,197 earned by women, a $4,868 difference.

Table 10--Mean annual earnings in the first and last full year of employment after attainment, number of years in the labor force and number of months employed among 1980 high school sophomores working consistently[1] with certificates or associate's degrees as highest degree, by gender and gender dominance of major field of study[2]

	Annual earnings			
	First full year	Last full year	Years in labor force	Months employed
			Women	
Total	$19,446	$21,868	6.9	80.1
Gender dominance of major field of study, highest degree/certificate[2]				
Male	--	--	--	--
Female	18,635	21,197	7.0	82.3
Gender neutral	21,570	25,489	6.6	75.9
			Men	
Total	22,410	26,969	6.5	76.0
Gender dominance of major field of study, highest degree/certificate[2]				
Male	23,892	27,374	6.7	78.2
Female	20,357	26,065	6.1	71.3
Gender neutral	21,020	23,815	7.3	85.1

--Sample size is too small for a reliable estimate.

[1]Consistent employment was defined as working 91.67 percent of the total months in the labor force after highest degree attainment to the end of the data collection period.
[2]A program is gender dominant if 65 percent or more of the graduates were of the same sex.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School & Beyond: Sophomore Cohort 1980-1992 (HS&B:92), Data Analysis System.

Male and female workers with certificates or associate's degrees in gender-neutral majors did not have incomes that were significantly different in either the first or last full year reported. It was not possible to determine whether female or male workers earned more if they graduated in male dominated majors at the certificate or associate's degree level, as too few women in the sample graduated in male dominated majors to report the results.

Workers with bachelor's degrees

Women who graduated with bachelor's degrees earned $22,602 when they started their careers, compared to men who earned $26,778, a $4,176 difference (table 11). After being on the job for more than five years, women with bachelor's degrees earned $27,259, while their male counterparts earned $34,104, a $6,845 difference.

Table 11--Mean annual earnings in the first and last full year of employment after attainment, number of years in the labor force and number of months employed among 1980 high school sophomores working consistently[1] with bachelor's degrees as highest degree, by gender and gender dominance of major field of study[2]

	Annual earnings			
	First full year	Last full year	Years in labor force	Months employed[3]
		Women		
Total	$22,602	$27,259	5.6	64.2
Gender dominance of major field of study, highest degree/certificate[2]				
Male	23,968	31,363	5.5	64.6
Female	22,152	25,424	5.6	64.4
Gender neutral	22,905	28,558	5.6	64.5
		Men		
Total	26,778	34,104	5.4	62.0
Gender dominance of major field of study, highest degree/certificate[2]				
Male	30,888	38,007	5.4	62.5
Female	23,036	30,982	5.4	62.5
Gender neutral	26,073	33,401	5.4	62.7

[1]Consistent employment was defined as working 91.67 percent of the total months in the labor force after highest degree attainment to the end of the data collection period.
[2]A program is gender dominant if 65 percent or more of the graduates were of the same sex.
[3]Total is not within the range of some of the subgroup estimates due to the number of observations with missing values within the subgroup.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School & Beyond: Sophomore Cohort 1980-1992 (HS&B:92), Data Analysis System.

After controlling for the gender dominance of the major, the earnings difference still existed between men and women. Men who received bachelor's degrees in gender-neutral majors earned more than women in both the first and last full year of work. During the first full year, men working consistently with bachelor's degrees in gender-neutral programs earned $3,168 more than their female counterparts, women earned $22,905 while men earned $26,073. During the last full year

reported, the difference in earnings for consistent male and female workers with bachelor's degrees in gender-neutral programs was $4,843. Female workers with bachelor's degrees in gender-neutral programs earned $28,558, while their male counterparts earned $33,401 in that last year.

Earning differences appeared in the last full year reported between male and female workers with bachelor's degrees in both male and female dominated majors. Female workers with bachelor's degrees in female dominated majors earned $25,424 in the last year, while men earned $30,982, for a difference of $5,558. Female workers who graduated with bachelor's degrees in male dominated majors earned $31,363 in the last year while their male counterparts earned $38,007. The earnings difference between male and female workers who graduated in male dominated fields was $6,644 in the last year. However, significant differences did not exist between men's and women's earnings for the first year after graduation for those who received bachelor's degrees in either male or female dominated majors.

Again, the earnings differential between male and female workers who received bachelor's degrees cannot be attributed to time in the labor force. No significant difference existed between male and female workers in the number of years working or the number of months employed for graduates in male, female or gender-neutral majors.

EARNINGS GROWTH EXPERIENCED BY MEN AND WOMEN WORKING CONSISTENTLY

At all degree levels, men's annual earnings increased more than women's from the first year of work to the last year reported. The measure of change in earnings reported in table 12 illustrates the relative increase in men's and women's earnings in constant 1992 dollars. The percentile ranking of change in earnings provided a measure of the difference in men's and women's earnings growth.[34]

Table 12--Mean percentile ranking of change in annual earnings among 1980 high school sophomores working consistently[1] from first full year to last full year of employment after attainment of highest degree according to highest degree attained by 1992, by gender

	High school diploma or GED, no postsecondary experience	High school diploma or GED, some postsecondary experience	Certificate or associate's degree	Bachelor's degree[2]
Total	48.5	48.2	48.6	50.0
Gender				
Male	51.6	53.1	51.3	54.1
Female	42.4	41.8	46.0	45.8

[1]Consistent employment was defined as working 91.67 percent of the total months in the labor force after highest degree attainment to the end of the data collection period.
[2]Includes respondents who obtained a bachelor's degree as highest degree by 1992.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School & Beyond: Sophomore Cohort 1980-1992 (HS&B:92), Data Analysis System.

At all degree levels, the average percentile ranking of change in earnings for males exceeded that of their female counterparts. This suggests that the earnings of male workers increased more during the study period than those of women. Male workers with a high school diploma or GED and no postsecondary education had an average percentile ranking of change in earnings of 52, while female workers ranked 42. The mean percentile ranking of change in earnings for male workers who had some postsecondary education, but no degree, was higher than females by 11 percentile points.

[34]The design of this measure was necessary for technical reasons when developing the HS&B Data Analysis System.

As reported earlier, the earnings of males and females were not significantly different in the first year for either of these earnings levels, but men earned more than women in the last year reported.

The mean percentile ranking of change in earnings for male workers with a certificate or associate's degree was also higher than that of women with the same level of education. Men were ranked at 51 percent compared to 46 percent for women. Finally, the mean percentile ranking of change in earnings for male workers with a bachelor's degree was 8 percentile points higher than their female counterparts, 54 compared to 46, respectively. Thus, males with postsecondary degrees or certificates made more money than females when they started working and their income increased faster than females.

FACTORS ASSOCIATED WITH EARNINGS IN THE TOP AND BOTTOM CATEGORIES OF MEN AND WOMEN WORKING CONSISTENTLY

Given the earnings differential between men and women after controlling for education level, gender dominance of major field of study and work consistency, the characteristics of those men and women who achieved either high or low earnings was of interest. The following sections identify the characteristics of men and women, separately, that were associated with achievement of high or low earnings. Earnings categories were developed to approximate quartiles in their respective gender groups and were rounded to the closest $50. The information is presented for high school graduates and bachelor's degree recipients.

WORKERS WITH HIGH SCHOOL DIPLOMAS OR GEDS

Male workers

A male high school graduate had to earn a minimum of $31,000 to qualify for the top earnings quartile in table 13. Race/ethnicity and family formation factors for male high school graduates were related to the probability that earnings would be in the highest or lowest quartile in the last year of the study.

Family formation factors were related to the likelihood of earning in the highest or lowest category for male workers with no more than a high school diploma or GED. Consistent male workers with a high school diploma or GED who were married or never married by 1992 were more likely to have earnings of $31,000 or more than men who were no longer married by 1992. Twenty-eight and 27 percent of married and never married men, respectively, had final year incomes in the highest earnings category, compared to 9 percent of those no longer married. Being married compared to never married was not associated with a significantly different probability of achieving earnings in the top quartile.

Table 13--Percentage distribution of 1980 male high school sophomores working consistently[1] with high school diplomas or GEDs as highest degree, according to annual earnings in constant 1992 dollars for the last full year of employment after attainment, by selected characteristics

	Annual earnings in constant 1992 dollars for last full year of employment after highest degree attainment			
	Less than $17,500	$17,500-$23,499	$23,500-$30,999	$31,000 or more
Total	24.1	23.8	26.4	25.7
Family socioeconomic status, 1980				
Lowest third	28.1	24.1	26.5	21.3
Middle third	21.9	26.3	25.8	26.0
Highest third	23.5	17.9	27.0	31.5
Race/ethnicity				
American Indian/Alaskan Native	--	--	--	--
Asian/Pacific Islander	--	--	--	--
Black, non-Hispanic	30.6	32.4	14.3	22.7
White, non-Hispanic	22.8	22.6	27.2	27.4
Hispanic	30.0	23.5	32.2	14.3
Grades in high school[2]				
90-100	--	--	--	--
80-89	21.7	24.5	27.8	26.1
Less than 80	24.7	23.7	26.1	25.5
Number of children, June 1992				
None	28.3	21.2	25.2	25.3
One or more	20.1	26.3	27.5	26.2
Marital status, June 1992				
Married	20.8	25.2	26.5	27.5
No longer married	16.1	29.2	45.6	9.0
Never married	31.5	19.9	21.8	26.9
Postsecondary education experience, non-attainers				
No postsecondary education	23.5	25.7	26.0	24.8
Some postsecondary education	25.4	19.9	27.1	27.6

--Sample size is too small for a reliable estimate.

[1]Consistent employment was defined as working 91.67 percent of the total months in the labor force after highest degree attainment to the end of the data collection period.
[2]On a 100 point scale.

NOTE: Percentages may not sum to 100 percent due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School & Beyond: Sophomore Cohort 1980-1992 (HS&B:92), Data Analysis System.

Race/ethnicity of males was also related to achieving earnings in the highest quartile. White, non-Hispanic male workers with no more than a high school diploma or GED were more likely than Hispanic males to have earned $31,000 or more in the last year. Twenty-seven percent of white, non-Hispanic males achieved highest quartile earnings compared to 14 percent of Hispanic males.

Female workers

The minimum earnings for women to qualify for the top earnings quartile in table 14 were $24,000. For women with a high school diploma or GED, attaining some postsecondary education experience was associated with attaining earnings in the highest earnings quartile. Thirty percent of women who attempted postsecondary education earned in the highest quartile compared to 21 percent of those who never enrolled.

WORKERS WITH BACHELOR'S DEGREES

Male workers

For men with a bachelor's degree, the minimum earnings to qualify for the top earnings quartile in table 15 were $41,000. High school grades and gender dominance of major field were related to achieving earnings in the top or bottom quartiles during the last year reported for men with a bachelor's degree.

High school grades were related to the eventual earnings of college graduates. Male workers who received a bachelor's degree and had average high school grades of 90 or above (on a 100-point scale) were more likely to earn $41,000 or more during their last reported year than those with grades less than 80. Further, male workers with high school grades below 80 points were more likely to earn less than $25,000 during their last employment year than those with high school grades of 90 or above.

Men who majored in a female dominated major were more likely to have earnings in the lowest quartile than men who majored in male dominated or gender-neutral majors. Forty-two percent of men in female dominated majors had earnings under $25,000, compared to 23 percent of men in gender-neutral majors, and 14 percent in male dominated ones. The gender dominance of men's major field of study was not significantly related to earning $41,000 or more in the last full year reported.

Table 14--Percentage distribution of 1980 female high school sophomores working consistently[1] with high school diplomas or GEDs as highest degree, according to annual earnings in constant 1992 dollars for the last full year of employment after attainment, by selected characteristics

	Annual earnings in constant 1992 dollars for last full year of employment after highest degree attainment			
	Less than $14,500	$14,500-$19,499	$19,500-$23,999	$24,000 or more
Total	25.5	25.2	24.6	24.7
Family socioeconomic status, 1980				
Lowest third	32.5	26.0	21.9	19.7
Middle third	18.9	29.7	26.7	24.7
Highest third	26.8	15.8	25.2	32.2
Race/ethnicity				
American Indian/Alaskan Native	--	--	--	--
Asian/Pacific Islander	--	--	--	--
Black, non-Hispanic	23.3	22.7	31.6	22.5
White, non-Hispanic	25.0	25.7	24.0	25.3
Hispanic	31.6	24.1	15.6	28.7
Grades in high school[2]				
90-100	--	--	--	--
80-89	22.0	22.1	28.2	27.7
Less than 80	27.8	27.3	22.8	22.1
Number of children, June 1992				
None	25.0	22.1	24.3	28.6
One or more	26.0	28.1	24.8	21.2
Marital status, June 1992				
Married	29.3	24.0	24.4	22.4
No longer married	25.0	26.2	26.8	22.1
Never married	17.9	27.0	23.5	31.7
Postsecondary education experience, non-attainers				
No postsecondary education	26.2	30.0	22.7	21.1
Some postsecondary education	24.7	18.9	27.0	29.5

--Sample size is too small for a reliable estimate.

[1]Consistent employment was defined as working 91.67 percent of the total months in the labor force after highest degree attainment to the end of the data collection period.
[2]On a 100 point scale.

NOTE: Percentages may not sum to 100 percent due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School & Beyond: Sophomore Cohort 1980-1992 (HS&B:92), Data Analysis System.

Table 15--Percentage distribution of 1980 male high school sophomores working consistently[1] with bachelor's degrees as highest degree, according to annual earnings in constant 1992 dollars for the last full year of employment after attainment, by selected characteristics

	Annual earnings in constant 1992 dollars for last full year of employment after highest degree attainment			
	Less than $25,000	$25,000-$32,749	$32,750-$40,999[2]	$41,000 or more[2]
Total	25.3	23.2	26.0	25.5
Family socioeconomic status, 1980				
Lowest third	32.8	27.2	22.4	17.6
Middle third	25.1	25.1	23.3	26.6
Highest third	22.6	21.8	27.1	28.5
Race/ethnicity				
American Indian/Alaskan Native	--	--	--	--
Asian/Pacific Islander	--	--	--	--
Black, non-Hispanic	48.5	16.0	14.4	21.2
White, non-Hispanic	23.0	24.6	26.7	25.8
Hispanic	20.1	10.8	20.8	48.3
Grades in high school[3]				
90-100	9.8	7.9	31.6	50.6
80-89	23.9	22.5	23.5	30.2
Less than 80	30.4	29.0	27.2	13.4
Number of children, June 1992				
None	24.5	24.0	24.9	26.6
One or more	25.3	21.5	26.8	26.5
Marital status June 1992				
Married	24.0	21.3	25.0	29.7
No longer married	--	--	--	--
Never married	26.9	25.9	23.9	23.3
Age received highest degree				
Less than 24	23.0	23.9	24.9	28.3
24 or older	31.5	14.2	35.7	18.5
Gender dominance of major field of study, highest degree/certificate[4]				
Male	14.0	14.3	38.1	33.6
Female	41.5	21.9	15.4	21.2
Gender neutral	22.9	31.0	23.6	22.5

Table 15--Percentage distribution of 1980 male high school sophomores working consistently[1] with bachelor's degrees as highest degree, according to annual earnings in constant 1992 dollars for the last full year of employment after attainment, by selected characteristics--Continued

	Annual earnings in constant 1992 dollars for last full year of employment after highest degree attainment			
	Less than $25,000	$25,000-$32,749	$32,750-$40,999[2]	$41,000 or more[2]
Undergraduate grade point average				
Less than 2.50	28.3	23.4	24.3	24.0
2.50-3.50	22.6	26.1	25.6	25.7
Higher than 3.50	21.6	10.9	18.9	48.6

--Sample size is too small for a reliable estimate.

[1]Consistent employment was defined as working 91.67 percent of the total months in the labor force after highest degree attainment to the end of the data collection period.
[2]Total is not within the range of some of the subgroup estimates due to the number of observations with missing values within the subgroups.
[3]On a 100 point scale.
[4]A program is gender dominant if 65 percent or more of the graduates were of the same sex.

NOTE: Percentages may not sum to 100 percent due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School & Beyond: Sophomore Cohort 1980-1992 (HS&B:92), Data Analysis System.

Female workers

The top earnings quartile starts at $32,000 for female workers with a bachelor's degree. Table 16 shows that high school grades and gender dominance of major field of study were associated with the likelihood that a female worker had earnings in the top or bottom quartile.

High school grades of female college graduates were related to the earnings in their last full year. Thirty-nine percent of the female workers with a bachelor's degree who had high school grades of 90 or above (on a 100-point scale) earned $32,000 or more during their last year reported compared to 15 percent of those with grades below 80. Female workers who received bachelor's degrees and had high school grades of less than 80 were more likely to have earnings in the bottom quartile (below $20,250) during their last year reported than women with scores between 80 and 89.

Gender dominance of major field of study was related to earning in the bottom quartile in the last full year reported for women. Thirty percent of the women workers who received bachelor's degrees in female dominated majors had last year earnings in the lowest quartile compared to 6 percent of those in male dominated majors. Women with bachelor's degrees in male dominated

majors who worked consistently were no more likely than those in female dominated majors to achieve earnings in the high income category.

Table 16--Percentage distribution of 1980 female high school sophomores working consistently[1] with bachelor's degrees as highest degree, according to annual earnings in constant 1992 dollars for the last full year of employment after attainment, by selected characteristics

	Annual earnings in constant 1992 dollars for last full year of employment after highest degree attainment			
	Less than $20,250[2]	$20,250-$25,999	$26,000-$31,999	$32,000 or more[2]
Total	23.3	24.3	26.9	25.5
Family socioeconomic status, 1980				
Lowest third	28.2	28.5	24.8	18.5
Middle third	27.5	28.8	19.9	23.8
Highest third	18.9	21.0	31.9	28.2
Race/ethnicity				
American Indian/Alaskan Native	--	--	--	--
Asian/Pacific Islander	--	--	--	--
Black, non-Hispanic	23.1	36.8	21.8	18.3
White, non-Hispanic	23.0	23.3	28.0	25.7
Hispanic	18.6	24.8	23.7	32.9
Grades in high school[3]				
90-100	21.3	16.1	23.4	39.2
80-89	19.2	26.0	28.8	26.1
Less than 80	34.5	24.8	25.7	15.0
Number of children, June 1992				
None	20.8	23.2	29.5	26.4
One or more	28.9	28.1	19.6	23.4
Marital status, June 1992				
Married	24.9	24.4	24.9	25.9
No longer married	--	--	--	--
Never married	20.2	23.5	30.6	25.8
Age received highest degree				
Less than 24	22.7	23.8	27.7	25.7
24 or more	9.7	43.1	21.0	26.1
Gender dominance of major field of study, highest degree/certificate[4]				
Male	5.5	20.7	32.7	41.2
Female	29.7	26.7	24.9	18.8
Gender neutral	19.2	23.3	27.5	30.0

Table 16--Percentage distribution of 1980 female high school sophomores working consistently[1] with bachelor's degrees as highest degree, according to annual earnings in constant 1992 dollars for the last full year of employment after attainment, by selected characteristics--Continued

	Annual earnings in constant 1992 dollars for last full year of employment after highest degree attainment			
	Less than $20,250[1]	$20,250-$25,999	$26,000-$31,999	$32,000 or more[2]
Undergraduate grade point average				
Less than 2.50	25.9	31.0	25.5	17.7
2.50-3.50	21.0	24.4	29.2	25.4
Greater than 3.50	24.9	13.1	22.5	39.5

--Sample size is too small for a reliable estimate.

[1]Consistent employment was defined as working 91.67 percent of the total months in the labor force after highest degree attainment to the end of the data collection period.
[2]Total is not within the range of some of the subgroup estimates due to the number of observations with missing values within the subgroups.
[3]On a 100 point scale.
[4]A program is gender dominant if 65 percent or more of the graduates were of the same sex.

NOTE: Percentages may not sum to 100 percent due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School & Beyond: Sophomore Cohort 1980-1992 (HS&B:92), Data Analysis System.

FACTORS ASSOCIATED WITH EARNINGS IN THE TOP CATEGORY AFTER CONTROLLING FOR BACKGROUND VARIATION

Crosstabulations have limitations when used with survey data. Sample size restricts the number of cells into which the data can be usefully subdivided. In many instances, complex interrelationships exist among variables that cannot be disentangled in tabular analysis. To overcome the limitations of crosstabulations, a linear regression model was used to take into account the effects of all variables in the model simultaneously and control for interrelationships among variables that could influence findings in the crosstabulations, yielding adjusted means.[35] By estimating the joint effect of all variables taken together, the regression model was used to test individual parameters while holding the influence of other variables constant. Because of the interrelationships between variables, it was of interest to learn if differences were still found with the use of a linear model.

WORKERS WITH HIGH SCHOOL DIPLOMAS OR GEDS

Male workers

Table 17 shows the adjusted percentages of male consistent workers with high school diplomas or GEDs by 1992 who achieved the top earnings category, taking into account other characteristics. The unadjusted means are included for comparison.

After the other variables in the model were taken into consideration, some findings remained consistent with the tabular analysis. Male workers who were married by 1992 were still more likely to have earnings of $31,000 or more than males who were no longer married by 1992. The regression also confirmed that Hispanic men were less likely to achieve earnings in the highest earnings category in the last year reported compared to white, non-Hispanic male workers with no more than a high school diploma or GED.

[35] Appendix B contains a description of the means adjustment method.

Table 17--Percentage of 1980 male high school sophomores working consistently[1] with high school diplomas or GEDs as highest degree who were in the highest earnings quartile during the last full year of employment after attainment, and the adjusted percentage after taking into account the covariation of the variables listed[2]

	Unadjusted Percentage[3]	Adjusted percentage[4]	WLS coefficient[5]	Standard error[6]
Total	25.7	25.7	53.1	2.7
Family socioeconomic status, 1980				
Lowest third	21.3	20.7	+	+
Middle third	26.0	25.9	5.2	3.8
Highest third	31.5	29.5 *	8.8	4.0
Race/ethnicity				
White, non-Hispanic	27.4	26.7	+	+
Black, non-Hispanic	22.7	22.3	-4.4	6.0
Hispanic	14.3 *	15.0 *	-11.7	4.8
Grades in high school[7]				
90-100	--	--	+	+
80-89	26.1	25.3	-31.7	21.2
Less than 80	25.5	25.0	-32.0	20.9
Number of children, June 1992				
None	25.3	23.4	+	+
One or more	26.2	27.1	3.7	3.9
Marital status, June 1992				
Married	27.5	26.6	+	+
No longer married	9.0 *	8.8 *	-17.8	5.0
Never married	26.9	27.6	1.0	4.1
Postsecondary education experience, non-attainers				
No postsecondary education	24.8	25.0	+	+
Some postsecondary education	27.6	25.7	0.7	3.4

--Sample size is too small for a reliable estimate.
* p<=.05 comparing to the reference group, indicated by +.
\+ Not available for reference group.

[1]Consistent employment was defined as working 91.67 percent of the total months in the labor force after highest degree attainment to the end of the data collection period.
[2]The group in italics is the reference group for comparison.
[3]Estimates from HS&B:92 Data Analysis System.
[4]Percentages adjusted for differences associated with other variables in the table (see appendix B for details).
[5]Weighted least squares (WLS) coefficient (see appendix B for details) multiplied by 100 for conversion to a percentage.
[6]Standard error of WLS coefficient, adjusted for design effect (see appendix B for details) multiplied by 100 for conversion to a percentage.
[7]On a 100 point scale.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School & Beyond: Sophomore Cohort 1980-1992 (HS&B:92), Data Analysis System.

One result did change. After the means were adjusted, males whose 1980 family socioeconomic status was in the highest third were more likely to have an income in the top earnings quartile when compared to those whose family was in the lowest socioeconomic group. In the crosstabulation, the respondent's family SES was not associated with earnings differences.

Female workers

Table 18 shows the adjusted percentages of consistent female workers with high school diplomas or GEDs by 1992 who had earnings in the top quartile. The linear regression yields different results from those reported in the crosstabulation. First, the adjusted results indicate that pursuing a postsecondary education without obtaining a degree or certificate did not change the probability that female workers would be in the top earnings quartile compared to those with no postsecondary experience. In the crosstabulation, these women were more likely to have incomes in the highest quartile.

Second, the linear regression revealed a relationship between grades in high school and the probability that female high school graduates would have incomes in the top quartile. The adjusted results suggest that workers with high school grades below 80 were less likely to achieve earnings in the top quartile than workers with high school grades of 90 to 100. Again, a significant relationship between grades and earnings was not found in the crosstabulation.

Third, the crosstabular analysis did not show any difference in the probability of earning in the highest quartile by family SES. However, after adjusting the means, the linear regression revealed that women in the lowest third of family SES were less likely to achieve earnings in the top category than those in the top third.

Table 18--Percentage of 1980 female high school sophomores working consistently[1] with high school diplomas or GEDs as highest degree who were in the highest earnings quartile during the last full year of employment after attainment, and the adjusted percentage after taking into account the covariation of the variables listed[2]

	Unadjusted percentage[3]	Adjusted percentage[4]	WLS coefficient[5]	Standard error[6]
Total	24.7	24.7	40.5	3.6
Family socioeconomic status, 1980				
Lowest third	19.7	20.2	+	+
Middle third	24.7	24.4	4.2	4.1
Highest third	32.2	31.0 *	10.8	5.4
Race/ethnicity				
White, non-Hispanic	25.3	24.7	+	+
Black, non-Hispanic	22.5	21.6	-3.1	6.9
Hispanic	28.7	32.4	7.7	8.2
Grades in high school[7]				
90-100	--	--	+	+
80-89	27.7	27.3	-18.3	12.1
Less than 80	22.1	22.0 *	-23.7	12.1
Number of children, June 1992				
None	28.6	27.1	+	+
One or more	21.2	22.2	-4.8	4.2
Marital status, June 1992				
Married	22.4	23.1	+	+
No longer married	22.1	21.6	-1.5	6.5
Never married	31.7	28.8	5.7	4.9
Postsecondary education experience, non-attainers				
No postsecondary education	21.1	22.7	+	+
Some postsecondary education	29.5 *	27.0	4.4	4.0

--Sample size is too small for a reliable estimate.
* p<=.05 comparing to the reference group, indicated by +.
\+ Not available for reference group.

[1]Consistent employment was defined as working 91.67 percent of the total months in the labor force after highest degree attainment to the end of the data collection period.
[2]The group in italics is the reference group for comparison.
[3]Estimates from HS&B:92 Data Analysis System.
[4]Percentages adjusted for differences associated with other variables in the table (see appendix B for details).
[5]Weighted least squares (WLS) coefficient (see appendix B for details) multiplied by 100 for conversion to a percentage.
[6]Standard error of WLS coefficient, adjusted for design effect (see appendix B for details) multiplied by 100 for conversion to a percentage.
[7]On a 100 point scale.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School & Beyond: Sophomore Cohort 1980-1992 (HS&B:92), Data Analysis System.

WORKERS WITH BACHELOR'S DEGREES

Male workers

Table 19 displays the adjusted percentages of male consistent workers with bachelor's degrees by 1992 who achieved the top earnings category, taking into account other characteristics. After adjusting the means, high school grades were still related to earnings. Male workers who had high school grades of 90 to 100 had a higher probability of having earnings in the top quartile compared to those with lower high school grades. Also, the linear regression revealed that male workers who received a bachelor's degree and were never married were less likely to achieve earnings in the top category than those who were married. This finding was not significant in the tabular analysis.

Female workers

Table 20 shows the adjusted percentages of female workers with bachelor's degrees by 1992 who achieved the top earnings category, taking into account other characteristics. The linear regression for these individuals confirmed the finding from the crosstabulation analysis that high school grades were a predictor of high earnings for female workers who received bachelor's degrees. Also, the linear regression revealed that obtaining a bachelor's degree in a male dominated major rather than a female dominated or gender-neutral major was a predictor of earning a high income.

Table 19--Percentage of 1980 male high school sophomores working consistently[1] with bachelor's degrees as highest degree who were in the highest earnings quartile during the last full year of employment after attainment, and the adjusted percentage after taking into account the covariation of the variables listed[2]

	Unadjusted percentage[3,8]	Adjusted percentage[4]	WLS coefficient[5]	Standard error[6]
Total	25.5	25.5	57.0	2.3
Family socioeconomic status, 1980				
Lowest third	17.6	19.3	+	+
Middle third	26.6	26.2	6.9	7.6
Highest third	28.5	26.2	6.9	7.1
Race/ethnicity				
White, non-Hispanic	25.8	23.9	+	+
Black, non-Hispanic	21.2	26.8	2.9	8.3
Hispanic	48.3	46.9	23.0	12.5
Grades in high school[7]				
90-100	50.6	47.5	+	+
80-89	30.2	28.8 *	-18.7	8.2
Less than 80	13.4 *	14.1 *	-33.4	9.2
Number of children, June 1992				
None	26.6	26.4	+	+
One or more	26.5	22.5	-3.9	5.8
Marital status, June 1992				
Married	29.7	29.3	+	+
Never married	23.3	20.8 *	-8.5	4.3
Age received highest degree				
Less than 24	28.3	26.4	+	+
24 or older	18.5	9.8 *	-16.6	7.6
Gender dominance of major field of study, highest degree/certificate[9]				
Male	33.6	32.0	+	+
Female	21.2	23.3	-8.8	6.5
Gender neutral	22.5	22.4	-9.6	5.0

Table 19--Percentage of 1980 male high school sophomores working consistently[1] with bachelor's degrees as highest degree who were in the highest earnings quartile during the last full year of employment after attainment, and the adjusted percentage after taking into account the covariation of the variables listed[2]--Continued

	Unadjusted percentage[3,8]	Adjusted percentage[4]	WLS coefficient[5]	Standard error[6]
Undergraduate grade point average				
Less than 2.50	24.0	29.4	+	+
2.50-3.50	25.7	22.1	-7.3	4.6
Greater than 3.50	48.6	42.1	12.7	8.3

--Sample size is too small for a reliable estimate.
* p<=.05 comparing to the reference group, indicated by +.
\+ Not available for reference group.

[1]Consistent employment was defined as working 91.67 percent of the total months in the labor force after highest degree attainment to the end of the data collection period.
[2]The group in italics is the reference group for comparison.
[3]Estimates from HS&B:92 Data Analysis System.
[4]Percentages adjusted for differences associated with other variables in the table (see appendix B for details).
[5]Weighted least squares (WLS) coefficient (see appendix B for details) multiplied by 100 for conversion to a percentage.
[6]Standard error of WLS coefficient, adjusted for design effect (see appendix B for details) multiplied by 100 for conversion to a percentage.
[7]On a 100 point scale.
[8]Total is not within the range of some of the subgroup estimates due to the number of observations with missing values within the subgroups.
[9]A program is gender dominant if 65 percent or more of the graduates were of the same sex.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School & Beyond: Sophomore Cohort 1980-1992 (HS&B:92), Data Analysis System.

Table 20--Percentage of 1980 female high school sophomores working consistently[1] with bachelor's degrees as highest degree who were in the highest earnings quartile during the last full year of employment after attainment, and the adjusted percentage after taking into account the covariation of the variables listed[2]

	Unadjusted percentage[3,8]	Adjusted percentage[4]	WLS coefficient[5]	Standard error[6]
Total	25.5	25.5	50.1	2.0
Family socioeconomic status, 1980				
Lowest third	18.5	21.6	+	+
Middle third	23.8	24.3	2.7	6.7
Highest third	28.2	26.8	5.2	6.8
Race/ethnicity				
White, non-Hispanic	25.7	25.1	+	+
Black, non-Hispanic	25.7	24.9	-0.3	7.5
Hispanic	32.9	31.7	6.6	6.6
Grades in high school[7]				
90-100	39.2	38.8	+	+
80-89	26.1	25.6 *	-13.2	5.5
Less than 80	15.0 *	16.3 *	-22.5	6.9
Number of children, June 1992				
None	26.4	26.3	+	+
One or more	23.4	22.7	-3.5	5.0
Marital status, June 1992				
Married	25.9	26.7	+	+
Never married	25.8	24.6	-2.1	4.2
Age received highest degree				
Less than 24	25.7	25.4	+	+
24 or older	26.1	31.4	6.1	11.6
Gender dominance of major field of study, highest degree/certificate[9]				
Male	41.2	42.7	+	+
Female	18.8	20.3 *	-22.4	7.0
Gender neutral	30.0	26.6 *	-16.1	6.6

Table 20--Percentage of 1980 female high school sophomores working consistently[1] with bachelor's degrees as highest degree who were in the highest earnings quartile during the last full year of employment after attainment, and the adjusted percentage after taking into account the covariation of the variables listed[2]--Continued

	Unadjusted percentage[3,8]	Adjusted percentage[4]	WLS coefficient[5]	Standard error[6]
Undergraduate grade point average				
Less than 2.50	17.7	22.1	+	+
2.50-3.50	25.4	25.3	3.1	4.8
Greater than 3.50	39.5	31.7	9.6	6.8

--Sample size is too small for a reliable estimate.
* p<=.05 comparing to the reference group, indicated by +.
\+ Not available for reference group.

[1]Consistent employment was defined as working 91.67 percent of the total months in the labor force after highest degree attainment to the end of the data collection period.
[2]The group in italics is the reference group for comparison.
[3]Estimates from HS&B:92 Data Analysis System.
[4]Percentages adjusted for differences associated with other variables in the table (see appendix B for details).
[5]Weighted least squares (WLS) coefficient (see appendix B for details) multiplied by 100 for conversion to a percentage.
[6]Standard error of WLS coefficient, adjusted for design effect (see appendix B for details) multiplied by 100 for conversion to a percentage.
[7]On a 100 point scale.
[8]Total is not within the range of some of the subgroup estimates due to the number of observations with missing values within the subgroups.
[9]A program is gender dominant if 65 percent or more of the graduates were of the same sex.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School & Beyond: Sophomore Cohort 1980-1992 (HS&B), Data Analysis System.

SUMMARY AND IMPLICATIONS

Over the past several decades, an increasing number of women have pursued postsecondary education. Women now exceed men in the rate of completion at most levels of postsecondary education. At the same time, women are increasingly likely to work out of the home, while they continue to earn less than men. Several theories have been put forth to explain this income discrepancy. This report considered two of these possibilities. First, the disparity between the incomes of men and women may have been due to the interruption of women's careers for family reasons such as caring for children or following a transferred husband. Second, women may have obtained training and education to prepare for occupations traditionally held by females that paid less than occupations pursued by men.

Women were less likely than men to work consistently after leaving school. Further, both men and women with less education were less likely to work consistently than those with higher levels of education. Nine percent of the female and 37 percent of the male high school dropouts worked consistently compared to 50 percent of both males and females who earned bachelor's degrees.

Family formation was another factor that was associated with work consistency. Compared to having no children, the effect of having two or more children was that women were less likely to work consistently and men were more likely. Several possible explanations exist as to why women with two or more children were less likely to be work consistently than their childless counterparts. First, women with children may have found it more difficult to hold down a job consistently than those without children. Second, the costs associated with daycare may have reduced the value of work, especially for women with lower income potential. In 1986, poor women had to utilize 25 percent of their earnings for childcare, while women in households that were not poor utilized 6 percent.[36] Thus, work may not have made economic sense for low-income women who had to pay for childcare.

Earnings information was limited to respondents who worked consistently after they left school; therefore, earnings differences reported were not due to women working fewer years after

[36] U. S. Department of Labor, Women's Bureau. *1993 Handbook on Women Workers: Trends and Issues.* (Washington, D.C.: author, 1993), p. 13.

leaving school or leaving the labor market for extended lengths of time. The prevailing finding was that men either earned more or did not have significantly different incomes when compared to women. In no case did women enjoy an earnings advantage over men. Although education improved earnings for both men and women, it did not eliminate the income gap. Differences in earnings were apparent between men and women even when education level was controlled. Further, controlling for gender dominance of major field of study did not explain the difference in earnings between men and women completely.

Although more women earned bachelor's degrees than men, and consistent female workers spent more time in the labor market after graduation than their male counterparts, in each category of gender dominance of field of study, incomes of men with a bachelor's degree were higher than women's in the last year. Thus, the increased success of women in higher education and the commitment to their jobs after graduation has not been rewarded with the same income as men.

Several data limitations may have affected the results. First, the inability to determine if a person was working part- or full-time may have influenced the results. As reported, among consistent workers, women were slightly more likely than men to have had annual earnings below $8,000 in the last year of work (this was used as an indicator of working part-time). However, the difference was not large enough to explain the income differences noted between men and women. Also, type of job was not classified in the data. Men and women with the same majors may have taken different types of jobs. This job type difference could have contributed to the earnings discrepancies between men and women.

Other factors beyond those considered in this report may also have helped cause the earnings discrepancies between males and females. Among factors that might explain the differential between men's and women's earnings are employment choices made by women and socialized differences between men and women. First, women may be more likely than men to accept a less demanding, lower paying position early in their career. A woman may make early career choices because she expects to require time to be the primary caretaker for children. Second, from birth, girls and boys are socialized differently. Girls are expected to be passive and less aggressive than boys. Socialized differences are carried through life into the work place. Aggressiveness in business is usually seen

as an asset, and these socialized characteristics may help men achieve higher positions and incomes than women.[37]

[37] B. Deckard. *The Women's Movement: Political, Socioeconomic and Psychological Issues.* (New York: Harper & Row, 1983), p. 87.

APPENDIX A: GLOSSARY

This glossary describes the variables used in this report. The variables were taken directly from the NCES HS&B:92 Data Analysis System (DAS). This is an NCES software application that generates tables from the HS&B data. A description of the DAS software can be found in appendix B. The labels in parentheses correspond to the names of the variables in the DAS.

Age at degree attainment **AGE**

Respondent's age upon completion of highest degree.

Annual earnings during the first full calendar year reported **STRT_PAY**

For consistent workers, annual earnings during the first full calendar year of employment after completion of highest degree. Years included were 1983 to 1991. The earnings were corrected to 1992 constant dollars. Consistent employment was defined as working at least 91.67 percent of the total months in the labor force after attaining the highest level of education, or 11 out of 12 months for each year in the labor force.

Annual earnings during the last full calendar year reported **END_PAY**

For consistent workers, annual earnings during the last full calendar year the respondent was working, up to and including 1991. The earnings were corrected to 1992 constant dollars. Consistent employment was defined as working at least 91.67 percent of the total months in the labor force after attaining the highest level of education, or 11 out of 12 months for each year in the labor force.

Continuously enrolled in postsecondary education, degree/certificate attainers **BREAK_ED**

For respondents completing a postsecondary certificate or degree, whether there was a break in their postsecondary education of greater than six months.

Break in postsecondary education
No break in postsecondary education

Employment consistency **CONS_EMP**

Consistent employment, or whether the respondent was employed 91.67 percent of the time, from completion of highest degree until June 1992.

Consistently employed
Not consistently employed

Family income, 1991 **Y4601C**

Total household income, before income taxes, in 1991 (in 1991 dollars).

Family socioeconomic status, 1980 **PBYSES**

Percentile ranking of respondent's base year socioeconomic status. Socioeconomic status was based on father's occupation, father's education, mother's education, family income, and material possessions of the household.

Gender **SEX**

Male
Female

Gender dominance of major field of study, highest degree or certificate **PGM_GNDR**

Dominant gender associated with a student's major field of study for the highest degree or certificate received. A program was male or female dominated if 65 percent or more of the awards were made to males or females, respectively. A program was gender-neutral if neither men nor women comprised 65 percent of the award recipients.

Male	Sixty-five percent or more of the graduates in a major field of study were male.
Female	Sixty-five percent or more of the graduates in a major field of study were female.
Gender-neutral	Neither males nor females comprise 65 percent of the graduates in a major field of study.

The following were determined to be male dominated certificate and associate's degree programs:

Agribusiness, production
Agriculture, animal, plant science

Air transportation
Automobile, air mechanics
Chemical engineering
Civil, ocean engineering
Communication technology
Construction, industrial art
Drama, speech
Electrical, communication engineer
Electronic mechanics and repairs
Engineering, science technologies
Environmental science
Film arts
Fine art, art history
Forestry, forest production
Integrated, general science
Mechanical engineering
Music
Natural resource conservation
Other engineering
Other mechanics
Other transportation
Precision production
Protective service

The following were determined to be female dominated certificate and associate's degree programs:

Accounting
Allied health, general
Architect, environmental design
Area studies
Business administration, management
Childcare, guidance
Clinical health sciences
Community, mental health
Cosmetology
Data processing
Dental, medical technician
Dentistry
Early childhood education
Elementary education
English, American literature
Finance
Health, hospital administration
Home economics, other
Law
Letters
Liberal studies
Library, archival science
Marketing, distribution
Medicine
Nursing
Nutrition, food science
Other business support
Other consumer services
Other education
Other ethnic studies
Other health sciences
Paralegal, pre-law
Physical, health education
Practical nursing
Psychology
Public health
Secondary, junior high education
Secretarial, clerical
Special education
Speech pathology, audiology
Textiles, fashion
Veterinary medicine
Vocational home economics
Writing, creative and technical

The following were determined to be gender-neutral certificate and associate's degree programs:

American, civil studies
Anthropology, archaeology
Basic, personal skills
Biochemistry, biophysics
Biopsychology
Botany
Chemistry
Communications

Computer programming, information science
Economics
Foreign languages
Geography
Geology, earth science
Graphic design, printing
History
Interdisciplinary studies
International relations
Journalism, broadcasting
Mathematics
Operations research
Other biology sciences
Other physical sciences
Philosophy
Physics
Political science
Public administration
Recreation, sports
Religious studies
Social work
Sociology, demography, criminology
Statistics, biostatistics
Theology
Zoology

The following were determined to be male dominated bachelor's and post baccalaureate programs:

Agribusiness, production
Agriculture, animal, plant science
Air transportation
Automobile, air mechanics
Chemical engineering
Civil, ocean engineering
Construction, industrial art
Economics
Electrical, communications engineer
Electronic mechanics and repair
Engineering, science technologies
Environmental science
Forestry, forest production
Geography
Geology, earth science
Law
Mechanical engineering
Natural resource conservation
Operations research
Other consumer services
Other engineering
Other mechanics
Other physical sciences
Other transportation
Philosophy
Physics
Theology

The following were determined to be female dominated bachelor's and post baccalaureate programs:

Allied health, general
Childcare, guidance
Clinical health sciences
Communications
Community, mental health
Dental, medical technician
Dentistry
Early childhood education
Elementary education
Fine art, art history
Foreign languages
Health, hospital administration
Home economics
Letters
Library, archival science
Nursing
Nutrition, food science
Other business support

Other education
Other health sciences
Physical, health education
Political science
Practical nursing
Psychology
Secondary, junior high education
Secretarial, clerical
Social work
Sociology, demography, criminology
Special education
Speech pathology, audiology
Textiles, fashion
Vocational home economics

The following were determined to be gender-neutral bachelor's and post baccalaureate programs:

Accounting
American, civil studies
Anthropology, archaeology
Architect, environmental design
Area studies
Basic, personal skills
Biochemistry, biophysics
Biopsychology
Botany
Business administration, management
Chemistry
Communications technology
Computer programming
Computer, information science
Cosmetology
Data processing
Drama, speech
English, American literature
Film arts
Finance
Graphic design
Graphics, printing
History
Integrated, general science
Interdisciplinary studies
International relations
Journalism, broadcasting
Liberal studies
Marketing, distribution
Mathematics
Medicine
Music
Other biology sciences
Other ethnic studies
Paralegal, pre-law
Precision production
Protective services
Public administration
Public health
Recreation, sports
Religious studies
Statistics, biostatistics
Veterinary medicine
Writing, creative and technical
Zoology

Grade point average **GPA**

Respondent's grade point average in postsecondary education.

Highest degree the respondent received by June 1992 **HIGH_DEG**

No diploma/degree
GED/certificate
High school graduate

Certificate
Associate's degree
Bachelor's degree
Master's degree
Professional degree
Doctoral degree

High school grades **HSGRADES**

High school grades on a 100 point scale, combined from 1980 survey, 1982 follow-up survey and high school transcripts.

Mostly A's	Numerical average of 90-100.
About half A's and half B's	Numerical average of 85-89.
Mostly B's	Numerical average of 80-84.
About half B's and half C's	Numerical average of 75-79.
Mostly C's	Numerical average of 70-74.
About half C's and half B's	Numerical average of 65-69.
Mostly D's	Numerical average of 60-64.
Mostly below D	Numerical average below 60.

Marital status, June 1992 **MARST92**

Married	Respondent was married or in a marriage-like relationship as of June 1992.
No longer married	Respondent was separated, divorced or widowed as of June 1992.
Never married	Respondent was never married as of June 1992.

No degree, attending some postsecondary education, what degree attempted **PSE_ATMT**

Postsecondary degree attempted, but no degree obtained

No degree
Certificate
Associate's degree
Bachelor's degree
Master's degree
Professional degree
Doctoral degree

Number of children, June 1992 **Y4402**

Number of children respondent has, living in or out of the household.

Number of months employed **NUMMNTHS**

Number of months the respondent was employed out of the number of months he or she was in the labor force.

Number of months the respondent was enrolled in postsecondary education **SCH_MNTH**

The number of months a respondent was enrolled in postsecondary education between July 1982 and June 1992, degree or certificate completers.

Number of years in the labor force **LABOR_YR**

Number of years a respondent was eligible to be included in the labor force.

Percentile ranking of the change in starting and ending pay **RANK_CHG**

Percentile ranking of the respondent's change in annual earnings from the first full year of employment after completion of highest level of education to the last full year reported. A ranking was completed for each highest degree earned category. This variable was created for consistent workers.

Personal income, 1991 **Y4301B9**

Respondent's annual earnings in 1991 (in 1991 dollars).

Postsecondary education experience, non-attainers **SOME_PSE**

For respondents with a high school diploma or GED as highest degree attained, whether they were enrolled in any postsecondary education between July 1982 and June 1992.

Enrolled in postsecondary education
Did not enroll in postsecondary education

Race/ethnicity **RACE4**

American Indian/Alaskan Native	A person having origins in any of the original peoples of North America and who maintains cultural identification through tribal affiliation or community recognition.
Asian/Pacific Islander	A person having origins in any of the Asian or Pacific Islander original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or Pacific Islands. This included people from China, Japan, Korea, the Philippine Islands, Samoa, India and Vietnam.
Black, non-Hispanic	A person having origins in any of the black racial groups of Africa, and not of Hispanic origin.
Hispanic	A person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race.
White, non-Hispanic	A person having origins in any of the original peoples of Europe, North Africa, or the Middle East (except those of Hispanic origin).

Worked while attending school **SCH_WRK**

The percent of months a respondent was enrolled in postsecondary education and worked.

0-33 percent	The respondent worked between zero and 33 percent of the time attended postsecondary education.
34-66 percent	The respondent worked between 34 and 66 percent of the time attended postsecondary education.
67-100 percent	The respondent worked between 67 and 100 percent of the time attended postsecondary education.

APPENDIX B: TECHNICAL NOTES

The High School and Beyond Fourth Follow-up

The High School and Beyond (HS&B) survey began in the spring of 1980 with the collection of base year questionnaire and test data on over 58,000 high school seniors and sophomores. The first follow-up survey was conducted in the spring of 1982, the second follow-up in the spring of 1984, the third follow-up in the spring of 1986, and the fourth follow-up in the spring of 1992.

The HS&B Fourth Follow-up Survey was the fifth wave of the longitudinal study, but unlike previous rounds, the fourth follow-up focused exclusively on the sophomore class. The Fourth Follow-up included two components: a respondent survey which sampled 14,825 members of the 1980 sophomore cohort, and a transcript study based on the 9,064 sophomore cohort members who reported postsecondary attendance. The goals of the fourth follow-up were to obtain information on issues of access to and choice of undergraduate and graduate educational institutions, persistence in fulfilling educational goals and progress through the curriculum, rates of graduation and of other educational outcomes, and labor market outcomes in relation to level of education obtained and labor market experiences.

Sample design

In 1980, the base year, students were selected using a two-stage, stratified probability sample design with schools as the first-stage units and students within schools as the second-stage units.[38] The total number of schools selected for the sample was 1,122, from a frame of 24,725 schools with grades 10 or 12 or both. Within each stratum, schools were selected with probabilities proportional to the estimated enrollment in their 10th and 12th grades. Within each school, 36 seniors and 36 sophomores were randomly selected. In those schools with fewer than 36 seniors or 36 sophomores, all eligible students were drawn in the sample.

The first follow-up sophomore and senior cohort samples were based on the HS&B base year samples, retaining the essential features of a stratified multi-stage design (for further details see

[38]For further details on the base year sample design see M. Frankel, L. Kohnke, D. Buonanno, & R. Tourangeau. *High School and Beyond Sample Design Report* (Chicago: National Opinion Research Center, 1981).

Tourangeau et al., 1983).[39] Subsequent to the first follow-up survey, high school transcripts were sought for a probability subsample of nearly 18,500 members of the 1980 sophomore cohort. The subsampling plan for the Transcript Study emphasized the retention of members of subgroups of special relevance for education policy analysis. Compared to the base year and first follow-up surveys, the Transcript Study sample design further increased the over-representation of racial and ethnic minorities (especially those with above average HS&B achievement test scores), students who attended private high schools, school dropouts, transfers and early graduates, and students whose parents participated in the base year Parent's Survey on financing postsecondary education.

The samples of the 1980 sophomore cohort for the second and third follow-up surveys were based upon the transcript study design. A total of 14,825 cases were selected from among the 18,500 retained for the transcript study. As was the case for the transcript sample, the sophomore cohort second and third follow-up samples included disproportionate numbers of sample members from policy-relevant subpopulations (e.g., racial and ethnic minorities, students from private high schools, high school dropouts, students who planned to pursue some type of postsecondary schooling, and so on).[40] The members of the senior cohort selected into the second follow-up sample consisted exactly of those selected into the first follow-up sample. The third follow-up was the last one conducted for the senior cohort.

The fourth follow-up was composed solely of members from the sophomore cohort. The members of the sophomore cohort selected into the fourth follow-up sample consisted exactly of those selected into the second and third follow-up sample. For any student who ever enrolled in postsecondary education, complete transcript information was requested from the institutions indicated by the student.

Sample weights

The general purpose of weighting was to compensate for the unequal probability of selection into the sample, and to adjust for respondent nonresponse to the survey. The weights were based on the inverse of the selection probabilities at each stage of the sample selection process and on nonresponse adjustment factors computed within weighting cells. The fourth follow-up had two major components, the collection of survey data and the collection of postsecondary transcript data. Nonresponse occurred during both of these data collection phases. Weights were computed to

[39] R. Tourangeau, H. McWilliams, C. Jones, M. Frankel, & F. O'Brien. *High School and Beyond First Follow-Up (1982) Sample Design Report* (Chicago: National Opinion Research Center, 1983).
[40] C. Jones & B. D. Spencer. *High School and Beyond Second Follow-Up (1984) Sample Design Report* (Chicago: National Opinion Research Center 1985), tables 2.4-1 through 2.4-4.

account for nonresponse during either phase. For the survey data, two weights were computed. The first weight (FU4WT) was computed for all fourth follow-up respondents. The second weight (PANEL5WT) was computed for all fourth follow-up respondents who also participated in the base year and first, second and third follow-up surveys. For more information about the design and implementation of the survey weights, see the High School and Beyond Fourth Follow-up Methodology Report.[41]

Accuracy of Estimates

The estimates in this report were derived from samples and were subject to two broad classes of error--sampling and nonsampling error. Sampling errors occurred because the data were collected from a sample of a population rather than from the entire population. Estimates based on a sample differ somewhat from the values that would have been obtained from a universe survey using the same instruments, instructions, and procedures. Nonsampling errors come from a variety of sources and affect universe surveys as well as sample surveys. Examples of sources of nonsampling error include design, reporting, and processing errors and errors due to nonresponse. The effects of nonsampling errors are more difficult to evaluate than those resulting from sampling variability. As much as possible, procedures were built into surveys in order to minimize nonsampling errors.

The standard error is a measure of the variability due to sampling when estimating a parameter. It indicates how much variance there is in the population of possible estimates of a parameter for a given sample size. Standard errors can be used as a measure of the precision expected from a particular sample. The probability that a complete census parameter would differ from the sample estimate by less than the standard error is about 68 out of 100. The chances that the difference would be less than 1.65 times the standard error are about 90 out of 100; that the difference would be less than 1.96 times the standard error, about 95 out of 100. Table B2 displays standard errors for table B1.

[41] D. Zahs, S. Pedlow, M. Morrissey, P. Marnell, & B. Nichols. *The High School and Beyond Fourth Follow-Up Methodology Report* (Washington, D.C.: U.S. Department of Education, National Center for Education Statistics, 1994), section 3.

Table B1--Percentage distribution of 1980 high school sophomore women and men according to work consistency[1], by selected characteristics

	Men		Women	
	Inconsistent workers	Consistent workers	Inconsistent workers	Consistent workers
Total	67.2	32.8	54.3	45.7
Family socioeconomic status, 1980				
Lowest third	74.5	25.5	58.4	41.6
Middle third	62.6	37.4	49.5	50.5
Highest third	61.4	38.6	54.6	45.4
Race/ethnicity				
American Indian/Alaskan Native	73.2	26.8	67.1	32.9
Asian/Pacific Islander	60.0	40.0	63.3	36.7
Black, non-Hispanic	78.5	21.5	67.0	33.0
White, non-Hispanic	64.6	35.4	51.6	48.4
Hispanic	73.9	26.1	56.0	44.0
Total household income before taxes, 1991				
Less than $10,000	82.7	17.3	77.1	22.9
$10,000-19,999	80.8	19.2	69.0	31.1
$20,000-29,999	67.2	32.8	53.4	46.6
$30,000-39,999	66.4	33.6	45.5	54.5
$40,000-49,999	54.4	45.6	43.3	56.7
$50,000 or more	53.6	46.4	42.7	57.3
Personal annual earnings, 1991				
Less than $10,000	88.2	11.8	82.2	17.8
$10,000-19,999	61.6	38.4	58.2	41.8
$20,000-29,999	46.0	54.0	47.9	52.1
$30,000-39,999	48.8	51.2	41.6	58.4
$40,000-49,999	39.0	61.0	37.5	62.5
$50,000 or more	58.9	41.1	40.8	59.2
Grades in high school[2]				
90-100	63.3	36.7	60.8	39.2
80-89	60.7	39.3	49.1	50.9
Less than 80	72.1	27.9	56.1	43.9
Marital status, June 1992				
Married	66.7	33.3	45.9	54.1
Never married	64.0	36.0	61.4	38.6
No longer married	73.7	26.3	51.1	48.9
Number of children, June 1992				
None	54.9	45.1	56.4	43.6
One	64.7	35.3	51.3	48.7
Two or more	82.9	17.1	50.3	49.7

Table B1--Percentage distribution of 1980 high school sophomore women and men according to work consistency[1], by selected characteristics--Continued

	Men		Women	
	Inconsistent workers	Consistent workers	Inconsistent workers	Consistent workers
Highest degree the respondent received				
No diploma/degree	91.5	8.5	63.5	36.5
GED/Certificate	89.8	10.2	63.6	36.4
High school diploma	70.0	30.0	52.3	47.7
Certificate	61.9	38.1	53.2	46.8
Associate's degree	59.1	40.9	49.1	50.9
Bachelor's degree	50.4	49.6	50.1	49.9
Graduate degree	88.2	11.8	84.7	15.3
Enrolled in any postsecondary education, non-attainers				
No postsecondary education	76.6	23.4	53.6	46.4
Some postsecondary education	69.6	30.4	57.8	42.2
Degree/certificate attempted, non-attainers				
None	56.8	43.2	68.4	31.6
Certificate	73.2	26.8	53.7	46.3
Associate's degree	64.4	35.6	51.2	48.8
Bachelor's degree	75.3	24.7	61.0	39.1
Graduate degree	--	--	--	--
Age received highest degree, degree/certificate attainers				
Less than 24	50.5	49.5	45.1	54.9
24 or older	94.8	5.2	90.4	9.6
Gender dominance of major field of study, highest degree/certificate[3]				
Male	42.4	57.6	48.8	51.2
Female	54.7	45.3	47.9	52.1
Gender neutral	52.7	47.3	49.7	50.3
Continuously enrolled in postsecondary education, degree/certificate attainers				
Continuously enrolled	58.2	41.9	53.7	46.4
Not continuously enrolled	39.9	60.1	--	--
Undergraduate grade point average, postsecondary degree/certificate attainers				
Less than 2.50	67.4	32.6	55.5	44.5
2.50-3.50	58.0	42.0	55.4	44.6
Greater than 3.50	62.0	38.0	51.4	48.6
Number of months enrolled in postsecondary education, degree/certificate attainers				
Less than 24	70.4	29.6	54.9	45.1
24 or more	67.1	32.9	61.3	38.7

Table B1--Percentage distribution of 1980 high school sophomore women and men according to work consistency[1], by selected characteristics--Continued

	Men		Women	
	Inconsistent workers	Consistent workers	Inconsistent workers	Consistent workers
Percent of months working while enrolled, degree/certificate attainers				
None	82.2	17.8	79.4	20.6
1-33%	69.2	30.8	68.7	31.3
34-66%	71.6	28.4	67.8	32.2
67-100%	50.9	49.1	43.8	56.2

--Sample size is too small for a reliable estimate.

[1]Consistent employment was defined as working 91.67 percent of the total months in the labor force after highest degree attainment to the end of the data collection period.
[2]On a 100 point scale.
[3]A program is gender dominant if 65 percent or more of the graduates were of the same sex.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School & Beyond: Sophomore Cohort 1980-1992 (HS&B:92), Data Analysis System.

Table B2--Standard errors for Table B1: Percentage distribution of 1980 high school sophomore women and men according to work consistency[1], by selected characteristics

	Men		Women	
	Inconsistent workers	Consistent workers	Inconsistent workers	Consistent workers
Total	0.83	0.83	0.93	0.93
Family socioeconomic status, 1980				
Lowest third	1.33	1.33	1.81	1.81
Middle third	1.33	1.33	1.65	1.65
Highest third	1.51	1.51	1.53	1.53
Race/ethnicity				
American Indian/Alaskan Native	6.40	6.40	5.72	5.72
Asian/Pacific Islander	4.09	4.09	4.95	4.95
Black, non-Hispanic	1.98	1.98	2.74	2.74
White, non-Hispanic	0.98	0.98	1.08	1.08
Hispanic	2.52	2.52	3.29	3.29
Total household income before taxes, 1991				
Less than $10,000	1.73	1.73	2.77	2.77
$10,000-19,999	1.86	1.86	2.39	2.39
$20,000-29,999	2.02	2.02	1.97	1.97
$30,000-39,999	2.00	2.00	2.26	2.26
$40,000-49,999	2.38	2.38	2.69	2.69
$50,000 or more	1.97	1.97	2.22	2.22
Personal annual earnings in 1991				
Less than $10,000	1.59	1.59	2.57	2.57
$10,000-19,999	1.60	1.60	1.91	1.91
$20,000-29,999	1.74	1.74	1.63	1.63
$30,000-39,999	2.87	2.87	2.19	2.19
$40,000-49,999	4.95	4.95	3.74	3.74
$50,000 or more	7.79	7.79	4.41	4.41
Grades in high school[2]				
90-100	3.31	3.31	4.78	4.78
80-89	1.40	1.40	1.62	1.62
Less than 80	1.07	1.07	1.17	1.17
Marital status, June 1992				
Married	1.08	1.08	1.36	1.36
No longer married	2.34	2.34	3.45	3.45
Never married	1.55	1.55	1.36	1.36
Number of children, June 1992				
None	1.35	1.35	1.28	1.28
One	1.72	1.72	2.21	2.21
Two or more	1.14	1.14	1.96	1.96

Table B2--Standard errors for Table B1: Percentage distribution of 1980 high school sophomore women and men according to work consistency[1], by selected characteristics--Continued

	Men		Women	
	Inconsistent workers	Consistent workers	Inconsistent workers	Consistent workers
Highest degree the respondent received				
No diploma/degree	1.80	1.80	3.36	3.36
GED/Certificate	3.07	3.07	4.65	4.65
High school diploma	1.25	1.25	1.35	1.35
Certificate	2.47	2.47	3.13	3.13
Associate's degree	2.75	2.75	3.59	3.59
Bachelor's degree	1.91	1.91	1.86	1.86
Graduate degree	2.88	2.88	3.53	3.53
Enrolled in any postsecondary education, non-attainers				
No postsecondary education	1.24	1.24	1.50	1.50
Some postsecondary education	1.95	1.95	2.07	2.07
Degree/certificate attempted, non-attainers				
None	6.66	6.66	4.91	4.91
Certificate	5.63	5.63	6.96	6.96
Associate's degree	3.42	3.42	3.84	3.84
Bachelor's degree	2.66	2.66	3.13	3.13
Graduate degree	--	--	--	--
Age received highest degree, degree/certificate attainers				
Less than 24	1.41	1.41	1.66	1.66
24 or older	1.39	1.39	2.13	2.13
Gender dominance of major field of study, highest degree/certificate[3]				
Male	5.64	5.64	2.73	2.73
Female	1.76	1.76	3.50	3.50
Gender neutral	2.68	2.68	2.61	2.61
Continuously enrolled in postsecondary education, degree/certificate attainers				
Continuously enrolled	1.25	1.25	1.44	1.44
Not continuously enrolled	9.07	9.07	--	--
Undergraduate grade point average, postsecondary degree/certificate attainers				
Less than 2.50	1.63	1.63	1.91	1.91
2.50-3.50	1.50	1.50	1.64	1.64
Greater than 3.50	3.44	3.44	4.30	4.30

Table B2--Standard errors for Table B1: Percentage distribution of 1980 high school sophomore women and men according to work consistency[1], by selected characteristics—Continued

	Men		Women	
	Inconsistent workers	Consistent workers	Inconsistent workers	Consistent workers
Number of months enrolled in postsecondary education, degree/certificate attainers				
Less than 24	2.61	2.61	3.04	3.04
24 or more	2.82	2.82	3.07	3.07
Percent of months working while enrolled, degree/certificate attainers				
None	2.01	2.01	2.74	2.74
1-33%	2.52	2.52	2.73	2.73
34-66%	2.92	2.92	3.38	3.38
67-100%	1.46	1.46	1.55	1.55

--Sample size is too small for a reliable estimate.

[1]Consistent employment was defined as working 91.67 percent of the total months in the labor force after highest degree attainment to the end of the data collection period.
[2]On a 100 point scale.
[3]A program is gender dominant if 65 percent or more of the graduates were of the same sex.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School & Beyond: Sophomore Cohort 1980-1992 (HS&B:92), Data Analysis System.

Data Analysis System

The estimates presented in this report were produced using the National Center for Education Statistics (NCES) Data Analysis System (DAS) for the HS&B Fourth Follow-up. The DAS software makes it possible for users to specify and generate their own tables from the HS&B data. With the DAS, users can recreate or expand upon the tables presented in this report. In addition to the table estimates, the DAS calculates appropriate standard errors and weighted sample sizes for the estimates.[42] For example, table B2 presents the standard errors that correspond to table B1. If the number of valid cases is too small to produce an estimate, the DAS prints the message "low-N" instead of the estimate (converted to a"--" in the tables).

In addition to the tables, the DAS will also produce a correlation matrix of selected variables that can be used in linear regression models, and the design effects (DEFT) for all the parameter

[42]The HS&B sample was not a simple random sample, and techniques for estimating standard errors that are appropriate for simple random samples do not produce accurate standard errors for these data. The DAS takes into account the complex sampling procedures and calculates standard errors that are appropriate for the variable. The method for computing sampling errors used by the DAS involves approximating the estimator by the linear terms of a Taylor series expansion. The procedure is typically referred to as the Taylor series method.

estimates in the correlation matrix. Since statistical procedures generally compute regression coefficients based on simple random sample assumptions, the standard errors must be adjusted with the design effects to take into account the complex sampling procedures used in the HS&B surveys.

For more information about the 1992 HS&B Fourth Follow-up DAS, visit the Web Site at www.pedar-das.org, or contact:

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Statistical Procedures

Two types of statistical procedures were employed in this report: testing differences between means, and adjustment of means after controlling for covariation among a group of variables. Each procedure is described below.

Differences between the means

The descriptive comparisons were tested in this report using Student's t statistics. Differences between estimates are tested against the probability of a Type I error, or significance level. The significance levels were determined by calculating Student's t values for the differences between each pair of means or proportions and comparing these with published tables of significance levels for two-tailed hypothesis testing.

Student's t values may be computed, for comparisons using these tables' estimates, with the following formula:

$$t = \frac{P_1 - P_2}{\sqrt{se_1^2 + se_2^2}} \qquad (1)$$

where P_1 and P_2 are the estimates to be compared, and se_1 and se_2 are their corresponding standard errors. Note that this formula is only valid for independent estimates. When estimates were not independent (for example, when comparing a total percentage with that for a subgroup that is included in the total), a covariance term was added to the denominator of the t-test formula.

There are hazards in reporting statistical tests for each comparison. First, comparisons based on large t statistics may appear to merit special attention. This can be misleading since the magnitude of the t statistic is related not only to the observed differences in means or percentages, but also to the number of students in the categories used for comparison. Hence, a small difference compared across a large number of students will produce a large t statistic.

A second hazard in reporting statistical tests for each comparison is making multiple comparisons among categories of an independent variable. For example, when making paired comparisons among different levels of income, the probability of a Type I error for these comparisons, when taken as a group, is larger than the probability for a singe comparison. When more than one difference between groups of related characteristics or "families" is tested for statistical significance, one must apply a standard that assures a level of significance for all of those comparisons taken together.

Comparisons were made in this report only when $p<=.05/k$ for a particular pairwise comparison where that comparison was one of k tests within a family. This guarantees both that the individual comparison would have $p<=.05$ and that when k comparisons were made within a family of possible tests, the significance level of the comparison would sum to $p<=.05$.[43]

For example, in a comparison between males and females of average earnings, only one comparison is possible (males versus females). In this family, $k = 1$, and the comparison can be evaluated with Student's t test. When students are divided into five race/ethnicity groups and all possible comparisons are made, then $k = 10$ and the significance level of each test must be $p<=.05/10$, or .005. The formula for calculating family size (k) is as follows:

$$k = [\, j * (j - 1) \,] / 2 \qquad (2)$$

where j is the number of categories for the variable being tested. In the case of race/ethnicity, there are five race/ethnicity groups (American Indian, Asian/Pacific Islander, black non-Hispanic, Hispanic, and white non-Hispanic), so substituting 5 for j in equation 2 yields:

$$k = [\, (5)(5 - 1) \,] / 2 = 10 \qquad (3)$$

[43]The standard that $p<=.05/k$ for each comparison is more stringent than the criterion that the significance level of the comparisons should sum to $p<=.05$. For tables showing the t statistic required to ensure that $p<=.05/k$ for a particular family size and degrees of freedom, see Olive Jean Dunn, "Multiple Comparison Among Means," *Journal of the American Statistical Association*. vol. 56, p. 52-64.

Adjustment of means to control for background variation

Tabular results are limited by sample size when attempting to control for additional factors that may account for the variation observed between two variables. For example, when examining the percentages of those who completed a degree, it is impossible to know to what extent the observed variation is due to low-income status differences and to what extent it is due to differences in other factors related to income, such as type of institution attended, parents' education, and so on. However, if a nested table were produced showing income within type of institution and within parent's education, the cell sizes would be too small to identify the patterns. When the sample size becomes too small to support controls for another level of variation, one must use other methods to take such variation into account.

To overcome this difficulty, multiple linear regression was used to obtain means that were adjusted for covariation among a list of control variables.[44] The dependent variable, earnings in the highest category, was regressed on a set of descriptive variables such as gender, race-ethnicity, etc. Substituting ones or zeros for the subgroup characteristic(s) of interest and the mean proportions for the other variables results in an estimate of the adjusted proportion for the specified subgroup, holding all other variables constant. For example, consider a hypothetical case in which two variables, age and gender, are used to describe an outcome, Y (such as completing a degree). The variables age and gender are recoded into a dummy variable representing age and a dummy variable representing gender:

Age	*A*
24 years or older	1
Under 24 years old	0
Gender	*G*
Female	1
Male	0

The following regression equation is then estimated from the correlation matrix output from the DAS:

$$Y = a + \beta_1 A + \beta_2 G \qquad (4)$$

[44]For more information about regression, including the weighted least squared (WLS) regression used here, see M. S. Lewis-Beck, *Applied Regression*, vol. 22 (Beverly Hills, CA: Sage Publications, Inc., 1980) and W. D. Berry and S. Feldman, *Multiple Regression in Practice*, vol. 50 (Beverly Hills, CA: Sage Publications, Inc. 1987).

To estimate the adjusted mean for any subgroup evaluated at the mean of all other variables, one substitutes the appropriate values for that subgroup's dummy variables (1 or 0) and the mean for the dummy variables representing all other subgroups. For example, suppose *Y* represents earning a degree, and is being described by age (A) and gender (G), coded as shown above, with means as follows:

Variable	Mean
A	0.355
G	0.521

Next, suppose the regression equation results in:

$$Y = 0.15 + (0.17)A + (0.01)G \quad (5)$$

To estimate the adjusted value for older students, one substitutes the appropriate parameter estimates and variable values into equation 5.

Variable	Parameter	Value
a	0.15	--
A	0.17	1.000
G	0.01	0.521

This results in:

$$Y = 0.15 + (01.7)(1) + (0.01)(0.521) = 0.325 \quad (6)$$

In this case, the adjusted mean for older students is 0.325 and represents the expected outcome for older students who look like the average student across the other variables (in this example, gender). In other words, the adjusted percentage of older students who attained a degree is 32.5 percent (0.325 x 100 for conversion to a percentage).

It is relatively straightforward to produce a multivariate model using the DAS, since one of the output options of the DAS is a correlation matrix, computed using pairwise missing values.[45] This matrix can be used by most statistical software packages as the input data to produce least-

[45]Although the DAS simplifies the process of making regression models, it also limits the range of models. Analysts who wish to use other than pairwise treatment of missing values to estimate probit/logit models (which are the most appropriate for models with categorical dependent variables) can apply for a restricted data license from NCES. For more information on these alternative model specifications see John. H. Aldrich and Forrest D. Nelson "Linear Probability, Logit and Probit Models," *Quantitative Applications in the Social Sciences*, vol. 45. (Beverly Hills,

squares regression estimates of the parameters. That was the general approach used for this report, with an additional adjustment to incorporate the complex sample design into the statistical significance tests of the parameter estimates (described below). For tabular presentation, parameter estimates and standard errors were multiplied by 100 to match the scale used for reporting unadjusted and adjusted percentages.

Most statistical software packages assume simple random sampling when computing standard errors of parameter estimates. Because of the complex sampling design used for HS&B, this assumption is incorrect. A better approximation of their standard errors is to multiply each standard error by the average design effect associated with the independent variable (DEFT),[46] where the DEFT is the ratio of the true standard error to the standard error computed under the assumption of simple random sampling. It is calculated by the DAS and produced with the correlation matrix.

CA: Sage University Press, 1984).

[46]The adjustment procedure and its limitations are described in C. J. Skinner and T. M. F. Smith (eds.). *Analysis of Complex Surveys*. (New York: John Wiley & Sons, 1989).

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