





# Degrees to dollars:

## Earnings of college graduates in 1998

by Olivia Crosby

The familiar adage is still true: College graduates usually earn more than other workers do. But the earnings of individual graduates are more difficult to predict. In 1998, the top 10 percent of college graduates made 3 times more than the bottom 10 percent. This article uses data from a Federal Government survey to find out what distinguished the high earners from the low.

College graduates tend to have high salaries because they qualify for many of the highest paying and fastest growing occupations in the economy. And even in occupations where a degree usually is not required, college graduates often earn more than do high school graduates with no college degree. According to the U.S. Department of Labor's 1999 *Report on the American Workforce*, the skill requirements for many occupations have increased. And for many employers, a degree signals a worker's ability to master complex skills.

Following a continuing trend of greater earning power, college graduates—workers with a bachelor's or higher degree—earned at least \$15,000 more in 1998 than did high school graduates. And the higher their level of education, the more most graduates made. (See table 1.)

### Specifics about earnings

Table 1 shows the monetary benefits of schooling. But general data about earnings mask interesting complexities. Some graduates make relatively little, while others earn more than 10 times the average. Although no one can say with certainty who will command high salaries, looking at data from the recent

**Table 1**

#### Median earnings of full-time, year-round workers by education level and earnings premiums, 1998

Education level	Median earnings, 1998	Earnings premium over high school graduates with no college	
		(dollars)	(percent)
High school diploma	\$25,062	—	—
Bachelor's degree	40,387	\$15,325	61
Master's degree	48,772	23,710	95
Doctoral degree	60,729	35,667	142
First-professional degree	71,258	46,196	184

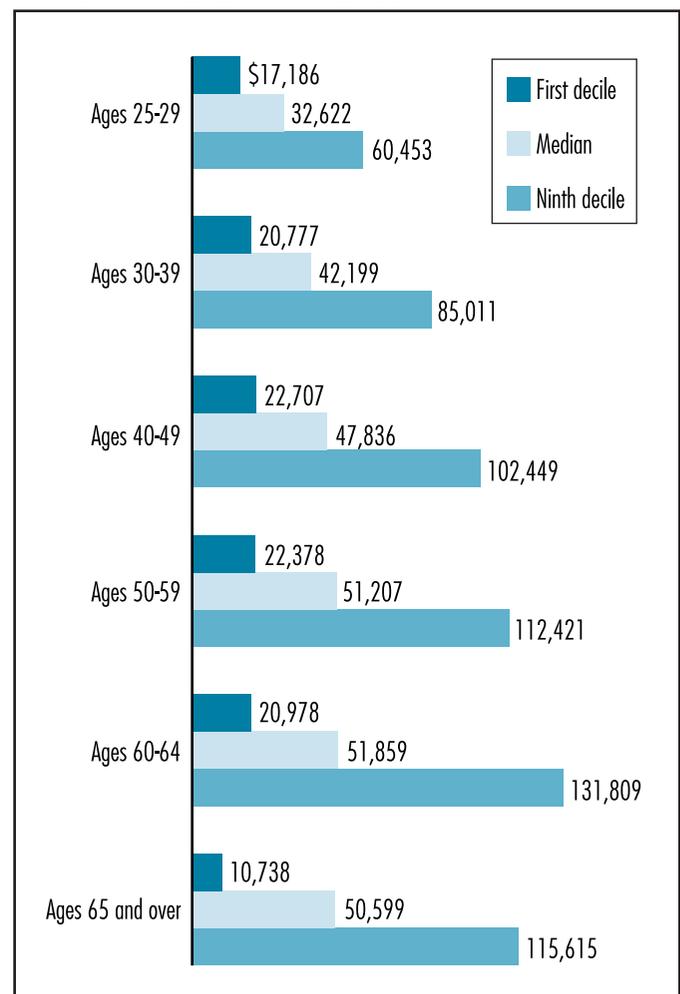
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past reveals how specific factors affect earnings. Survey data show the effects of age, education level, and occupation.

**Age.** Often, college graduates who earn little must gain more experience before their salaries increase. In 1998, the median earnings of graduates rose steadily with age, reaching a peak between the ages of 60 and 64. (See chart 1.) At every age, most

**Chart 1**

#### Earnings of college graduates by age, 1998



college graduates earned more than their high school graduate counterparts.

The earnings of college graduates in each age group are wide ranging. The youngest group had the least earnings variation in 1998; 80 percent earned between \$17,186 and \$60,453. The second oldest group had the most variation, as the top 10 percent probably reaped the benefits of years of experience and the bottom 10 percent likely switched to postretirement occupations.

**Education level.** Workers with a master's, doctoral, or first-professional degree usually earn more than those with a bachelor's. This is not surprising because more-educated workers qualify for several high-paying occupations that bachelor's degree holders do not. For example, only those with a medical degree may work as physicians, the highest paid occupation overall. Similarly, in many occupations, it is easier for workers with a master's degree to qualify for promotions and positions of responsibility.

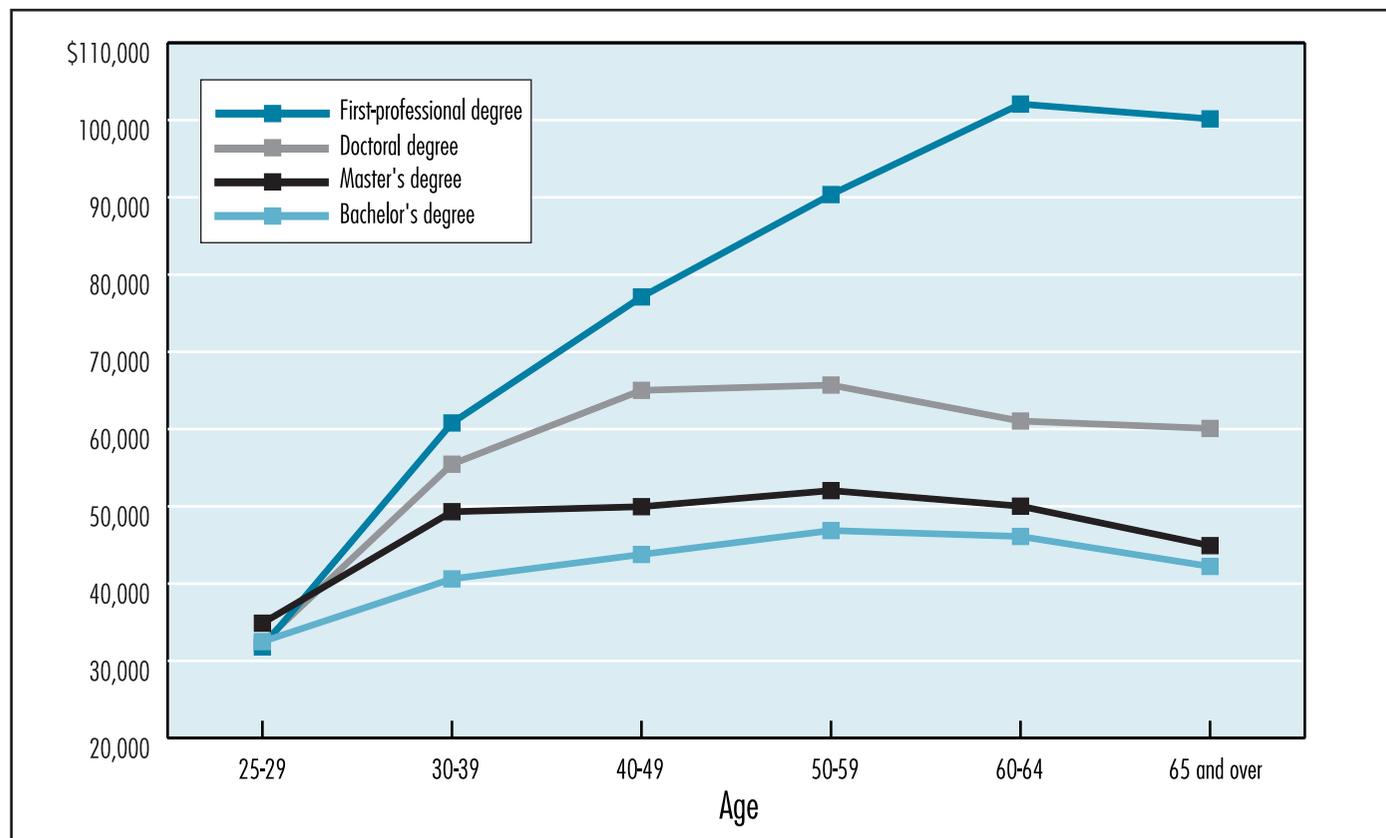
The rewards of graduate school continue with age. As chart 2 shows, advanced degrees brought higher pay for most workers over age 30. This was especially true of workers with a first-professional degree.

Higher earnings don't start before age 30 for many workers with an advanced degree because they have less work experience than do those with fewer years of school.

In part because of differences in age, education level does not dictate earnings precisely. Earnings vary widely at every level of education. (See chart 3.) The middle 80 percent of bachelor's degree holders earned anywhere from \$18,469 to \$83,502 in 1998; the middle 80 percent of doctoral degree holders earned between \$28,331 and \$305,179.

The earnings variation within educational groups shows that a college degree does not guarantee large salaries: the lowest earning 10 percent of bachelor's, master's, and first-professional degree holders made less than the majority of high school graduates.

**Chart 2**  
Median earnings of college graduates by age and degree, 1998





**Occupation.** No matter their ages or education levels, workers' occupations are the primary factor determining the financial reward from a degree. The earnings of most college-educated social workers, for instance, are lower than those of most life scientists and production supervisors.

Occupations that usually require a college degree, such as accountant, engineer, or counselor, often have higher earnings and higher earnings premiums for college graduates. Most of these occupations fall into the professional specialty occupational group or the executive, administrative, and managerial group. Each of the occupations comprising the top 10 in earnings belongs to one of these groups. (See chart 4.)

College graduates also earn more than their counterparts in many occupations in which a degree is not usually required, such as construction tradesworker and retail sales worker. One

reason is that graduates often qualify for promotions and special training more easily. In 1998, for example, guards with a bachelor's degree earned more than twice as much as guards without a degree, in part because those with a degree were more likely to protect critical facilities and use high-tech security equipment. Some clerical workers, such as secretaries and office supervisors, also earned more if they had a bachelor's degree, often because they had more complex responsibilities.

In some occupations, educational requirements are ambiguous. Qualifications for police officers, for example, vary by county and State. Although 75 percent of police officers do not have a degree, many younger officers now need a degree to qualify for some jobs. This educational upgrading shows itself in the 1998 earnings of police officers. Those who had a bachelor's degree earned 20 percent more than those without a degree did.

Nonretail sales workers, who fall into many educational groups, also earn high premiums for attending college. In 1998, most earned over 50 percent more if they had a degree. The highest premium went to those who sold business and financial products, including insurance.

Some occupations do not offer substantially higher earnings to workers with a degree. A degree makes little difference in earnings for truckdrivers and mail and message distributing workers, for example. These jobs don't require the skills learned in college, so employers don't pay a premium to workers with a degree.

**Graduate degree and occupation.** Which occupations reward advanced degrees? Table 2 shows many that offer a premium to workers who progress from one degree to another.

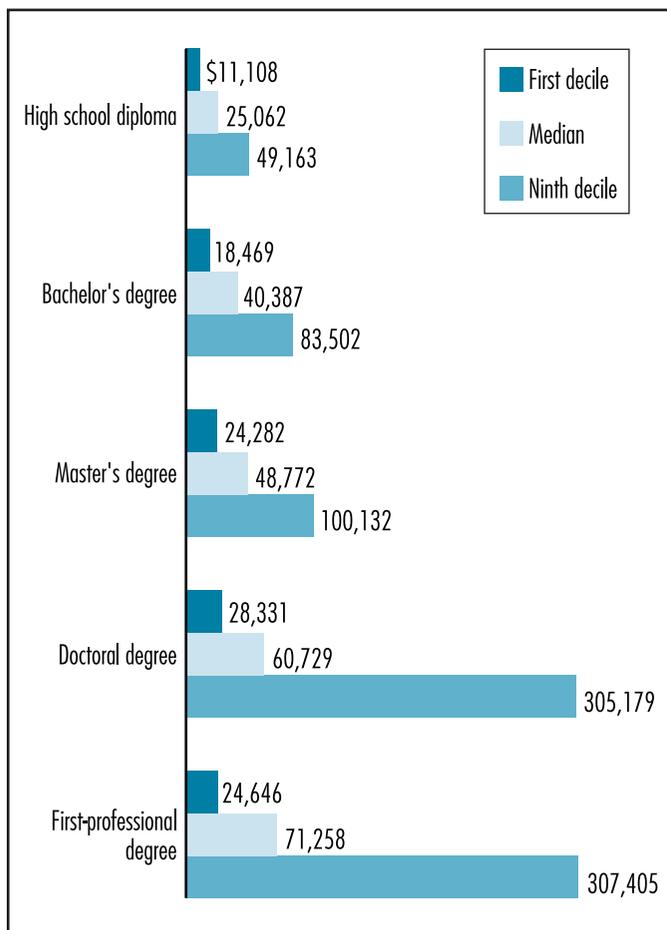
Of specific occupations with more than 50,000 workers who had a master's degree, public relations, advertising, and marketing managers earned the most money in 1998, with median earnings of nearly \$200,000. These workers also seized the biggest payoff for staying in school, earning 49 percent more than their counterparts with a bachelor's degree. Computer scientists, on the other hand, obtained almost no premium for having a master's degree despite a high salary overall.

For all but six occupations, there were insufficient data to calculate the premium for a doctoral degree. Psychologist garnered the highest increase of the six, with doctoral-level psychologists earning 82 percent more than those with a master's degree did.

### Beyond earnings

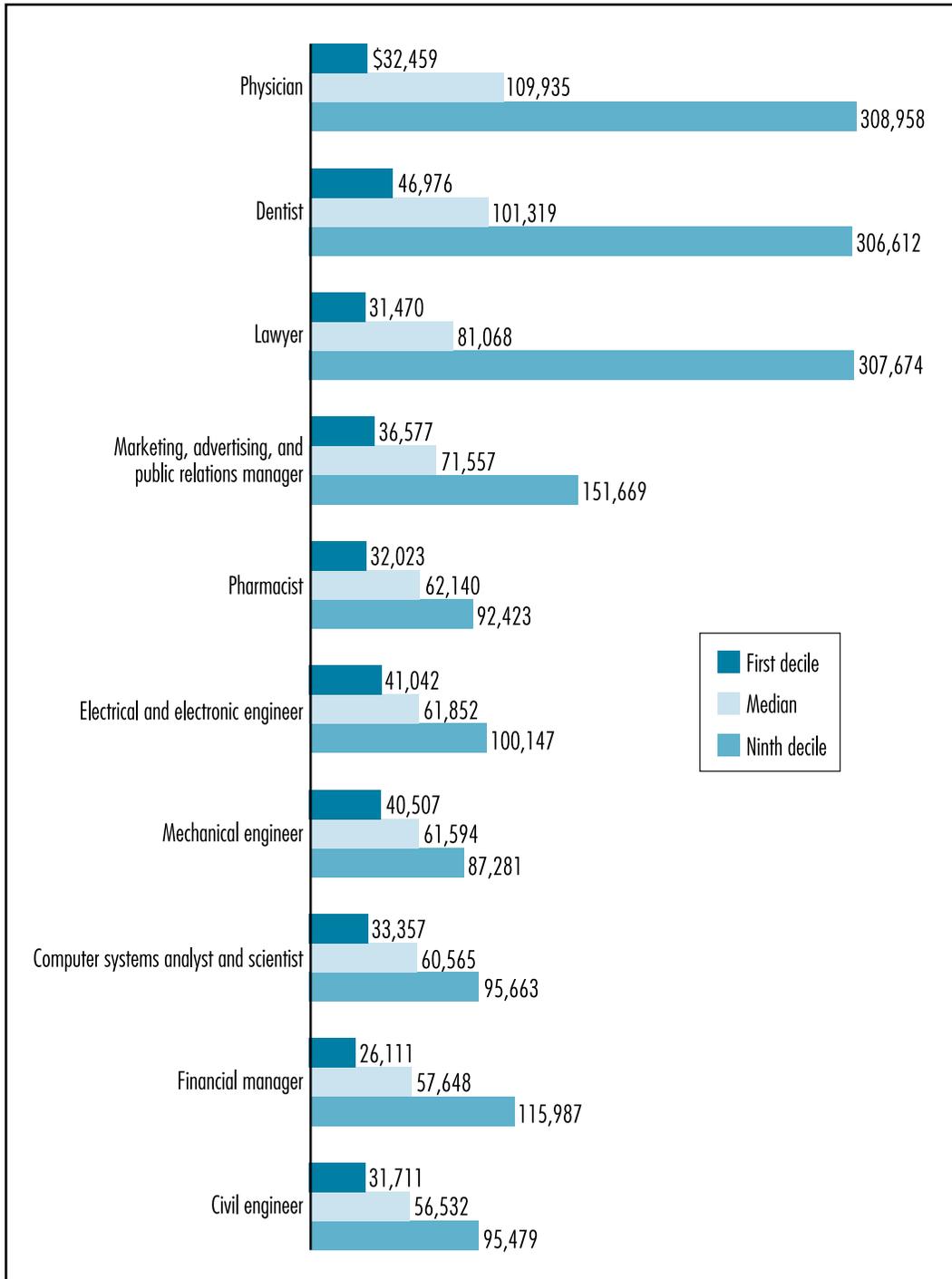
The decision to pursue higher education hinges on more than salary considerations. Most people decide to go to college to qualify for jobs they enjoy. For some occupations, a college

**Chart 3**  
Earnings by education level, 1998



**Chart 4**

**Highest earning occupations for college graduates, 1998**





degree is the only way to gain entry. Elementary school teachers and engineers need a bachelor's degree, for example, and dentists, lawyers, and most college professors must have graduate-level education.

Across all occupations, college graduates share many advantages. In addition to the intangible benefits of education, college graduates enjoy lower rates of unemployment and are less likely to work part time involuntarily.

But the dividends of a college education do not come without cost. A degree requires investment of money and effort and, in many cases, delays full-time entry into the workforce.

And college does not teach the skills required for many occupations, such as electrician or machinist. Many of these noncollege occupations pay high earnings. To learn more about noncollege jobs that pay more than many college-level ones, see Matthew Mariani's article, "High earning workers who

*(Continued on page 38)*

**Table 2**

**Earnings of workers in selected occupations, by most advanced degree, 1998<sup>1</sup>**

Occupation	Median earnings					Earnings premium over preceding education level (percent) <sup>2</sup>	
	Any college degree	Bachelor's degree	Master's degree	Doctoral or first-professional degree	High school diploma	Bachelor's degree	Master's degree
Accountants and auditors	\$40,177	\$37,475	\$46,434	–	\$27,219	38	24
Administrators and officials, public administration	53,134	51,043	61,023	–	31,013	65	20
Administrators, education and related fields	50,508	38,780	53,832	\$66,214	35,308	10	39
Advertising and related sales occupations	35,880	33,072	–	–	–	–	–
Airplane pilots and navigators	43,334	43,251	–	–	–	–	–
Architects	51,076	52,788	–	–	–	–	–
Authors	37,080	38,244	–	–	–	–	–
Biological and life scientists	45,456	–	–	–	–	–	–
Bookkeepers, accounting, and auditing clerks	25,100	25,212	–	–	23,030	9	–
Cashiers	20,071	20,471	–	–	15,652	31	–
Chemists, except biochemists	51,678	40,437	–	–	–	–	–
Civil engineers	56,532	51,355	59,750	–	–	–	16
Clergy	35,988	25,670	38,066	–	–	–	48
Clinical laboratory technologists and technicians	35,075	35,013	–	–	–	–	–
Computer programmers	51,611	50,966	56,469	–	47,273	8	11
Computer systems analysts and scientists	60,565	60,293	60,331	–	52,990	14	<1
Construction trades, except supervisors	32,463	35,222	–	–	28,237	25	–
Counselors, educational and vocational	37,598	34,148	37,910	–	–	–	11
Dentists	101,319	–	–	101,158	–	–	–
Designers	35,692	36,120	–	–	27,373	32	–
Economists	56,526	50,682	–	–	–	–	–
Editors and reporters	47,915	41,459	51,487	–	–	–	24
Electrical and electronic engineers	61,852	60,391	66,964	–	47,760	26	11
Electrical and electronic equipment repairers	46,786	47,173	–	–	36,828	28	–
Engineering and related technologists and technicians	34,481	34,494	–	–	36,283	-5	–
Farm operators and managers	25,325	25,205	–	–	13,887	82	–
Financial managers	57,648	48,985	72,163	–	32,141	52	47
Financial records processing occupations	25,464	25,540	–	–	22,964	11	–

## Earnings of workers in selected occupations, by most advanced degree, 1998<sup>1</sup> (continued)

Occupation	Median earnings					Earnings premium over preceding education level (percent) <sup>2</sup>	
	Any college degree	Bachelor's degree	Master's degree	Doctoral or first-professional degree	High school diploma	Bachelor's degree	Master's degree
Guards	40,038	40,708	–	–	20,132	102	–
Handlers, equipment cleaners, helpers, and laborers	20,860	20,663	–	–	21,839	-5	–
Health technologists and technicians	35,016	33,158	–	–	22,168	50	–
Industrial engineers	55,431	51,006	–	–	–	–	–
Information clerks	23,192	23,504	–	–	20,776	13	–
Inspectors and compliance officers, except construction	45,659	45,134	–	–	–	–	–
Insurance adjusters, examiners, and investigators	32,429	32,406	–	–	29,229	11	–
Insurance sales occupations	55,106	55,280	–	–	32,361	71	–
Investigators and adjusters, except insurance	29,982	29,593	–	–	25,412	16	–
Lawyers	81,068	–	–	81,501	–	–	–
Legal assistants	28,311	28,919	–	–	25,678	13	–
Librarians	33,579	27,234	39,926	–	–	–	47
Machine operators, assemblers, and inspectors	30,649	30,328	–	–	26,297	15	–
Machine operators and tenders, except precision	30,441	30,821	–	–	25,684	20	–
Mail and message distributing occupations	36,749	35,899	–	–	36,186	-1	–
Management analysts	51,252	50,642	52,077	–	–	–	3
Managers, food serving and lodging establishments	41,780	41,197	52,291	–	24,310	69	27
Managers, marketing, advertising, and public relations	71,557	67,648	100,966	–	36,922	83	49
Managers, medicine and health	47,474	46,911	41,808	–	29,994	56	-11
Managers, properties and real estate	50,541	47,802	–	–	26,188	83	–
Mechanical engineers	61,594	60,782	63,462	–	–	–	4
Mechanics and repairers, except supervisors	41,261	40,759	–	–	31,541	29	–
Miscellaneous mechanics and repairers	36,079	36,550	–	–	31,038	18	–
Operations and systems researchers and analysts	51,637	48,527	–	–	–	–	–
Painters, sculptors, craft-artists, and artist printmakers	26,261	25,663	–	–	–	–	–
Personnel and labor relations managers	51,079	51,408	–	–	–	–	–
Personnel, training, and labor relations specialists	40,469	39,341	–	–	29,871	32	–
Pharmacists	62,140	61,890	–	65,990	–	–	–
Photographers	30,064	26,928	–	–	–	–	–
Physical therapists	51,407	51,376	–	–	–	–	–
Physicians	109,935	–	–	110,624	–	–	–
Police and detectives, except supervisors	41,795	40,995	–	–	34,065	20	–
Psychologists	37,520	–	33,102	60,173	–	–	–



## Earnings of workers in selected occupations, by most advanced degree, 1998<sup>1</sup> (continued)

Occupation	Median earnings					Earnings premium over preceding education level (percent) <sup>2</sup>	
	Any college degree	Bachelor's degree	Master's degree	Doctoral or first-professional degree	High school diploma	Bachelor's degree	Master's degree
Public relations specialists	46,457	47,576	–	–	–	–	–
Real estate sales occupations	41,543	41,869	–	–	26,971	55	–
Records processing occupations, except financial	25,937	25,735	–	–	23,995	7	–
Registered nurses	41,836	41,100	47,074	–	–	–	15
Religious workers, except clergy and teachers	30,615	31,688	–	–	–	–	–
Sales representatives, commodities except retail	55,786	53,096	71,304	–	36,013	47	34
Sales representatives, mining, manufacturing and wholesale	56,056	54,169	71,003	–	36,090	50	31
Sales workers, retail and personal services	30,978	30,297	36,604	–	19,658	54	21
Secretaries	25,491	25,580	–	–	23,436	9	–
Securities and financial services sales occupations	50,418	42,128	62,179	–	–	–	48
Social workers	32,303	31,815	33,533	–	–	–	5
Speech therapists	33,730	–	32,979	–	–	–	–
Street and door-to-door sales workers	40,154	39,894	–	–	23,111	73	–
Supervisors and proprietors, sales occupations	47,549	45,479	60,944	–	29,400	55	34
Supervisors, administrative support occupations	43,146	40,568	–	–	29,852	36	–
Supervisors, construction occupations	41,857	41,770	–	–	40,347	4	–
Supervisors, general office	42,201	37,457	–	–	28,911	30	–
Supervisors, production occupations	42,351	41,453	–	–	32,088	29	–
Teacher aides	17,284	17,106	–	–	14,866	15	–
Teachers, college and university	45,855	36,219	38,714	52,289	–	–	7
Teachers, elementary school	35,028	30,935	38,840	44,425	16,610	86	26
Teachers, postsecondary, subject not specified	42,122	36,469	38,419	55,717	–	–	5
Teachers, pre-kindergarten and kindergarten	27,015	25,476	36,412	–	15,455	65	43
Teachers, secondary school	36,563	31,423	42,712	39,109	–	–	36
Teachers, special education	33,536	29,274	40,405	–	–	–	38
Teachers, not elsewhere classified	36,564	33,377	47,779	–	22,537	48	43
Technicians, except health, engineering, and science	43,871	43,318	53,189	–	35,842	21	23
Truckdrivers	30,438	30,589	–	–	31,627	-3	–
Waiters and waitresses	18,594	20,307	–	–	14,703	38	–

Source: Current Population Survey, March 1999 supplement  
 –Data not shown where survey respondents number less than 50,000.

<sup>1</sup>The table shows median earnings for the 90 specific occupations in which at least 80,000 college graduates worked. The first five columns show the earnings of workers with each level of education; the last two columns show the difference in earnings between one level and the next. The data include only full-time, year-round workers aged 25 and over, so after-school jobs and periods of unemployment do not cloud earnings differences.

<sup>2</sup>The earnings premiums for workers with a doctoral degree over workers with a master's degree are not shown because there were insufficient data to calculate premiums for all but six occupations. Those six with sufficient data were administrators, education and related fields (with an earnings premium of 23 percent over master's degree holders), psychologists (82 percent), college and university teachers (35 percent), elementary school teachers (14 percent), postsecondary school teachers, subject not specified (45 percent), and secondary school teachers (-8 percent).

(Continued from page 35)

don't have a bachelor's degree," in the fall 1999 *OOQ*, available online at <http://stats.bls.gov/opub/ooq/1999/fall/art02.pdf>.

### The data and their limitations

The data in this article are from the 1999 March supplement to the Current Population Survey (CPS) conducted by the U.S. Census Bureau for the Bureau of Labor Statistics (BLS). In the survey, interviewers asked individuals in approximately 62,500 households about their annual or hourly wages, employment status, education level, and longest held occupation of the previous year.

For many occupations, there were relatively few respondents with a given level of education; in this analysis, earnings data based on a small pool of workers were considered unreliable and were therefore not reported.

The analysis also excluded occupations with fewer than 80,000 college-educated workers, passing over many occupations, such as technical writer and conservation scientist, that usually require a degree but have a small number of workers.

Limitations also stem from CPS data and how they were used. Like all surveys, the CPS is vulnerable to errors that can affect its results. The fact that individuals supply their occupational titles, rather than choosing from a supplied list, is one source of error. For example, some kindergarten teachers might classify themselves as elementary school teachers, unaware that the CPS defines their occupation separately.

In addition, the earnings premiums calculated here might understate the value of a degree to some workers. In occupations with increasing educational requirements, a higher proportion of young workers has a degree. Their entry-level salaries lower the median earnings for college graduates in the occupation. As these young graduates gain experience—and the higher salaries that go with it—the median earnings of college graduates and the premium for having a degree should rise.

Finally, median earnings and broad occupational categories, like the ones published in the tables, overlook important differences among individuals. Earnings depend on many factors not discussed here, including differences in geography and individual ability.

### Learn more

Many occupations that require a degree were not included in this analysis. But other BLS surveys compile data on more occupations, including most of those that require a college degree. To find earnings information for these occupations, check the *Occupational Outlook Handbook*, avail-



able at many libraries and career centers and online at <http://stats.bls.gov/ocohome.htm>.

Also, because this article combines the earnings of workers without regard to experience, it is not a good indicator of entry-level salaries. But numerous private organizations conduct starting-salary surveys. *Handbook* statements often include data from these surveys.

There are many places to find other kinds of information about college graduates. For example, to learn about the employment status, earnings, and educational status of college graduates, see Tiffany T. Stringer's article, "Four years after graduation: The Class of 1993," elsewhere in this issue of the *OOQ*. To learn about the employment prospects of college graduates over the next decade, see Chad Fleetwood and Kristina Shelley's article, "The outlook for college graduates, 1998-2008: A balancing act," in the fall 2000 issue, available online at <http://stats.bls.gov/opub/ooq/2000/fall/art01.pdf>. **OOQ**