

## ALL IN A WEEK'S WORK: AVERAGE WORK WEEKS OF DOCTORAL SCIENTISTS AND ENGINEERS

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This InfoBrief uses data from the National Science Foundation's 2003 Survey of Doctorate Recipients (SDR) to describe average work week durations and differences among science and engineering doctorate holders who are employed full time. These differences are discussed in terms of employment sector (education, industry, government),<sup>2</sup> field of doctorate, years since doctorate receipt, and (for those employed in academia) tenure status. Work week differences are also examined in terms of the sex of the doctorate holder and the number of children living in his or her household.

### Work Week Length, Employment Sectors, and Doctoral Fields of Study

The doctoral S&E workforce in 2003 was employed in three broad sectors: *education*, primarily college and university teaching and research but also including university administration and employment in K-12 institutions; *industry and self-employment*; and federal, state, or local *government*. The work weeks averaged 50.6 hours in education, 47.6 hours in industry/self-employment, and 45.2 hours in government (table 1).<sup>3</sup>

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<sup>2</sup>"Education" includes university and college faculty, research staff, and administrators as well as employees in K-12 education. "Industry/self-employed" includes individuals working in private nonprofit organizations as well as those in industry and those who are self-employed. "Government" includes federal, state, and local government employees.

<sup>3</sup>Hours worked per week are summarized throughout this report using means instead of medians. The conclusions are generally the same for both measures.

This pattern of sectoral differences generally held across the eight broad fields of study in which the employees' doctorates were received (table 1).<sup>4</sup> Specifically, across all eight fields of doctoral study, those employed in education worked longer work weeks than those in industry/self-employment or government. And in all broad fields except the computer and information sciences and health sciences (where the sector differences were not statistically significant), those employed in industry/self-employment worked longer work weeks than those employed in government.

Some notable differences across broad fields of doctoral study were apparent as well. Overall, the longest work weeks were reported by those who had earned doctorates in the biological and agricultural sciences. Doctorate recipients in the health sciences, computer and information sciences, social sciences, and engineering reported work weeks that were just slightly shorter. Within the individual employment sectors, doctorate recipients from most fields of study generally reported fairly similar average work weeks. The main exceptions to this pattern of within-sector similarity were psychologists and mathematicians, who tended to work shorter weeks than those with doctorates in the other fields in all sectors.

<sup>4</sup>All differences noted in this report were tested for statistical significance and found to have probabilities of no real difference of less than .05. Standard errors of the means were corrected for SDR sample design effects using the Taylor Series method of direct estimation.



TABLE 1. Mean hours worked per week by S&amp;E doctorate holders in full-time employment, by employment sector and field of doctorate: 2003

Field of doctorate	All employment sectors		Education		Industry/self-employed		Government	
	Mean hours worked	Population size	Mean hours worked	Population size	Mean hours worked	Population size	Mean hours worked	Population size
All S&E	48.79	530,962	50.59	254,279	47.61	222,136	45.17	54,547
Biological and agricultural sciences	50.53	135,280	52.07	74,893	49.25	44,947	46.77	15,440
Computer and information sciences	49.33	11,035	51.00	5,020	48.15	5,616	44.84	399
Engineering	48.64	94,889	52.13	27,365	47.56	59,259	44.83	8,264
Health sciences	49.57	20,649	50.82	12,734	47.76	6,002	46.89	1,914
Mathematical sciences	47.33	24,886	48.65	15,430	45.59	7,829	43.08	1,627
Physical sciences	48.26	103,883	50.65	39,912	47.10	52,553	45.28	11,418
Psychology	46.62	70,334	47.90	32,348	46.19	30,161	42.97	7,825
Social sciences	48.80	70,006	49.68	46,577	48.30	15,768	44.45	7,661

NOTE: "Education" includes university and college faculty, research staff, and administrators as well as employees in K-12 education. "Industry/self-employed" includes individuals working in private nonprofit organizations as well as those in industry and those who are self-employed. "Government" includes federal, state, and local government employees.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Doctorate Recipients, 2003.

### Work Week Hours and Career Stages

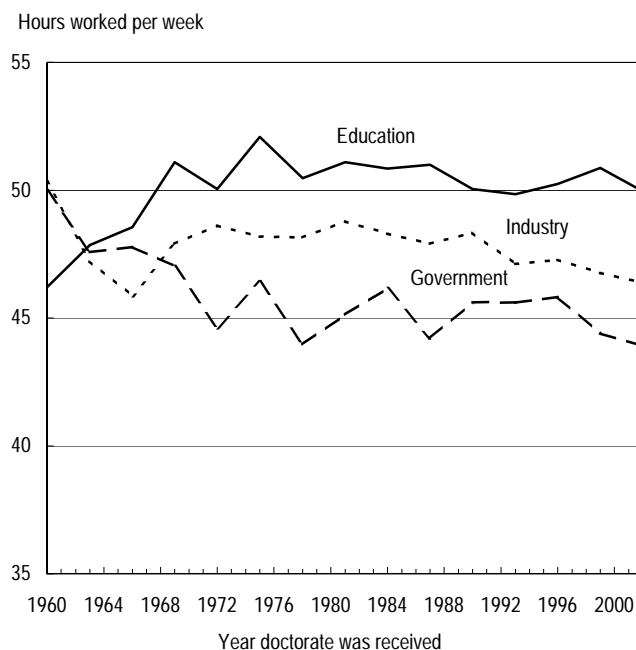
Average work week hours may vary with professional career stages. At the beginning of a career, longer than average work weeks may be necessary for advancement. This tendency is perhaps most commonly associated with such professions as medicine and law, where incoming practitioners have especially long work weeks.<sup>5</sup> Academic employment in a tenure track is also widely assumed to require greater time investments in the early career stages.

Despite expectations that workers in earlier career stages would tend to have longer work weeks, there was no clear correlation between work week length and years since doctorate receipt for the doctoral labor force in 2003 (figure 1). The average work week was similar for all years since doctorate for those employed in the education and government sectors. Among doctoral recipients employed by industry or self-employed, those from the most recent cohorts appeared to work slightly shorter weeks than those from older doctoral cohorts.

Focusing on academic employment in colleges and universities, table 2 shows that tenure-track faculty who had not yet received tenure reported the longest work

<sup>5</sup>Current Population Survey (CPS) data from October 2003 show that medical doctors and surgeons younger than 36 years old reported working an average of 54.1 hours per week, compared to 50.7 hours per week by those 36 or older. Similarly, the CPS found that lawyers less than 36 years old worked an average of 48.2 hours per week, compared to 45.0 hours by lawyers over 36.

FIGURE 1. Mean hours worked per week by S&E doctorate holders in full-time employment, by employment sector and year doctorate was received: 2003



SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Doctorate Recipients, 2003.

weeks on average (52.5 compared to 51.1 hours per week reported by tenured faculty). Those academics who were not on a tenure track—either because their university or college did not have a tenure system or their particular position was not tenurable—reported

TABLE 2. Mean hours worked per week by S&amp;E doctorate holders employed full time in postsecondary academic institutions, by tenure status: 2003

Tenure status	Population	
	Mean	Size
All employed full time in postsecondary academic institutions	50.71	246,762
Tenured	51.13	126,539
On tenure track but not tenured	52.51	42,795
Not on tenure track	48.72	62,144
Postdoctoral appointment	50.33	15,285

NOTE: Mean hours worked are reported for employees of postsecondary academic institutions only; this includes teachers, researchers, administrators, and other staff.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Doctorate Recipients, 2003.

working nearly 4 hours less per week than those on a tenure track, and almost 2.5 hours less per week than those who were tenured. Table 2 also shows the average work week for postdoctoral scholars. These “postdocs” reported working 50.3 hours per week on average—less than the nontenured tenure-track faculty, but more than non-tenure-track individuals, and not significantly different from tenured faculty.<sup>6</sup>

### Sex and Number of Children

Differences in work week duration were also evident vis-à-vis survey respondents' sex and number of resident children. Men worked an average of about 0.7 more hours per week than women. This difference is associated with having children under the age of 19 (here called “nonadult children”)<sup>7</sup> living in the household. Comparing those with no nonadult children in the household shows no difference in the average work

<sup>6</sup>The average work week for SDR respondents employed in higher education (50.7 hours) is lower than the average of 53.3 hours per week reported by the 1999 National Study of Postsecondary Faculty. See Linda J. Zimble, *Background Characteristics, Work Activities, and Compensation of Faculty and Instructional Staff in Postsecondary Institutions: Fall 1998*, NCES 2001-152 (Washington, DC: National Center for Education Statistics, 2001), table 23. This disparity may reflect—at least in part—differences in survey methodology: The National Study of Postsecondary Faculty derived the hours worked per week by summing responses to a series of items asking for hours spent each week on four different types of activities, while the SDR obtained its estimates from a single survey item.

<sup>7</sup>“Nonadult children” are children 18 years old or younger.

weeks of men and women. In contrast, when the household had one or more nonadult children, women reported shorter work weeks than men with the same number of children (table 3). This pattern of work week differences among women and men with children held regardless of a respondent's marital status within each employment sector (additional tables are available from the authors on request). Moreover, this pattern is consistent with findings from the American Time Use Survey, which showed that adult working women in households with children under the age of 18 spent less time at employed work than adult working men with children under the age of 18; women also devoted more time than men to providing child care.<sup>8</sup>

### Summary

The 2003 SDR data indicate that average work week lengths in the doctoral labor force differed by employment sector, with those in education working the most hours. Average work week differences were smaller among the broad doctoral fields of study, and were not clearly related to years since doctoral completion. Not surprisingly, among those in academia, untenured individuals with tenure-track appointments worked more hours than those who had already attained tenure. Both tenured and tenure-track individuals reported working longer weeks than those in non-tenure-track higher education positions. Among doctoral scientists and engineers with nonadult children, men worked more hours than women. However, among those

TABLE 3. Mean hours worked per week by S&amp;E doctorate holders in full-time employment, by sex and nonadult children living in the household: 2003

Nonadult	Male		Female	
	Mean	Population size	Mean	Population size
All full-time employed	48.97	397,379	48.25	133,583
None	49.31	208,116	49.35	82,030
One	48.57	75,052	46.88	25,516
Two	48.44	85,914	46.04	21,621
Three or more	49.13	28,297	46.56	4,416

NOTE: Nonadult children are children 18 years old or younger.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Doctorate Recipients, 2003.

<sup>8</sup>American Time Use Survey Summary ([www.bls.gov/news.release/atus.nr0.htm](http://www.bls.gov/news.release/atus.nr0.htm)).

*without* nonadult children, women worked essentially the same number of hours per week as men.

### Data Notes

The Survey of Doctorate Recipients is a biennial survey of doctoral research scientists and engineers, which has been conducted since 1973. This report is the first release of data from the 2003 survey. The focus of the survey is on the labor force experiences of this population and how those experiences change over the course of individual careers and across historical cohorts.

The 2003 SDR was administered over the period October 15, 2003, to May 31, 2005, to a nationally representative sample of about 40,000 U.S. residents who received doctorate degrees in science, engineering, and health from U.S. universities. The sample frame for the SDR is built from the Doctorate Records File, a comprehensive list of all recipients of research doctorates from U.S. universities and their demographic characteristics from 1920 to the present. Since 1958, the Doctorate Records File has been updated annually with data from the Survey of Earned Doctorates (SED), a census of new doctorate recipients sponsored by the National Science Foundation and five other federal agencies. The SDR sample is augmented every 2 years with members of the new U.S. doctoral cohorts surveyed by the SED; sample members are retired from the study after age 75. In 2003, the SDR had a response rate of 80 percent. Respondents completed the survey via a paper form sent through the mail, a telephone interview, or an online Web-based questionnaire (new to the 2003 SDR).

The measure of hours per week worked examined here is taken from responses to a question in the 2003 SDR questionnaire asking: "During a typical week on this [your principal] job, how many hours did you usually work?" The data examined here are only for those respondents who reported working 35 or more hours per week on the principal jobs held during the reference period of the week of October 1, 2003.<sup>9</sup>

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<sup>9</sup>A shortcoming of the 2003 SDR is that it did not ask about second jobs worked by the respondents and thus underestimated the total hours actually worked by some individuals. The 2001 SDR did collect data on whether respondents worked at a second job, and a total of 13 percent of the SDR full-time labor force reported so doing in 2001. Second jobs were held by 16 percent of those who held primary jobs in education, 14 percent of those with primary jobs in government, and 9 percent of those who held primary jobs in business or industry. However, because the 2001 SDR did not ask for the number of hours typically worked on that second job, the extent of underestimation in the 2003 SDR is unclear.

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