Young worker participation in post-school education and training

Although participation in post-school adult education and training has increased for all workers, data from the 1991 National Household Education Survey confirm that workers with more formal education are more likely to participate in employment-related training

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The level of formal education attained by U.S. workers increased substantially during the 1970s and 1980s.[1] Over the same period, real (inflation-adjusted) earnings declined for many workers,[2] prompting some analysts to focus on the methods by which workers augment their skills once they have completed full-time schooling.[3] Inquiry into the issue, however, has been hampered by a relative lack of data.[4]

Burt Barnow and others review most of the existing data that have been used to look at skill development after full-time schooling has ceased.[5] Among these data, the 1991 National Household Education Survey (NHES) has been perhaps the least used.[6] First conducted in 1991, the NHES is a relatively new survey designed to address a wide range of education-related issues. Because it provides information not obtained in other major surveys (for example, detailed information is obtained about the kind of training taken, reasons for taking it, and whether or not it was required by the employer), the NHES offers an additional data source for researchers, policy analysts, and others interested in the educational activities of the U.S. population.[7]

This article uses data from the 1991 NHES (Adult Education component) to provide a picture of the extent to which young workers (17 to 35 years) who are not currently enrolled in school full time participate in part-time education and training activities. Respondents were grouped by age and education level to examine how much participation in such activities varies by these characteristics. Participation rates are compared across groups classified according to the amount of formal education completed. Comparisons also are made of participation in adult education activities across age cohorts.

Much like in the earlier studies, the NHES data show that participation in part-time adult education activities has been increasing and that young workers with higher levels of formal education are more likely to participate in such activities (including employment-related training). The discrepancy is particularly great between those with at least some college education and those with only a high school diploma or less. If this discrepancy became greater during the 1980s, it could be a contributing factor to the increase in the relative earnings of more highly educated workers during the period.[8]

The first section of the article briefly describes the 1991 NHES and the sample used in the analysis. Subsequent sections include the following: a description of the data as it is organized by level of formal education and age; an analysis of the data looking at both those who participated in part-time adult education and training activities in the *12 months prior to the survey*, as well as those who had done so *at any time* since completing their formal schooling; and finally, the results of this study are compared with those of earlier studies that used the National Longitudinal Sur-

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vey of Youth (NLSY) and the Current Population Survey (CPS).

The National Household Education Survey

The 1991 NHES,[9] administered between January 1990 and May 1991 by the National Center for Education Statistics (NCES), is a telephone survey of a random sample of the civilian noninstitutionalized U.S. population. The adult education component of the 1991 NHES provided a sample of 12,568 completed interviews with adults older than 16 years of age. The adult education component is used, with the sample further restricted to 17- to 35-year-olds who were not enrolled in school full time when the survey was conducted. The young adult labor force is emphasized because of the importance of training for workers in their early years in the work force. Training early helps workers to better capitalize on what they learned in their formal full-time schooling experience; it also aids the school-to-work transition.

Respondents included in this study answered "no" to the question, "Have you been enrolled as a *full-time* student in any kind of school, training program, or other educational program in the past 12 months?" Labor force participants are defined here as those who "ever worked at a job for pay" and who said that, "in general," they considered their primary activity during the previous 12 months to have been "working at a job."

In the NHES, part-time adult education and training include any of the following: part-time college courses; continuing education courses or noncredit courses; courses by mail, television, radio, or newspaper; private instruction or tutoring; educational or training activities given by employers, neighborhood or labor organizations, churches or community groups; instruction in basic skills such as mathematics, computers, reading and writing English, or instruction in English as a second language; or any other organized educational activity.

Respondents who indicated that they had participated in any of the above forms of education or training activities were then asked to name up to four such activities in which they had participated in the previous 12 months. Followup questions were asked about each of the named activities, including the nature of the training, reasons for taking it, and whether or not it was required by the employer. Respondents who had not participated in part-time training activities in the previous year were asked if they had *ever* participated in adult education courses or other organized training activities since completing their full-time schooling. For these respondents however, no further information about the training is available.

Organizing the data

In this analysis, young adults were grouped by age and by educational attainment into the following categories: less than a high school diploma, high school diploma or equivalent, some college only and bachelor's degree or more.[10] To adjust for varying levels of work experience, slightly different age groups were used for each of the education categories: for those without a high school diploma, 17- to 29-year-olds were examined; for those with a high school diploma only, 19- to 31-year-olds were studied; for the some-college group, age was restricted to 21 to 33 years; and for college graduates, it was limited to 21 to 33 years. (See explanations below.) It would have been preferable to investigate participation in post-school education and training activities that began during the first year after respondents had left school and had become employed. Unfortunately, the data do not provide information on exactly when individuals leave full-time schooling and begin their first work experience. Also, most of the information provided by the NHES concerns participation in adult education or training during the past 12 months, rather than since leaving full-time school.

In the subsample used here, 17-year-olds without a high school diploma at the time of the survey presumably are primarily individuals who have had about 1 year of work experience after leaving full-time school. In most States, 16 years is the earliest age at which young persons may leave school, and in some States, it is even higher. The sample used in this analysis is limited to individuals who were not enrolled as full-time students in any kind of educational program in the previous 12 months, and who said their main activity in the past 12 months was "working at a job."

Assuming that most 19-year-olds with a high school diploma graduated when they were 18 years old, they would have had about a year of work experience since leaving full-time school. By similar reasoning, 21-year-olds with some college probably have had about a year of work experience as well, on average. Finally, it is assumed that most 23-year-old college graduates who were not enrolled in school full-time in the past 12 months and whose main activity was working also have had about a year of work experience since leaving school full time. Hence, by looking at 17-, 19-, 21-, and 23-year-olds, respectively, in the educational attainment categories, less than a high school diploma, high school diploma only, some college only, and college graduates, we observe a sample of individuals each with about a year of work experience.

Although it may have been preferable to analyze the data by single years of age, sample limitations made it necessary to group the data into intervals.[11] Somewhat arbitrarily, a cutoff age of 35 years was chosen to represent about the end of the first one-third of an average person's working life. Hence, the data were grouped into 12-year intervals, using the following age and education parameters: for college graduates, the age interval is 23 to 35 years; for those with some college only, 21 to 33 years; for those with a high school diploma only, 19 to 31 years; and for those with less than a high school diploma, 17 to 29 years.

Again, preferably, each of the educational attainment groups would have roughly the same amount of work experience. If everyone in each of the groups had become employed during the first year after leaving full-time schooling and worked continuously from that point forward, the average number of years of work experience for each group would equal the mean age of the group minus the minimum age for the group. The mean ages[12] for the four groups are 30 for college graduates, 28 for those with some college only, 26 for those with a high school diploma only, and 24 for those with less than a high school diploma. Hence, under the assumption of continuous work by everyone since leaving school, each of the groups will have, on average, about 7 years of work experience.

Recent training activities

Table 1 shows the proportions of the various age/education groups that participated in adult education and training activities in the 12 months prior to the survey. Participation in such activities among young adult workers clearly increases as the level of formal educational attainment increases. As described earlier, the average amount of work experience for each group is about 7 years.

The table also shows the extent of participation among young adult workers in employment-related training.[13] As can be seen readily, only a small part of such training is taken to prepare for a new job or career. In addition, as is true with other kinds of training, workers with more formal education are more likely to participate in employment-related training, further widening the gap in skills between the less-educated and those with more formal education. Workers with a high school diploma said they had participated in employment-related training in the 12 months prior to the survey at twice the rate of those without a diploma. Similarly, workers with some college only participated in such training at nearly twice the rate of those with a high school diploma only, and at nearly 4 times the rate of workers with less than a high school diploma. Finally, 63 percent of college graduates participated in employment-related training, compared with 46 percent of workers with some college only.

Employer-required training also increases with higher levels of formal educational attainment. Only about 6 percent of young workers with less than a high school diploma, for example, participated in an employer-required training activity in the 12 months prior to the survey. Each subsequent level of educational attainment adds 5 to 6 percentage points to this participation rate. There is evidence from the NHES, however, that members of the least educated group are participating in part-time education activities to improve basic reading, writing, or mathematics skills. About 6 percent of young workers with less than a high school diploma participated in adult education activities to improve their basic skills—nearly twice the proportion of workers with a high school diploma only. If improvement in such skills serves as a prerequisite for employment-related and employer-required training, then at least some of these workers are preparing themselves accordingly.

The survey also provides information about participation in various types of employment-related education or training.[14] As we would expect, the least educated group takes or receives less training than more educated groups for most categories. The very low participation rate in computer software training among young adult workers without a high school diploma—1.6 percent—may be particularly harmful to their earnings potential, given the evidence that using a computer on the job significantly affects earnings.[15] Members of the least educated group also participated in sales and marketing training at a very low rate—1.7 percent. And while their rate of participation in technical or skilled-worker training is higher, it still is only about a third of the rate for those with a high school diploma.

Groups with more formal education—such as those with some college only and those with at least a bachelor's degree—participated in most types of employment-related training at much higher rates than those with less education. For example, while the proportion of the some-college group that participated in any type of employment-related training was nearly twice that of the high-school-only group, it was about 3 times as much for executive or management development training and computer software training. In addition, members of the some-college group participated in supervisory training, professional development training, or sales and marketing training at about twice the rate of those with a high school education only.

The gap in training between college graduates and those with some college only, while substantial, was not as great as that between the some-college group and those with a high school education only. More than two-thirds of college graduates had participated in employment-related training in the 12 months prior to the survey, while 53 percent of those with some college had done so. Interestingly, the some-college group comes close to matching the college-graduates group in technical and skilled-worker training, sales and marketing training, and quality and statistical control training. Also, the gap between these two groups of young workers in the amount of computer training they have taken is not as great as that between the some-college group and the high-school-diploma-only group. Thus, pursuing some college education beyond high school clearly increases the likelihood that workers will participate in employment-related training.

Training since leaving school

Participation in part-time adult education and training among the out-of-school population has been increasing in recent

Table 1. **Percent of young adult workers participating in part-time adult education and training in the 12 months prior to the survey, by age, education, and type of training, 1990–91**

Type of training	Total	Less than a high school diploma	High school diploma only	Some college only	College graduates
	17 to 35 years	17 to 29 years	19 to 31 years	21 to 33 years	23 to 35 years
Proportion ever participating in training	56.8	21.7	45.9	79.9	77
Proportion participating in prior 12 months[1]	39.6	18.5	27.1	53.4	67.2
Employment-related training	35.2	12.2	24.4	45.5	62.9
Employer-required training	14.9	6.1	11.9	19.3	24.4
Training for new job or career	4.2	1.8	4.0	4.9	4.7
Type of employment-related training taken[1]					
Executive/management development	14.0	2.8	6.5	21.3	29.2
Supervisory training	14.0	2.7	9.1	20.1	25.6
Professional development	25.3	6.9	14.7	33.4	51.1
Technical/skilled-worker training	21.4	6.3	16.7	29.4	32.8
Computer software training	11.3	1.6	6.3	17.2	22.5
Quality/statistical control	12.7	4.8	9.9	17.6	20.0
Sales and marketing training	9.2	1.7	5.9	14.0	15.9
Job health and safety training	13.0	7.3	12.6	20.5	13.9
New employee training	8.4	3.5	6.7	13.9	11.5
Other training	.7	.8	.4	1.4	1.2
Basic math/literacy training	3.1	6.0	3.2	4.3	2.1
Sample size[2]	3,005	104	750	671	967

[1] Respondents could name up to four part-time adult education or training activities in which they had participated in the 12 months prior to the survey, and each could be classified in a different education or training category. Thus, the proportions for the subcategories sum to more than the proportions for the aggregate categories. If a respondent indicated that they had taken employment-related training, they were then asked to answer "yes" or "no" to each item on a list of different types of employment-related training.

[2] The sum of the sample sizes across the age and education groups does not equal the sample size for the total for 17- to 35-year-olds because in defining the groups, some observations were excluded—for example, those without a high school diploma who were over age 29, high school graduates over age 31, and so on. (See text for more on how the groups were defined.)

NOTE: Workers are defined here as those who were not enrolled in an education or training program full time during the 12 months prior to the survey, and whose primary activity during that period was working at a job.

Source: U.S. Department of Education, National Center for Education Statistics, National Household Education Survey, Adult Education Component, 1991.

years.[16] Data from the 1991 NHES support this conclusion, although the survey is cross-sectional and time series analysis was not performed. In 1990–91, the proportion of the out-of-school population aged 28 to 38 that had *ever* participated in any kind of adult education or training nearly matched the proportion of 39- to 49-year-olds participating in such activities (62.2 versus 65.3 percent). Moreover, the proportions for both of these groups are greater than the proportion for 50- to 60-year-olds, and all three are greater than the proportion for persons aged 61 years and older. (See table 2.) These results support the conclusion reached by other analysts[17] that participation in part-time adult education has been increasing over time.[18]

Even when the level of formal education is held constant, participation in such activities appears to be growing, particularly among college graduates. In 1990–91, 83 percent of 39- to 49-year-old college graduates had participated in part-time education or training since leaving full-time school; by contrast, 72 percent of 50- to 60-year-old college graduates had done so. Finally, just 60 percent of college graduates aged 61 years and older had participated in such activities since leaving school.[19]

Table 2 shows other evidence of increasing participation in part-time adult education and training activities as well. Among persons with less than a high school diploma, for example, 50- to 60-year-olds were less than half as likely as 39- to 49-year-olds to have ever taken such training. These results suggest that 39- to 49-year-olds in 1980–81 (most of whom were 50- to 60-year-olds by 1990–91) were less likely to participate in part-time training activities than were members of the same age cohort in 1990–91.[20]

The table also shows that persons who have achieved higher levels of formal education are more likely to have ever participated in part-time education and training activities. The evidence is especially strong for both 28- to 38-year-olds and 39- to 49-year-olds. For the other age groups, participation

increases through the first three educational attainment categories (all but college graduates). Also, the lower rates of participation among younger (17 to 27 years) and older (50 to 60 years) college graduates, relative to those with some college only, probably reflects greater use of part-time college courses by members of the some-college-only group, as many attempt to complete their college degrees.

Comparing the results of different surveys

Findings from other surveys also have documented greater participation in training activities among those with higher academic achievement. Using data from the National Longitudinal Survey of Youth (NLSY), Jonathan R. Veum examined training among young workers from 1986 to 1991, "a period in which the age range of the sample changed from 21–29 to 26–34," making it roughly comparable with the age groups used here, which range from 17 to 35 years.[21] The kinds of training asked about in the NLSY include business schools, vocational and technical institutes, correspondence courses, apprenticeships, company training, seminars outside of work, and "other."

All of the specific kinds of training referred to in the NLSY also are included in the 1991 NHES. In the latter, however, courses taken at 2- or 4-year colleges and universities are included as long as the respondents are not enrolled in a full-time course of study. To the extent that the NLSY does not capture this participation in part-time college courses, it is less comprehensive than the 1991 NHES data, and thus it should yield lower estimates of participation in education and training activities. On the other hand, the NLSY data refer to participation in training activities at any time over a 5-year period—1986 to 1991—while the NHES refers to the 12 months prior to the survey. Given such differences, caution should be used when comparing the two surveys.[22]

Data from the 1991 NHES, the NLSY, and the January 1991 Current Population Survey (CPS) show the same general trend—those who enter the work force with higher levels of formal academic achievement are more likely to participate in employment-related training activities. Table 3 compares the respective proportions participating in such activities in each of the three surveys by constructing the following ratios: the proportion of those with a high school diploma only that participated in post-school education was divided by the proportion of those with less than a high school diploma that participated in such activities; the proportion participating among those with some college only was divided by the corresponding proportion of those with a high school diploma only; and finally, the proportion participating among those with at least a bachelor's degree was divided by the proportion participating among those with some college only.

The first two rows of the table compare results from the NLSY with those from the 1991 NHES. The greatest difference in the two is that the latter shows higher ratios than does the former for the some-college/high-school-only group, as well as the college-graduates/some-college group. The difference may be attributed to the NLSY not including part-time study at community colleges, where many from these more educated groups get their training. Also, in this study, the age groups were adjusted to account for work experience, which would tend to increase rates of participation by accounting for these workers' later entry into the work force.

The last two rows of the table compare the results from the 1991 NHES with those of the January 1991 CPS. The data used

Table 2. **Percent of out-of-school population that has *ever* participated in adult education or training activities by age and education level, 1990–91**

Education level	17 to 27 years	28 to 38 years	39 to 49 years	50 to 60 years	61 years and older
Total, not enrolled full time[1]	50.7	62.2	65.3	52.2	40.0
Sample size	1,725	3,137	2,931	1,399	1,189
Less than a high school diploma	27.9	40.1	38.4	15.2	18.3
Sample size	165	145	131	106	222
High school diploma only	40.3	51.2	54.6	46.5	40.9
Sample size	700	1,022	911	490	413
Some college only	79.2	73.9	73.1	77.1	60.9
Sample size	476	882	760	334	214
College graduates	70.0	79.6	83.3	71.7	60.2
Sample size	384	1,088	1,129	469	340

[1]Persons who were not enrolled as full-time students in any school, training program, or other educational program in the 12 months prior to the survey.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Household Education Survey, Adult Education Component, 1991.

Table 3. Comparing training participation rates from the NHES with those from the NLSY and CPS

	High school diploma only relative to less than high school	Some college only relative to high school diploma	College graduates relative to some college only
Young adults from the NLSY[1]	1.8	1.3	1.1
Young adults from the 1991 NHES[2]	.2	1.9	1.4
Employed, over age 16, 1991 NHES[3]	2.4	1.7	1.4
Employed, aged 16 and older, 1991 CPS[4]	1.9	1.4	1.3

[1] In the NLSY, all respondents in each of the educational attainment categories were aged 26 to 34 in 1991. The NLSY data were obtained from Jonathan R. Veum, "Training among young adults: who, what kind, and for how long?" *Monthly Labor Review*, August 1993, pp. 27–32, table 1.

[2] The data used in these ratios are from the National Household Education Survey, Adult Education Component, 1991.

[3] The NHES data used in the computation of these ratios are for persons who were more than 16 years old at the time of the survey; the data were obtained from Teresita L. Chan Kopka and Samuel S. Peng, *Adult Education: Employment-Related Training,* NCES Report no. 94–471 (U.S. Department of Education, National Center for Education Statistics, May 1994), table 2.

[4] For the CPS, the data are for all employed persons, 16 years and older, who took skill-development training at their current job. The data were obtained from Alan Eck, "Job-related education and training: their impact on earnings," *Monthly Labor Review*, October 1993, pp. 21–38, table 8.

NOTE: Figures show the ratio of the proportions participating in education or training for the given categories. Thus, in the first data column, the figures show the proportion of those with a high school diploma only divided by the proportion with less than a high school diploma—for each of the surveys and the given universe.

here are for all workers who were employed and 16 years or older when the surveys were conducted.[23] Both sets of data show greater participation in education and training activities among the more educated. The NHES shows substantially higher participation rates for high school graduates relative to those with less than a high school diploma; and to a lesser extent, the NHES also shows higher rates for the some-college group relative to those with a high school diploma only. It should be noted that the NHES data refer to participation in the 12 months prior to the survey, while the CPS data refer to skill-improvement training taken over the course of the current job, which may account for the slight differences (in magnitude not direction) between the two.

Summary

The 1991 NHES provides a useful addition to our knowledge of the extent to which U.S. workers continue their learning and skill-development activities after leaving formal full-time schooling. A substantial proportion of these workers participated in part-time adult education activities in 1990–91, and the proportion appears to have grown over time, improving the overall quality of the work force.

The NHES data confirm that among the young adult labor force, participation in part-time adult education, including part-time employment-related training, is higher among those with higher levels of formal academic achievement. In this study, the data were grouped by age and educational attainment, using the following four categories: non-high school graduates (17 to 29 years), high school graduates only (19 to 31 years), those with some college only (21 to 33 years), and college graduates (23 to 35 years). The age categories varied for each education category in an attempt to adjust for average years of work experience. The difference in the use of part-time employment-related training between those with at least some college and those with a high school education or less was particularly large in the NHES. Moreover, only a small part of this difference is compensated for by a higher use of part-time education in basic literacy or math skills among the least educated group. These findings underscore the importance to young workers of attaining at least some formal academic education beyond high school.

The NHES data also provide information on the type of employment-related training taken by young workers. For certain types of training, young adult workers with less than a high school diploma participate at very low rates. While this might be expected for categories such as executive and management development training and supervisory training, it is somewhat surprising that only about 6 percent of these low-educated workers participated in any training required by their employer, and less than 2 percent participated in any computer software training, or any sales and marketing training. Only about 6 percent participated in technical or skilled-worker training.

Clearly there are substantial labor market advantages to attaining at least some college education. Both college graduates and workers with some college only, for example, participated in technical and skilled-worker training, sales and marketing training, and statistical and quality control training at roughly the same rate. In addition, the proportion of the some-college group that participated in computer software training was nearly 3 times that of those with a high school diploma only.

Finally, the findings of this study generally agree with similar studies using the NLSY and the CPS.[24] The NHES data, compared with the NLSY data, show somewhat higher tendencies to participate in education and training among young adult

workers with some college only versus those with a high school diploma only, and among college graduates compared with those having just some college. The discrepancy may be partly because the NLSY does not include education and training activities taken at community colleges, while the NHES does include such training, and partly because an adjustment was made to the NHES data to control for average years of work experience. □

Footnotes

ACKNOWLEDGMENT: The author thanks Tom Joyce and Fred Siskind for helpful comments on an early draft of this article.

[1] See Alan Eck, "Job-related education and training: their impact on earnings," *Monthly Labor Review*, October 1993, pp. 21–38. See also *Labor Force Statistics Derived From the Current Population Survey, 1948–87*, Bulletin 2307 (Bureau of Labor Statistics, 1988), table C-22, pp. 844–45. Although data on educational attainment of the *labor force* are available only from 1970, data on the education level of the *population* are available from 1940 and clearly show an increasing trend, suggesting that the labor force also has become more educated since 1940. See Robert Kominski and Andrea Adams, *Educational Attainment in the United States: March 1993 and 1992*, Current Population Reports, P20-476 (Bureau of the Census, 1994), table 17, pp. 93–95.

[2] See John Bound and George Johnson, "Changes in the Structure of Wages in the 1980s: An Evaluation of Alternative Explanations," *American Economic Review*, June 1992, pp. 371–92. See also *Handbook of Labor Statistics*, Bulletin 2340 (Bureau of Labor Statistics, 1989), table 85, p. 320, for historical average weekly earnings in current and constant (inflation-adjusted) dollars.

[3] For examples, see Lisa M. Lynch, ed., *Training and the Private Sector: International Comparisons* (Chicago, University of Chicago Press, 1994); Jonathan R. Veum, "Training among young adults: who, what kind, and for how long?" *Monthly Labor* Review, August 1993, pp. 27–32; and John Bishop, *Employer Training & Skill Shortages: A Review of the State of Knowledge*, working paper 91–32 (Ithaca, NY, Cornell University, New York State School of Industrial and Labor Relations, Center for Advanced Human Resource Studies, 1991).

[4] For a comprehensive statement on data needs, see Lisa M. Lynch, "A Needs Analysis of Training Data: What Do We Want, What Do We Have, Can We Ever Get It?" (mimeo., Tufts University, 1995).

[5] Burt Barnow, Linda Giannarelli, and Sharon Long, *Training Provided by Private Sector Employers*, report prepared for the Office of the Assistant Secretary for Policy, U.S. Department of Labor (Washington, DC, The Urban Institute, May 1996).

[6] For an example of an analysis that *does* use the 1991 NHES and reports similar findings to those presented here, see Teresita L. Chan Kopka and Samuel S. Peng, *Adult Education: Employment-Related Training*, NCES Report 94–471 (U.S. Department of Education, National Center for Education Statistics, May 1994).

[7] For a brief description of the NHES, see *National Household Education Survey: An Overview*, NCES Report 98-246 (U.S. Department of Education, National Center for Education Statistics, May 1998); also, Roslyn Korb, Kathryn Chandler, and Jerry West, *Adult Education Profile for 1990–91*, NCES Report 91–222 (U.S. Department of Education, National Center for Education Statistics, September 1991). For a more comprehensive report on the survey, see *An Overview of the National Household Education Survey: 1991, 1993, 1995, 1996*, NCES Report 97–448 (U.S. Department of Education, National Center for Education Statistics, May 1997).

[8] As reported by many researchers, including Bound and Johnson, in "Structure of Wages," 1992.

[9] For more information on the 1991 NHES and subsequent surveys, see sources cited in footnote 7 above.

[10] The high school degree group includes those who also had some vocational or technical training after high school but no college, while the some-college group includes those who have an associate's degree.

[11] Because most of the data on post-school education and training activities concern the prior 12 months, limiting the analysis to single years (17, 19, 21, and 23 years) would allow for comparisons to be made of workers in their first year after leaving full-time school and working at a job. Unfortunately, however, the sample was too small, and the age groups were expanded to 12-year intervals.

[12] Rounded to the nearest whole year.

[13] Employment-related training includes any courses that respondents said they were taking mainly "to improve, advance, or keep up to date on [their] current job"; or those taken "to train for a new job or a new career." Respondents who answered "yes" to the question, "Did you also have any employment- or career-related reason for taking [the training]?" also are included in this measure.

[14] If respondents indicate that they have taken some kind of employment-related training, they are then given a list of various kinds of such training and asked to answer "yes" or "no" to each item on the list.

[15] The wording in the 1991 NHES for this type of training was "Word processing or computer software training." For some evidence of the effect on earnings of lacking these skills, see Alan B. Krueger, "How Computers Have Changed the Wage Structure: Evidence from Microdata, 1984–89," *Quarterly Journal of Economics*, February 1993, pp. 33–66.

[16] See Norman Bowers and Paul Swaim, "Recent Trends in Job Training," *Contemporary Economic Policy*, January 1994, pp. 79–88.

[17] Bowers and Swaim came to the same conclusion using 1983 and 1991 Current Population Survey data.

[18] For example, the proportion for the 39- to 49-year-old group in 1990–91 was 65.3 percent. In 2000–2001, when members of the group will be aged 50 to 60, the proportion will necessarily be at least as great as it was in 1990–91, and probably greater. This means that 50- to 60-year-olds in 2001–2002 will have participated in part-time education and training activities at a greater rate than did their predecessors in 1990–91. A similar case can be made for other age groups as well.

[19] Recall that the NHES is *not* a longitudinal survey and thus some caution should be used when interpreting the data in this way; there may be some upward bias. Consider, for example, that particularly among older workers, there will be persons who will attain college degrees during the intervening years from 1990–2001, and these individuals will most likely have done so by attending education and training on a part-time basis. Thus, we would expect to observe greater rates of participation among older college graduates. The fact that we do not (at least not beyond the 17- to 27-year-old group), suggests that the tendency for participation in part-time adult education to increase over time has been strong enough to more than offset this potential bias in the data as it is presented here.

[20] These data may be downward biased to an extent. Some 39- to 49-year-olds without a high school diploma in 1990–91, for example, may attain one by the time they enter the 50- to 60-year-old cohort in 2001–2002, thus putting downward pressure on the number of 39- to 49-year-olds without high school diplomas. Similar reasoning may be applied to other groups as well. In addition, some recall bias may exist in the evidence from these data that post-school participation in adult education and training is increasing. Older age cohorts are more likely to fail to recall participation in such activities because, on average, they were involved in them longer ago. Recall problems would have to be extremely large, however, to lead to different conclusions because younger age cohorts said they participated at such high rates relative to older age cohorts. Even if comparisons were limited to 28- to 38-year-olds and 39- to 49-year-olds, where recall differences would

tend to be minimal, the conclusions hold. Finally, the structure and sequencing of questions in the 1991 NHES should minimize recall difficulties regarding this issue. Respondents are first asked, "Please tell me whether or not you have been involved in any of these *in the past 12 months*," after which they are asked to respond to each item in a list of possible education and training activities. If the respondent answers "no" to every item on the list, they immediately are asked if they have *ever* participated in any such activities, using the same list, which still should be fresh in their minds from the previous question.

[21] Jonathan R. Veum, "Training among young adults: who, what kind, and for how long?" *Monthly Labor Review*, August 1993, pp. 27–32. The National Longitudinal Survey of Youth (NLSY) is part of the larger National Longitudinal Surveys (NLS); it collects data on young men and women who were 14 to 22 years of age in 1979, interviewing the same respondents annually since then. According to Veum, the NLSY "provides some of the most comprehensive data currently available on training." For more information about the NLS, see *BLS Handbook of Methods*, Bulletin 2490, April 1997, pp. 50–56.

[22] Nonetheless, Veum reported that 38 percent of persons who were aged 21 to 29 years in 1986 received training at some time during the 1986–91 period, roughly comparable to the 35-percent figure for 17- to 35-year-olds presented here.

[23] Although the focus of the present study is on *young* adult workers, the comparison of the NHES with the CPS uses *all* workers, mainly for the sake of convenience—these results were taken from other studies that used all workers. (The NHES includes workers who were older than age 16 when the survey was conducted; the CPS data are for those 16 years and older.) As can be seen from the second and third rows of the table, the NHES shows similar results for both young workers and all workers. For the NHES, see Chan Kopka and Peng, *Adult Education*; for the CPS, see Eck, "Job-related education and training," table 8.

[24] See, for example, Veum, "Training among young adults"; Eck, "Job-related education and training"; as well as others cited above.