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HOW AMERICAN ADULTS OBTAIN WORK SKILLS: RESULTS OF A NEW NATIONAL SURVEY

PAUL OSTERMAN

Employer-provided training is an important determinant of economic outcomes, yet our understanding of its extent and distribution is well out of date—with the most recent national survey being from 2008. This article updates our understanding of employer-provided training through a 2020 nationally representative survey of 3,648 working civilian adults between the ages of 24 and 64. Results show that while employer-provided training is reasonably extensive, considerable disparities occur along the lines of race, ethnicity, and educational attainment. Additionally, the author contributes to the literature by making clear distinctions among types of employment—standard, contract (those employed by a contract company but working onsite at another firm), and freelancer (those with no employer per se). Contract workers receive considerably less employer training than do employees who work under standard arrangements. Findings are robust to a range of job skill measures as well as skill specificity. The author also examines the relationship between employer-provided training and whether people seek out training on their own and shows that the inequalities in access to employer-provided training are accentuated with self-directed training.

The turbulence and uncertainty of the US labor market over the past decades as well as worries about the impact of automation and artificial intelligence have led to a growing focus on the role of training and skill in enabling people to navigate these waters. A great deal of the policy discourse regarding the future of work has emphasized this strategy (Osterman 2019; Aspen Institute 2020; Markle 2020; Holzer 2021). The public shares in this perception as illustrated in a survey in which 54% of Americans believed that

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training is essential for career success and another 33% believed it to be important (Pew Research Center 2016).

Employer-provided training is the largest source of skill development, and there are good reasons to care about such training. Standard human capital theory emphasizes its importance, and a substantial empirical literature demonstrates a positive relationship between firm-provided training and wage growth and promotions for individuals and productivity and quality for firms (Brown 1989; Lynch 1992; Bartel 1994, 1995, 2000; Liu and Batt 2007).

Our understanding of employer training is limited because available nationally representative data are nearly 20 years old. Given the outdated nature of accessible data, the first contribution of the present article is to update findings concerning the incidence of employer training using a new and original survey, executed in January 2020 with a sample size of 3,648. I assess how access to work-skills training varies by the characteristics of firms and the personal characteristics of employees. In undertaking this study, I work with a rich set of explanatory variables that characterize the employers and the skill requirements of the job. Given widespread concern with inequality, I pay close attention to how access to training varies by race, ethnicity, educational attainment, and gender. In addition, while the literature has long recognized the importance of informal training and has sometimes measured it, little prior work models who and who does not receive it. I am able to explore this and focus on the nature of the social relationships that in part govern informal training.

A second novel contribution of the article is to identify the nature of respondent's employment relationship and assess the importance of this variation for access to training. Since 2000 there has been a growing interest in the spread of non-standard employment arrangements (Kalleberg 2009; Dey and Houseman 2010; Bidwell, Briscoe, Fernandez-Mateo, and Sterling 2013; Bernhardt, Batt, Houseman, and Appelbaum 2015; Wakabayashi 2018). By non-standard I mean freelancers who do not have an employer per se and contract company employees who are employed by one firm but are assigned to work at the site of another organization (to avoid confusion I will refer to freelancers and contract company employees, hence not using the term "independent contractor," which is sometimes used synonymously with "freelancers"). The article focuses on standard employees but also provides descriptive data on training outcomes for contract company employees and freelancers.

A third contribution is to bring to bear the survey's information on training that respondents undertook themselves—self-directed training—to ask whether people who do not receive employer training are able to make up for this by seeking out training on their own. This question is important given the impact of training on earnings trajectories and career opportunities, and it is also a question that has not been addressed in the prior literature.

Taken as a whole this article provides the most complete and the most current characterization of employer-provided training available in the literature. I show that while employer-provided training is reasonably extensive, considerable disparities occur along the lines of race, ethnicity, and educational attainment. These disparities are important for formal training and are even more striking with respect to informal training. Additionally, contract company employees and freelancers receive less employer training than do employees in standard arrangements. I also find that inequalities in access to employer training are accentuated when we consider self-directed training.

Prior Literature: Employer-Based Training

Our theoretical understanding of employer provision of training begins with Becker's (1964) classic distinction between general and specific training. General training provides skills that can be used at many employers whereas specific skills are useful only at the employer that provides them. Assuming that the two types of skills are distinct and can be identified (and this is a strong assumption upon which subsequent research casts doubt), then Becker argued that because workers are mobile the firms will not provide general training unless the worker pays for it via wages which are lower than his or her productivity. The Becker model has been refined, for example, with the introduction of the idea of task-specific skills so that jobs in reality are a mixture of the two flavors, general and specific (Gibbons and Waldman 2006), but the model retains its core characteristics and predictions.

In support of this framework, researchers who engage in fieldwork with firms report that many, particularly smaller, firms are concerned about poaching. That said, the difficulty that observers have long noted is that employers seem to provide general training and, while this is possible if wages are reduced, systematic studies that analyze data on training and compensation do not support this expectation (Barron, Berger, and Black 1997; Loewenstein and Spletzer 1999; Autor 2001).

More recently economists turned to monopsony models to rationalize the consistent finding of employer provision of general training in the absence of a wage penalty. For example, Autor (2001) argued that temporary help firms are willing to provide general training because it gives them private information on the abilities of job candidates that they can exploit in pricing their services to customers. Acemoglu and Pischke (1999) argued that if wage adjustment is constrained by frictions then firms can capture rents by providing general training that raises productivity at a faster clip than compensation rises. The net effect of these lines of thought is that our understanding of employer provision of training becomes a matter of understanding empirical patterns in the absence of clear theoretical guidance.

Another approach to theorizing about the determinants of employer training is to place it in the context of the larger framework of a firm's

internal labor market (ILM). The most straightforward version is that large firms with well-developed job ladders will provide more training because they are more likely than small firms to be able to retain employees (Lynch and Black 1998) and, as we will see, the literature does support a strong firm size effect. At a deeper level the literature argues that for some organizations training investment is a component of a human resource and production strategy that puts more responsibility in the hands of frontline employees and sometimes also implements practices such as job rotation, quality programs, and under some circumstances employee voice. Training is seen as a practice that is complementary to these job design elements (Macduffie 1995; Ichniowski, Shaw, and Premushi 1997; Black and Lynch 2001). It is of course possible to invest in training but not in the context of other practices, but the argument is that when employers broaden the scope of employees they are more likely to also invest in skill development.

Organizational sociologists also view training as a component of a firm's ILM or human resource practices. Knoke and Kalleberg (1994) utilized an employer-based survey that collected data on organizational characteristics and training policies and concluded that "company managers presumably view formal training as an integral component of a larger human resources program that defines employees' positions in the organization" (p. 544).

In short, an employer's decision to invest in training should not be viewed in isolation but rather be considered as part of a broader set of decisions about how to organize work. The empirical literature regarding employer training supports this expectation (Osterman 1995; Lynch and Black 1998; Frazis, Gittleman, and Joyce 2000). An additional implication of this framework is that as ILMs erode, firms are likely to reduce their provision of training (Cappelli 2015).

Our Understanding to Date

Up through the early 2000s a large literature on employer-provided training drew upon multiple data sets of both firms and workers. Comprehensive reviews are available in Barron et al. (1997), Mikelson and Nightingale (2004), Waddoups (2016), and Lerman, McKernan, and Riegg (2004). Since 2000, available data on employer training have been scarce and those surveys that are available are limited in important respects. The paragraphs below describe the surveys of individuals carried out since 2000 as well as the most recent nationally representative surveys of organizations.

The Educational Quality of the Workforce National Employers Survey was conducted by the Bureau of the Census in 1994 and surveyed 2,945 establishments of 20 or more employees. Public sector, nonprofit, and corporate headquarters were excluded. The training measures were assessed at the time of the survey and included formal training, broadly defined with

examples provided, and informal training. Data were also collected on the intensity of the training and the subject matter of the formal training.

The Survey of Employer-Provided Training was conducted in 1995 by the Bureau of Labor Statistics. It was unique in collecting both establishment data ($n = 1,062$) and data on random employees within those establishments ($n = 1,074$). The survey was limited to establishments with 50 employees or more. Data were collected on formal training within the 12 months prior to the survey and on informal training. Additionally data were collected on the intensity of the training and these data, for both establishments and employees, were based on a time log over a two-week period.

The 1997 National Longitudinal Survey surveyed people who were between age 12 and 16 in 1996 (and hence between 36 and 40 in 2020). The survey is conducted every two years and the most recent available wave is from 2018. The survey contains detailed information on formal training and in some waves contains questions about freelance status. It does not capture whether the respondent worked for a contracting firm. This said, the major limitation is the restricted age range which precludes generalization to the workforce.

The Survey of Income and Program Participation (SIPP), conducted by the Census Bureau, is a nationally representative survey of 16- to 65-year-olds that was administered in multiple waves but 2008 was the last wave to contain questions regarding employer-based training. The sample is large, with the 2008 survey capturing 42,000 respondents. The training question is asked with respect to the prior 12 months and employer training must be inferred from separate questions regarding any training received and who paid for or sponsored the training. The training questions do not distinguish between formal and informal training but detail is provided on intensity. Questions regarding other training venues are limited to those whose income is below 200% of the poverty line. The survey does not distinguish among the possible employment statuses (standard, freelance, contract company employee) although it does capture self-employment in general.

The Adult Training and Education Survey (ATES), a component of the National Household Education Survey and sponsored by the National Center for Education Statistics, is a large ($n = 47,744$), nationally representative survey most recently conducted in 2016. The purpose of the survey was to measure attainment of certifications and credentials and hence there is no information on training, formal or informal, that did not lead to these. Self-employment in general is captured but no distinctions are available regarding different possible employment status (standard, freelance, contract company employee).

The General Social Survey is a nationally representative survey of individuals conducted in multiple waves. The 2006, 2014, and 2018 surveys contain one question regarding formal employer training (whether any was received), but questions regarding informal training and the intensity (length) of the training were not included. One additional question was

asked in 2006 and 2016 regarding the receipt of any work-related training, but this question makes no distinction between employer training and training in other venues. The survey does make distinctions among the several alternative employment statuses.

Here I highlight three clusters of findings in the research to date: the incidence of training, firm-level contingencies regarding the provision of training, and the distribution of training by employee characteristics.

Incidence

Research regarding the extent of firm-provided training draws upon either surveys of firms (e.g., Barron et al. 1997; Lynch and Black 1998) or surveys of individuals (Lerman et al. 2004; Waddoups 2014, 2016). Matched employee-employer sampling is rare but one example is Frazis et al. (2000). In all cases the core questions are similar: what fraction of firms provide training to their employees or what fraction of individuals report having received training from their employer. A typical pattern is that incidence is higher in firm-based surveys than in employee surveys, which is not surprising as a firm could reply that it provides training even if it does so for only a small subset of its workers. It also appears, however, that estimated relationships regarding determinants of training are not sensitive to whether the survey is firm or individual based (Frazis et al. 2000). A secondary question concerns the intensity of training, that is, how many hours of training are provided or received. A third consideration regarding incidence is whether the focus is entirely on formal training or whether informal on-the-job training is considered.

One challenge in this literature is the considerable variation across surveys in the sampling frame. Surveys of individuals differ in the age range considered as well as whether the sample is all people regardless of employment status or only people who are employed. Surveys of firms vary in the size of firms, or establishments, which are sampled (and almost always the smallest are eliminated) as well as the industry (for example, whether public-sector organizations are included).

Contingencies

A consistent finding is that training incidence increases with firm size. The standard explanation is that larger firms have resources to invest in training and, keeping in mind the Becker style theory, that well-developed internal labor markets and job ladders provide incentives that reduce turnover. Moving beyond this, several employer-based studies examine whether the implementation of so-called high performance (or high commitment) work systems are correlated with greater training investments, and the expectation is supported (Osterman 1995; Lynch and Black 1998; Frazis et al. 2000). By comparison, evidence is inconsistent regarding the impact of unions. Waddoups (2014) found a positive relationship, Lynch and Black (1998) found no effect, and Frazis et al. (2000) reported a negative one.

Lynch and Black (1998) were distinctive in having data on capital intensity of establishments; they found a positive relationship with training investment and also reported that the content of training varies by industry. Finally, a general finding in those surveys that do track informal training is that it has a higher incidence than formal employer-training programs (Barron et al. 1997; Frazis et al. 2000).

Distribution

Considerable uniformity occurred across all surveys in finding that firms provide more training to their better-educated employees. This pattern has several possible explanations. Increased schooling may be correlated with greater ability to absorb or benefit from training. However, it is also possible that firms undervalue so-called frontline workers, and decision makers are more inclined to invest in people like themselves. None of the literature is able to distinguish between these possibilities. The literature is also consistent in reporting that African Americans and Hispanics are less likely than whites to receive firm-based training. With respect to gender, reports are conflicting regarding patterns.

Methods

The survey on which this article is based was conducted in January 2020 by National Opinion Research Corporation (NORC) and draws from its standing nationally representative AmeriSpeak panel.¹ The survey is limited to people between the ages of 24 and 64 who were working in civilian non-agricultural jobs. The survey was conducted online in English and Spanish. Respondents had the option of answering via telephone but only 89 respondents availed themselves of this option. Table 1 provides the relevant data for our sample and benchmarks it against the Outgoing Rotation Group of the Current Population Survey. As is apparent, the weighted survey is a close match on demographic dimensions.

A potential concern regarding the survey is that it was done largely online, which carries the possibility this might bias the findings given that not everyone utilizes the internet. As noted, the survey did provide a

¹NORC describes the survey as follows: “Funded and operated by NORC at the University of Chicago, AmeriSpeak® is a probability-based panel designed to be representative of the US household population. Randomly selected US households are sampled using area probability and address-based sampling, with a known, non-zero probability of selection from the NORC National Sample Frame. These sampled households are then contacted by US mail, telephone, and field interviewers (face to face). The panel provides sample coverage of approximately 97% of the U.S. household population. Those excluded from the sample include people with P.O. Box only addresses, some addresses not listed in the USPS Delivery Sequence File, and some newly constructed dwellings. While most AmeriSpeak households participate in surveys by web, non-internet households can participate in AmeriSpeak surveys by telephone. Households without conventional internet access but having web access via smartphones are allowed to participate in AmeriSpeak surveys by web.” For the survey reported here the survey completion rate was 0.943. Accessed at <https://amerispeak.norc.org/about-amerispeak/Pages/default.asp>%. ”

Table 1. Sample and Benchmark

	<i>2019 Census ORG Age 24–64, Employed</i>	<i>American Training Survey, Unweighted</i>	<i>American Training Survey, Weighted</i>
Percent women (%)	46.9	43.2	47.4
Mean age	42.7	42.4	42.8
Percent white (%)	61.5	61.4	61.7
Percent African American (%)	11.7	11.8	11.6
Percent Hispanic (%)	17.6	17.7	17.5
Percent Asian (%)	7.0	4.5	3.8
Percent less than high school (%)	5.6	2.9	5.1
Percent high school only (%)	26.1	22.7	31.7
Percent some college (%)	26.5	25.5	21.3
Percent college degree (%)	41.6	48.9	41.9

Notes: ORG, Outgoing Rotation Group.

telephone option although the take-up was very low. Also note that standing panels such as the one utilized here have been used in recent academic research (Kochan, Yang, Kimball, and Kelly 2019; Pedulla and Mueller-Gastell 2019; McGinty, Presskreischer, Han, and Barry 2020), government research reports (Robles and McGee 2016; Board of Governors of the Federal Reserve System 2018), and Pew Survey Research (Horowitz and Graf 2019).

Research on possible biases in online surveys is reassuring. In 2015, Pew, perhaps the leading national survey firm, executed parallel surveys and searched for differences in responses between those in the mail survey arm and those in the online arm (Keeter and McGeeney 2015). At the time, Pew reported that 89% of the population had access to the internet, a figure that has likely since increased. In their study, out of 406 survey items two-thirds had a difference in the response between the two arms of 1 percentage point or less, and only nine items had a difference of 5 percentage points or more. When they examined differences within subgroups, the most important consideration was age: Those 65 and older showed more differences between the two arms because a lower fraction of this age group was on the internet, and hence those who reply via that mode are more likely a biased sample. This finding is not a concern for the present research since the age range tops out at 64. The central conclusion of the Pew Report was that “most survey estimates produced by Web surveys will be a little different from those produced by surveys that cover the entire public” (Keeter and McGeeney 2015: 8–9).

These results are reinforced by a separate study comparing probability sampling and interviewing via Random Digit Dialing (RDD) versus via the internet. Chang and Krosnick (2009) concluded that the internet methodology was equivalent with respect to representativeness and superior with respect to self-reporting accuracy (largely attributable to the lower rate of social desirability response bias).

Variable Definitions

Definitions, means, and standard deviations of the dependent and independent variables are provided in Table 2. The survey questions on non-obvious items are provided in the Online Appendix. The key dependent variables are incidence of formal and informal skills training in the 12 months prior to the survey, a measure that most accurately enables comparison with the prior literature. The survey defined formal further skills training as “training, for example, on how to run a new machine, a new administrative process, or use a new piece of software.” The important point here is that I explicitly distinguished further training (the focus of this article) from orientation, safety, and training in workplace behaviors (the rates of receiving orientation, safety, and behavior training were high). These distinctions are not typically made in the literature. With respect to informal training, the question was: “Many people also gain job skills when their fellow employees take the time to show them how to do the job or to learn new skills. Have you received such training?” The survey also collected data on the duration (intensity) of the most recent incident of formal training, and we discuss the results for this measure.

As noted above, I distinguish between standard employees, contract company employees, and freelancers. The questions here are an improvement over the most widely used nationally representative household survey, the Bureau of Labor Statistics Contingent Worker Survey (CWS), which likely misses a good deal of contract company employment. The explanation is in part that the CWS permits proxy responses who will not know the details of employment arrangements and are unlikely to report that a job is contracting. Respondents can easily be confused by what is meant by the question phrasing because the CWS asks, “Were you employed by government, by a private company, a nonprofit organization, or were you self-employed or [if applicable] working in the family business?” and a contract company worker could reasonably answer that she was employed by the company where she works whereas another could refer to their legal employer (National Academies of Sciences 2020: 9). With these concerns in mind the survey instrument was carefully designed to follow best practice with respect to the definitions and measurement of these employment categories (Abraham, Hershbein, and Houseman 2019). The sequence of questions that made these distinctions is reported in the Online Appendix.

A few additional variables deserve comment. The specific skills variables are based on questions: “If you changed jobs how useful would the skills you received in training be to a new employer in the same industry? If you changed jobs how useful would the skills you received in training be in a different industry?” The answers to these questions were on a 1 to 5 scale from totally transferable to not at all transferable, and I assign a positive value if the answer was totally or mostly transferable. The framing is similar to that used elsewhere in the literature (Loewenstein and Spletzer 1999; Waddoups 2014) but I add the distinction between same industry and different industry specificity.

Table 2. Variables: Definitions, Universe, Means, and Standard Deviations

<i>Variable name</i>	<i>Variable definition</i>	<i>Universe</i>	<i>Mean</i>	<i>Standard deviation</i>
Dependent variables				
Incidence of formal training	Whether received formal skills training in the previous 12 months	Everyone For contract company employees the training is from the work site and the legal employer. For freelancers it is from the most recent client.	.553	.497
Intensity of formal training	Length (hours) of most recent formal training episode	Standard employees	14.353	33.255
Incidence of informal training	Whether received informal training in previous 12 months	Everyone For contract company employees the training is from the work site and the legal employer. For freelancers it is from the most recent client	.471	.499
Independent variables				
Demographic characteristics				
Age	Age in years	All	42.7	11.6
Gender	1 if female, 0 otherwise	All	.47	.49
College	1 if attained college degree or more, 0 otherwise	All	.42	.49
High school	1 if attained high school degree or less, 0 otherwise	All	.36	.48
African American	1 if African American, 0 otherwise	All	.11	.32
Hispanic	1 if Hispanic, 0 otherwise	All	.17	.38
Asian	1 if Asian, 0 otherwise	All	.03	.19
Organizational characteristics				
Union	1 if employment covered by union contract, 0 otherwise	Standard employees and contract company employees	.16	.36

(continued)

Table 2. Continued

<i>Variable name</i>	<i>Variable definition</i>	<i>Universe</i>	<i>Mean</i>	<i>Standard deviation</i>
Size1	1–50 employees at work location (excluding temps and contract company employees)	Standard employees	.30	.46
Size2	51–100 employees at work location (excluding temps and contract company employees)	Standard employees	.10	.30
Size3	101–250 employees at work location (excluding temps and contract company employees)	Standard employees	.10	.30
Size4	251–500 employees at work location (excluding temps and contract company employees)	Standard employees	.07	.26
Size5	501–1000 employees at work location (excluding temps and contract company employees)	Standard employees	.06	.25
Size6	1001 or more employees at work location (excluding temps and contract company employees)	Standard employees	.13	.33
Specific1	1 if skill is totally or mostly transferable to employer in same industry, 0 otherwise	Standard employees and contract company employees	.73	.44
Specific2	1 if skill is totally or mostly transferable to employer in different industry, 0 otherwise	Standard employees and contract company employees	.31	.46
Problems	1 if solve difficult problems at least weekly, 0 otherwise	All	.47	.49
Physical Documents	1 if physical work at least weekly 1 if read 5-page documents at least weekly, 0 otherwise	All All	.40 .35	.49 .47
BasicMath	1 if use basic math (addition, subtraction, multiplication) at least weekly, 0 otherwise	All	.75	.42
AdvancedMath	1 if use math beyond basic at least weekly, 0 otherwise	All	.38	.48

(continued)

Table 2. Continued

<i>Variable name</i>	<i>Variable definition</i>	<i>Universe</i>	<i>Mean</i>	<i>Standard deviation</i>
BasicComputer	1 if work with basic computers (email, word processing, web search but not a device such as a cash register tied to a computer) at least weekly, 0 otherwise	All	.78	.41
AdvancedComputer	1 if use computers beyond basic at least weekly, 0 otherwise	All	.68	.46
Teams	1 if work in teams at least weekly, 0 otherwise	All	.74	.43
Additional controls				
Part time	1 if usually work less than 35 hours a week, 0 otherwise	All	.15	.36
Hired in past 12 months	1 if hired in the past 12 months	Standard and contract company employees	.19	.39
Government	1 if their employer is a government organization	Standard employees	.17	.37
Unemp	U-6 unemployment rate in state of residence. The U-6 unemployment rate includes the standard measure plus discouraged workers plus people who want work but have not looked plus involuntary part-time worker.	All	6.9	1.6
Likelihood of being laid off	1 if very likely to be laid off within 5 years, 0 otherwise	Standard employees and contract company employees	.05	.23
Likelihood of quitting	1 if very or somewhat likely to quit your job, 0 otherwise	All	.24	.42

Source: American Training Survey.

Notes: Survey questions on non-obvious items are provided in the Online Appendix.

Table 3. Classifying the Workforce

	<i>Percentage</i>
Standard employees	81.4
Contract company employees	10.8
Freelancers in main job	7.7
Additionally	
Standard in main job, who are freelancers in second job	5.7
Contract company employees on location for less than a month and hence considered temp workers	2.1
Traditional self-employed	3.5

Source: American Training Survey.

Notes: See footnote 2 for a description of how these categories were measured.

The job skill variables are based on a question stem that asks, “How often does the following occur in your main job?” and then lists the skill or activity and offers a 5-point response option for each that ranges from never to every day. The variable used here takes on a positive value if the answer was at least once a week (for a discussion of construction of skill variables see Handel 2020).

Additional variables employed in the training models are age, gender, race, ethnicity, establishment size, union status, part-time status, job tenure, and whether the employer is a governmental organization. When we turn to understanding self-directed training I also consider the local unemployment rate and the respondents’ expectations regarding job security and their quit intentions.

Incidence of Employer Training

As noted above, I distinguish among relationships between employees and employers, and the distribution of employment status is reported in Table 3. As is apparent, standard employment dominates but non-standard situations are relatively common. These categories are potentially important in affecting access to training; most previous person-based surveys of training have not made these distinctions.

The training patterns and how they vary by the categories of respondents are shown in Table 4. As mentioned previously, these training figures exclude orientation, safety, and workplace behavior training. Note that in the first two columns I include main job freelancers and this may seem strange given that they do not have an employer. In fact though, it is possible for a client to provide a freelancer with training about a specific process or technology.² Additionally, among main job freelancers 25.5% reported

²One might wonder whether a client can legally provide training to a freelancer. This is not a problem on its face as regulatory policy does permit some training. The Department of Labor rule at the time of the survey for what constituted joint employment (and hence what might discourage the work site from offering training) was a 5-factor test that does not include any mention of training. Additionally, when Courts determine employee status under the Fair Labor Standards Act they generally employ a 6-factor “economic realities” standard that does not include training (Congressional Research Service 2021).

Table 4. Incidence of Formal and Informal Employer-Provided Training

	<i>Everyone</i>		<i>Standard employees only</i>	
	<i>Formal training (%)</i>	<i>Informal training (%)</i>	<i>Formal training (%)</i>	<i>Informal training (%)</i>
Everyone	55.3	47.1	58.6	49.9
Women	54.2	47.2	56.8	50.0
Men	56.4	46.9	60.3	49.9
White	57.3	49.8	60.3	52.9
African American	57.1	47.0	60.1	47.2
Hispanic	49.4	40.7	53.7	44.4
Asian	57.0	48.1	57.4	50.4
High school or less	48.1	32.5	51.9	34.8
Some college	55.9	48.7	57.1	51.8
College degree	62.2	60.0	64.6	62.1
Age < 35	55.3	51.4	58.9	56.0
Age 35–54	55.4	45.6	58.3	47.6
Age 55+	52.0	43.4	56.8	47.0

Source: American Training Survey.

Notes: Training, both formal and informal, refers to training in 12 months prior to the survey. Training for everyone includes training received by contract company employees and freelancers as well as standard employees.

Significantly different from category as a whole (first row) at 5% level.

Significantly different from category as a whole (first row) at 10% level.

that they worked regularly at the client’s site and 20.1% reported that they worked occasionally at the client’s site, and proximity also could impact training. Because the prior literature utilizing surveys of individuals does not distinguish between freelancers, contract company employees, and others, my including them in the first two columns facilitates comparison with earlier patterns. The last two columns focus only on standard employees, who are the focus of this article, and excludes main job freelancers as well as contract company employees.

Beginning with the top row we see that both formal and informal further training are reasonably extensive with more than half the workforce having received such training in the past 12 months. A natural question is how this overall rate of training compares to previous research but this is difficult to assess because of the wide range of sampling designs and time periods as shown in the paragraphs above in the Our Understanding to Date section. In addition surveys vary in how they define formal training (they are consistent in defining informal training). At one end of a spectrum the 1995 Survey of Employer-Provided Training (SEPT) limits itself to classroom or video activities with a defined curriculum. The 1997 National Employer Survey defines training as “all types of activities with a pre-defined objective,” and the General Social Survey asks about “any formal training from your current employer, such as in classes or seminars sponsored by the

employer.” The SIPP asks about “any kind of training designed to improve skills in [your job].”³ As the Online Appendix indicates, the definition used here first excludes orientation, workplace behavior, and safety training and then asks, “Has your employer or organization at your main job provided you job-related training (for example, training on how to run a new machine, a new administrative process, or use a new piece of software)?”

Keeping these definitions in mind, the overall level of incidence reported here is in the middle of the range of earlier surveys. Frazis et al. (2000), utilizing the 1995 SEPT of 50 employees or more, reported that 69.8% of employees received formal training in the past year. Lynch and Black (1998) used a 1994 employer survey that excluded the public sector and nonprofits. They reported that among the 81% of establishments that provided training, more than 40% of employees received formal training in the previous year, which implies an overall 32% rate. Waddoups (2016), drawing upon the 2008 SIPP survey, reported that 14.9% of workers age 16 to 65 received formal employer training in the past year to improve their skills, although the SIPP data are considered by some scholars to be outliers (Barron et al. 1997: 47). In their review of three surveys with different sampling frames, Mikelson and Nightingale (2004) reported that approximately 70% of employees received training from their employers although the time frame over which this training took place was unclear. Lerman et al. (2004) reviewed several surveys and found that the fraction of employees who received formal training varied between 26% and 65%. In 2018 the General Social Survey reported that 51% of respondents had received training from their employer. Finally, all researchers reported high levels of informal training with, for example, Lynch and Black (1998: 69) finding that “virtually every” establishment reported it and Lerman et al. (2004) characterizing it as “ubiquitous.”

Turning to the details of Table 4, it is apparent that no gender differences occur with respect to access to either formal or informal training. However, whites are consistently and significantly advantaged, Hispanics are consistently and significantly disadvantaged, and African Americans also receive less training although the patterns for them do not always reach standard levels of significance. Additionally, people with low levels of education, high school or less, receive less training whereas those with a college degree receive more. Age patterns do not lend themselves to a clear conclusion. To summarize, those groups that face labor market challenges on other dimensions such as wages also face difficulties when it comes to accessing employer-provided training.

³For descriptions of the training questions, see Frazis et al. 2000; Lynch and Black 1998; <https://www2.census.gov/programs-surveys/sipp/questionnaires/2008/sipp-2008-panel-wave-02-topical-module-questionnaire.pdf>, and <https://gss.norc.org/get-documentation/questionnaires>.

Determinants of Training

I conduct a multivariate analysis of the determinants of employer-provided training for standard employees, turning first to formal training and then to informal training. For both types of training, I proceed in two stages, first examining only demographic characteristics and then adding the full range of independent variables. In the full model, the independent variables are organized into several groups. The first group is demographic variables, education, and race and ethnicity; the second group controls for part-time status and whether the respondent is a new hire within the past year; the third grouping contains variables regarding the nature of the employer; and the final grouping controls for the job skills utilized by the respondent. In addition, the model includes occupational fixed effects. All models are logit estimates given the binary nature of the dependent variable, and the coefficients that are reported are the marginal effect of each variable with all variables taken at their means (this is the case in all subsequent logit models).

For formal training, the first column of Table 5, with only demographic and education variables, shows that neither age nor gender are significant in differentiating who does and does not receive further training. As was true in the descriptive table, those with low levels of formal education and Hispanics are disadvantaged. The education finding is consistent with virtually all of the prior training literature.

The second column reports the full model, and the effect of a college degree disappears when the nature of the job variables and occupational controls are added. Evidently the common finding that access to further training is correlated with education is confirmed but the underlying pattern is that education's impact is explained by occupational attainment and employer characteristics. The disadvantage experienced by Hispanics persists and a significant disadvantage for Asians also emerges.

Part-time status somewhat surprisingly does not seem to impact access to training, a finding that is inconsistent with the widespread finding in the literature that part-time workers are at an earnings disadvantage. The positive coefficient on the new hire variable indicates that training is biased toward new hires, a finding that is reasonable even though our training measure does not include various forms of orientation training.

Turning to the characteristics of the employer, as expected and as consistent with the literature, small establishments are less likely to provide further training (the omitted category in the model is establishments with between 1 and 50 employees). As noted above, the literature is mixed with respect to the impact of unionization; however, in these data employees who are covered by a union contract are more likely to receive training. Finally, employees in the public sector experience higher rates of training relative to private-sector workers, a finding that contributes to the broader literature comparing public- and private-sector working conditions and wages.

*Table 5. Formal and Informal Training for Standard Employees
Previous 12 months*

	<i>Formal training With demographic and education variables</i>	<i>Formal training With full set of variables</i>	<i>Informal training With demographic variables</i>	<i>Informal training With full set of variables</i>
Gender	-.014 (.018)	-.028 (.023)	-.007 (.019)	-.003 (.023)
Age 35-54	-.013 (.020)	-.023 (.022)	-.049 (.021)	-.042 (.023)
Age 55+	-.029 (.027)	-.015 (.031)	-.061 (.028)	-.017 (.032)
High school or less	-.046 (.025)	.014 (.028)	-.106 (.026)	-.066 (.029)
College degree	.063 (.022)	.018 (.026)	.127 (.022)	.082 (.026)
African American	-.022 (.029)	-.033 (.033)	-.071 (.030)	-.057 (.034)
Hispanic	-.103 (.025)	-.078 (.028)	-.091 (.026)	-.080 (.029)
Asian	-.045 (.044)	-.085 (.048)	-.088 (.045)	-.084 (.050)
Union		.094 (.032)		-.016 (.030)
Size2		.101 (.032)		.043 (.033)
Size3		.118 (.032)		.055 (.033)
Size4		.147 (.037)		.087 (.037)
Size5		.147 (.037)		.097 (.038)
Size6		.180 (.030)		.089 (.030)
Specific1		.100 (.026)		.133 (.028)
Specific2		-.019 (.022)		.010 (.023)
Problems		.025 (.023)		.096 (.024)
Documents		.004 (.024)		-.022 (.024)
Physical		-.031 (.024)		-.007 (.024)
Basic math		.109 (.028)		.068 (.029)
Advanced math		-.080 (.023)		-.036 (.023)
Basic computer		.031 (.035)		.037 (.037)
Advanced computer		.071 (.027)		.013 (.029)
Teams		.162 (.025)		.094 (.026)
Government		.074 (.030)		.035 (.030)

(continued)

Table 5. Continued

	<i>Formal training With demographic and education variables</i>	<i>Formal training With full set of variables</i>	<i>Informal training With demographic variables</i>	<i>Informal training With full set of variables</i>
Part-time		-.036 (.032)		-.004 (.033)
New hire		.152 (.028)		.144 (.028)
Occupation fixed effects	No	Yes	No	Yes
<i>N</i>	2,969	2,710	2,965	2,704
Log likelihood	-1976.82	-1638.976	-1983.186	-1719.570
Pseudo <i>R</i> ²	.012	.094	.033	.079

Source: American Training Survey.

Notes: Training, both formal and informal, refers to training in 12 months prior to the survey. The estimation is a logit model and the reported coefficients are the marginal effects with variables set at their mean. Contract company employees and main job freelancers excluded. Standard errors in parentheses.

Significant at 10% level; significant at 5% level.

With respect to the Becker model the results here do not speak to whether an employer will offer any general training but they do show that firms are more likely to offer further training in the presence of firm-specific (but not industry-specific) skills. This finding, along with the educational patterns and establishment size patterns, supports a good deal of the classical thinking regarding the provision of training.

The results for the skill content of the work are striking. As much of the future of work discussion implies, basic math and computer skills beyond the basics are associated with increased levels of further training. But at the same time, and consistent with earlier research on the relationship between high performance work systems and training (Osterman 1995; Lynch and Black 1998; Frazis et al. 2000), involvement in teams also implies additional further training. The negative coefficient on advanced math is hard to explain although one could speculate that people in math-intensive jobs arrive at work with math skills already in hand and hence do not require additional training.

The foregoing discussion examined the incidence of formal training but additionally, as noted in the literature review, the amount of training people receive—what the literature terms intensity—is also important for characterizing employer investment in their workforce. The survey asked about the hours of the most recent episode of formal training in the year prior to the survey and 70.4% reported that it was a day or less, 20.3% reported more than a day and less than a week, and 9.2% reported a week or longer. These durations may appear quite short but it is important to keep in mind that they refer to only the most recent spell and they are consistent with the literature. For example, Frazis et al. (2000) utilized a time diary and

reported that a typical episode of formal training during the period in which data were collected averaged 13.4 hours.

To explore this further I estimated a Tobit model for hours of training that included the same variables as the full model in Table 5. The results (not shown but available from the author) were largely similar to Table 5: the size fixed effects, union coverage, recent hire, industry skill specificity, simple math, advanced computer skills, and working in teams were all positive and significant, and advanced math was negative and significant. The only difference with Table 5 was that neither the race/ethnicity measures nor working in the public sector were significantly correlated with intensity of training.

Informal Training

Much of the literature, and many fieldwork observations, suggest that informal training is as important as formal training in providing skills, and Table 3 showed that the incidence patterns are similar to those for formal training. An important feature of informal training is that it is driven not only by the policies of the employer but also by the nature of interactions within the workforce.

In the third column of Table 5, which includes only demographic variables, we see that older employees receive less informal training than does the younger group. Additionally, Hispanics, African Americans, and Asians are all disadvantaged relative to whites. The education patterns are similar to those for formal training with better-educated employees receiving more.

In the last column with the full set of controls we see that, unlike the case for formal training, the education differentials persist. Quite strikingly the race and ethnic disparities also persist despite the full set of controls, and while the disadvantage of older workers is somewhat attenuated it too persists to some degree.

The structural characteristics of the employer, while important to some degree, play a smaller role for informal than for formal training. Union status is not important nor is public-sector status. Although one might expect that smaller organizations encourage more interaction among employees, nonetheless, larger size is associated with more informal training though the magnitude of the coefficients are notably smaller than in the formal training model. When it comes to job content the pattern is similar to that for formal training although the “soft skill” of solving complex problems takes on more importance for informal than formal training.

The patterns shown for informal training are new to the training literature. These data obviously rely on the recollection and perception of respondents and we do not actually observe interactions. This said, the results here raise significant questions regarding equity in access to job skills and, more broadly, about fairness in employment relationships.

Table 6. Employer Training, Contract Company Employees, and Freelancers

	<i>Formal training (%)</i>	<i>Informal training (%)</i>
Standard employees only	58.6	49.9
Contract company employees from legal employer	38.1	36.6
Contract company employees at site where assigned	33.5	35.1
Contract company employees, both sources	48.8	48.4
Main job freelancers from most recent client	29.9	14.8
Main job freelancers, work regularly at client site	36.5	15.4
Main job freelancers, work sometimes at client site	40.5	17.7
Main job freelancers, work never at client site	22.9	13.6

Source: American Training Survey.

Notes: Training, both formal and informal, refers to training in 12 months prior to the survey.

Statistically different from standard employees at 5% level.

Training for Contract Company Employees and Freelancers

The foregoing focused on standard employees who, as noted, constitute 81.5% of the adult workforce. What about the training provided to contract company employees and people who are freelancers in their main job? The training patterns for both groups as well as for standard employees who are the relevant comparison group are provided in Table 6.

Contract company employees have a legal employer from whom they may receive training (Autor 2001), and additionally, they may receive training from the site where they are assigned. The patterns in Table 6 show that when the two sources are considered separately, contract company employees receive less training than do standard employees but the gap closes considerably when training from the work site and training from the legal employer are aggregated. Nonetheless the gap with standard employees even after aggregation is statistically significant for formal training though it is insignificant with respect to informal training.

Main job freelancers differ from contract company employees in that they may have multiple clients and do not necessarily work at the client's site. Hence, the question of whether they receive formal or informal training from their client takes a different form. The survey asked freelancers to think about the training provided by the client for whom they worked the most weeks over the past year whether they work regularly, occasionally, or never at that client's site. As already noted, among main job freelancers, 25.5% reported they worked regularly at the client's site, 20.1% reported they worked occasionally at the client's site, and 54.4% never worked at the client's site. The median number of weeks a freelancer in their main job worked for their longest client was 30 and the mean was 27.4 with a standard deviation of 19.7.

Table 6 shows that as a group freelancers receive considerably less employer training than do standard and contract employees. Also, and not surprisingly, a positive relationship is seen between how much time a

Table 7. How People Obtain Job Training on Their Own, Not Provided or Required by Employers

	<i>Ever</i>		<i>Past 12 months</i>	
	<i>Everyone (%)</i>	<i>Everyone (%)</i>	<i>Standard and contract company employees (%)</i>	<i>Main job freelancers (%)</i>
Ever done any: at least 1 of 5 venues	47.2	18.9	18.4	25.7
Community colleges	19.4	1.8	1.8	1.6
Online programs	29.3	15.0	14.0	21.5
Proprietary schools	14.3	2.5	2.4	3.1
Union-affiliated training or union based apprenticeships	6.0	1.0	1.0	0.6
Training programs offered by governments, community groups, and nonprofits	11.8	4.1	4.0	4.8

Source: American Training Survey.

Notes: Incidence of union-based training includes union apprenticeships, which, unlike the questions regarding the other venues, may include employer involvement.

freelancer spends at the client’s site and whether he or she receives employer-provided training.

Self-Directed Training

Faced with the disparities documented above, a reasonable question is whether people seek out training on their own. This is certainly possible given the wide array of venues for obtaining skills training. To explore this the survey asked, “As an adult, have you done any training or education to improve your work skills because you wanted to, and it was not provided nor required by an employer or client?” This question was asked regarding training in community colleges, proprietary schools, online training, government or community job training programs, and union training. Table 7 shows the responses broken out by employment status.

Several lessons emerge from these data. First, over their careers half of employees have undertaken skills training on their own. Second, if one asks about training undertaken on their own at any point in their adult career, then educational institutions—community colleges and proprietary schools—are important whereas later in their career (i.e., the past year) other venues take on more importance. Perhaps the most striking feature of the data is the prevalence of online education. The survey asked about the nature of the online training and among those who accessed online training 38.2% utilized formal programs that were paid, 37.9% participated in formal unpaid programs, and 16.5% used sites such as YouTube. A final observation is that, not surprisingly, it is clear that freelancers undertake more training on their own initiative than do people in standard jobs, and that for freelancers online education dominates.

Table 8. Confidence and Familiarity with Training Venues

	<i>Less than college degree</i>			<i>College degree or more</i>		
	<i>Very or not unfamiliar (%)</i>	<i>Somewhat confident (%)</i>	<i>Confident (%)</i>	<i>Very or not unfamiliar (%)</i>	<i>Somewhat confident (%)</i>	<i>Confident (%)</i>
Community college	57.4	24.7	17.6	64.0	28.9	6.0
Proprietary school	49.6	25.3	24.8	56.3	30.5	12.9
Online	55.1	25.3	19.5	74.1	19.2	6.5
Union	32.1	36.2	31.4	29.8	43.6	26.3
Community/Government	45.3	30.2	24.3	57.9	31.4	10.6

Source: American Training Survey.

A natural question is to ask who does and does not seek out further training. I focus on activities undertaken in the 12 months prior to the survey because it would not be reasonable to relate current circumstances to training decisions made decades earlier.

When asked about their degree of interest in obtaining more training on their own, 25.5% said they were very interested and 23.9% reported they were somewhat interested. When I listed a set of obstacles to training, not surprisingly the two most cited were lack of time (48.5%) and cost (65.1%). This said, additional obstacles may be lack of confidence and lack of knowledge regarding options. Such gaps could affect whether people who want training seek it out or whether people even want more training. Table 8 provides data on people's responses regarding confidence and knowledge of training options, distinguishing between college and non-college graduates.

The most striking aspect of these figures is the sharp difference in confidence and familiarity by education level. For people without college degrees, only community colleges and online achieve a 50% confidence level and then just barely. For college graduates, only unions fall below 50% and community colleges and online clear this bar very comfortably.

In addition to the general question of who undertakes training on their own, a question of particular interest is the relationship between whether the respondent received employer-provided training and whether they sought out training on their own. Table 9 provides the patterns for standard employees, contract company employees, and freelancers. Notably, among standard employees and contract company employees, those who received training from their employer or their work site are more likely to seek out training on their own. By contrast, that relationship does not occur among freelancers, a reasonable finding given the low extent of client-provided training.

These patterns among standard employees and contract company employees suggest that self-directed training reinforces disparities rather than compensating for them. Table 10 shows the results of logit models for whether the respondent sought out additional training over the 12 months prior to the survey. The first column contains the results for standard

Table 9. Training on Own in Past 12 Months in at Least One of Five Venues

	<i>Received training from employer (client) or work site (%)</i>	<i>Did not receive training from employer (client) or work site (%)</i>
Standard employees or contract company employees	23.1	12.1
Freelancers in main job	27.0	25.0

Source: American Training Survey.

Notes: Training rates are for the 12 months prior to the survey. Venues include community college, proprietary school, online, union, community or government programs. Unions include both apprenticeships and joint programs with employers. The table should be read as saying, for example, that 23.1% of standard or contract company employees who did receive training at their work site also sought out training on their own, whereas 12.1% of standard or contract company employees who received no training at their work site sought out training on their own.

Table 10. Self-Directed Training during Previous 12 Months

	<i>Standard employees and contract company employees</i>	<i>Freelancers</i>
Gender	.017 (.014)	-.015 (.057)
Age 35–54	.004 (.015)	.009 (.065)
Age 55+	-.044 (.022)	-.084 (.075)
African American	.023 (.021)	-.271 (.111)
Hispanic	.005 (.019)	-.055 (.079)
Asian	.058 (.030)	-.049 (.127)
High school or less	-.065 (.021)	-.233 (.083)
College degree	.034 (.016)	.026 (.061)
Training from employer (client)	.113 (.014)	.042 (.057)
Unemployment	-.0001 (.004)	-.006 (.016)
Layoff likelihood	.080 (.026)	—
Quit likely	.041 (.015)	.068 (.063)
<i>N</i>	3,230	284
Log likelihood	-1547.340	-154.566
Pseudo R^2	.041	.071

Source: American Training Survey.

Notes: Training refers to the 12 months prior to the survey. Dependent variable is whether the respondent undertook training at own initiative without employer support at one of five venues. For contract company employees the employer training variable includes training from their legal employer and training at the site where they are assigned to work. The estimation is a logit model and the coefficients are marginal changes at the means of all variables. Standard errors in parentheses.

Significant at 10% level; significant at 5% level.

employees and contract company employees, both of whom have legal employers who provide training, and the second column for freelancers in their main job. It is reasonable to expect that the decision to undertake training on one's own is influenced by expectations regarding future prospects at the current job and hence, in addition to the variables used in prior models, the regressions for employees and contract company employees also include controls for whether the respondent expected to leave his or her job either voluntarily or involuntarily. (I do not include the layoff variable for freelancers since the meaning is unclear for them.)

Among standard employees and contract company employees it is apparent that the disparities are reinforced when it comes to self-directed training. Those with higher levels of education are more likely to seek out training as are those who received training from their employer. Unlike the case for employer-provided training, race and ethnicity are not factors in influencing utilization of self-directed training. Interestingly, and logically, people who expect to leave their job either voluntarily or involuntarily are also more likely to seek out training on their own. These patterns are attenuated for freelancers but the educational divide remains important. Given that main job freelancers represent approximately only 7% of the workforce, it is clear that overall self-directed training reinforces rather than compensates for the disparities that we have observed for employer-provided training.

Discussion and Conclusion

As shown in this article, slightly more than 50% of employees received further training in the 12 months prior to the survey. This finding represents the first national estimate of employer-provided training that has been available since 2008. With respect to patterns of who does and does not receive formal employer training, many of my findings, such as support for the role of skill specificity and the importance of establishment size, are consistent with the literature and provide support for the core theoretical ideas regarding provision of employer training. Other findings, such as the relationship between job skill requirements and training and the importance of distinguishing employment status (standard, contract company employees, freelancers), are new to the discussion. With respect to informal training I show that disparities based on race and ethnicity are even more important than they are for formal training, likely due to the importance of social relationships. Finally, accounting for the extent of self-directed training and examination of its relationship to employer-provided training is also new to the literature.

Many of these findings are ripe for a debate regarding whether the glass is half full or half empty. One might be concerned that nearly half the workforce received no training from their employer over the past year. And yet, we have no standard against which to judge how much training is necessary or appropriate, so perspectives may differ on this question. It is perfectly

possible that a person in a good job and with marketable skills does not need any additional training. To which, to continue the dialogue, it might be replied that in an increasingly precarious labor market ongoing skill training is an essential protection for everyone.

Even if one takes a sanguine view on average, what is perhaps most worrying about these results is 1) the finding of a consistent pattern of reduced access to formal and informal employer training for low education employees and 2) the evidence of racial and ethnic disparities. These disparities are reinforced when one considers self-directed training.

With respect to encouraging employers to provide more training, there are two challenges. The first is the standard Becker argument that employers will be reluctant to invest in skill training if the people whom they train will be poached. However, employer monopsony power creates possibilities for firms to reap the benefits of training investments (Acemoglu and Pischke 1999). The second concern is that in some industries, for example retail and restaurants, a flat job structure limits opportunities for employees to benefit from training (Batt, Lakhani, Lee, and Ouyang 2020; Carré and Tilly 2020).

Unionization is associated with increased employer investment but otherwise policymakers and advocates have struggled to find success. Periodically business and political leadership attempt to use the bully pulpit to press employers to adopt high road policies including greater investments in training, but these efforts tend to be ephemeral with little measured impact. Another approach lies in incentives such as training subsidies delivered directly or through the tax system (Fitzpayne and Pollack 2018), and, while promising, any effort along these lines will require a solution to the challenge of measuring incremental effort and hence avoiding payment to employers to do what they would do anyway.

An alternative is to work with firms to build internal career ladders that benefit lower ranking employees and also benefit firms by assuring them of a more predictable and reliable labor supply. Clear examples of success on this front have been documented, such as the experience of JVS in Boston in working with large hospitals to build career ladders (Osterman and Shulman 2011). Health care is particularly promising for these initiatives since the industry is heavily reliant on public funding and licensing, and hence employers are more likely than the typical firm to be responsive to pressures to improve job quality. Outside of health care, however, practitioner experience points to the challenges of career ladder initiatives. Enormous effort is required to interest employers in even considering participation in public training programs, and those organizations that do gain firms' attention still find it difficult to entice them to participate even in subsidized training (Barnow and Spaulding 2015).

The second broad strategy is expanding the public job training system to compensate for disparities in workplace training (Osterman 2020). A striking fact that is often overlooked in discussions of public employment policy

is that to an important extent we know what works. Specifically, we have good evidence that community colleges pay off for students who complete certificates or degree programs and that best-practice training programs raise the earnings of participants.

When students complete a degree or certificate at a community college the rate of return is good. While randomized control trials are not available for standard programs, sophisticated fixed-effect modeling, sometimes using survey data and sometimes using administrative data, support this conclusion. For example, an assessment using administrative data from six states found that completing an AA degree improved annual earnings by between \$4,640 and \$7,160 compared to entering the college and not obtaining the credential (Belfield and Bailey 2011). Smaller but positive results were also reported for completion of a certificate. A study of Career and Technical Education (CTE) in California community colleges reported earnings gains of between 14 and 28% (Stevens, Kurlaender, and Grosz 2018) and other studies have reached similar conclusions (Jepsen, Troske, and Coomes 2014).

High quality evaluations show a substantial payoff to the best practice training models. A strong example is Project QUEST in San Antonio, which was subject to a randomized controlled trial (RCT) with a nine-year follow up (Roder and Elliott 2019). From year three to year nine, participants earned significantly more than the control group and by year nine the gap was more than \$5,000 per year in annual earnings. These impacts are not unique to QUEST; other rigorous evaluations of other best practice intermediaries also found positive results (Conway, Blair, Dawson, and Dworak-Muñoz 2007; Hendra et al. 2016a, 2016b; Gasper, Henderson, and Berman 2017; Pavetti 2018). The challenge is not knowing what works but bringing programs to scale, and this in turn requires funding.⁴

With respect to future research, while the American Training Survey provides contemporary assessment of access to employer training and utilizes innovative variables and controls, it lacks information on the long-term consequences of training. How does access or lack of access to training affect careers and wage growth? Additionally, given that the present survey was executed just prior to the COVID-19 crisis, a related question is whether people who receive higher amounts of training are better able to respond to job loss and find equivalent new employment.

⁴Per pupil operating expenditures for community colleges are less than half that of four-year bachelor's degree programs (not master's and not research) at private colleges (Kahlenberg, Shireman, Quick, and Habash 2018). Furthermore, between 2000 and 2018 total funding per FTE from state, local, and federal sources for community colleges was flat in real (inflation-adjusted) terms while demands and expectations on the system increased considerably (Jenkins, Fink, and Brock 2020). Similarly, resources are an issue for job-training programs given that federal funding for adult job training has declined. Workforce Innovation and Opportunity Act (WIA/WIOA) formula spending between FY 2001 and FY 2019 fell from \$4.62 billion to \$2.82 billion (National Skills Coalition 2020).

Finally, the period prior to COVID-19 was a very strong labor market and the extent to which firms invest in training is likely pro-cyclical; hence, in a weaker labor market we might expect the incidence to fall. By contrast, considerable evidence supports that in weak labor markets enrollment in educational and training programs increase. Exactly how these patterns play out over the cycle remains to be seen.

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