

FATTENIN' FROGS FOR SNAKES?

COMPANY INVESTMENTS IN JOB SKILLS TRAINING*

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ABSTRACT

Human capital theory hypothesizes that no firm rationally invests in general job skills training because its competitors might hire the trained employees away before the firm could recoup its costs through higher worker productivity. Drawing from four explanatory perspectives, we developed several research hypotheses about the organizational and environmental sources of variation in company-provided job skills training for core employees, which we tested with a national sample of U.S. work establishments. Contrary to human capital theory expectations, the large majority of employers with core training programs reported providing skills that were either “to a great deal” or “to some extent” useful to other employers. Our general skills training analysis supported only one hypothesis, suggesting the inadequacy of human capital theory for explaining company training investments. We found evidence that the substantive contents of company job skills training programs differentiated into technical skills and social skills dimensions. Multivariate equations supported several hypothesized effects of organizational and environmental factors on the social and technical skills contents of company core training investments. We conclude with a reassessment of the classic general-specific job skills hypothesis and speculate about future directions for job skills training theory and research.

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It took me a long time, to find out my mistakes

Took me a long time, to find out my mistakes

(It sho' did man)

But I bet you my bottom dollar, I'm not fattenin' no more frogs for snakes.

-Sonny Boy Williamson II (Aleck Rice Miller 1910-1965)

In the four decades following Gary Becker's (1962) seminal theoretical article on human capital investments, labor economists advanced a classic hypothesis regarding the types of job skills that firms would provide to employees through on-the-job training programs designed to increase their job performances and productivities. No company would rationally invest in increasing its workers' general skills -- which by definition are useful to other firms -- because rival employers could simply raid or poach those trained employees and thereby harvest all the productivity gains from the training investment. However, a company logically should pay the full costs of any training program to improve its workers' firm-specific skills. Because specific skills have absolutely no value to competitors, the trained employees necessarily remain at the firm in order to obtain higher post-training wages. Hence, a company recoups its full investment in specific-skills training and earns profits during the post-training period because it enjoys productivity gains from its trained workers' improved job skills.

Although labor economists widely institutionalized the general-specific dichotomy in human capital theories about who pays for job training investments, the subsequent empirical support of this taken-for-granted hypothesis was surprisingly scant. In this article, we first

review the theoretical arguments and mixed empirical findings on the general-specific training investment hypothesis. Next, we identify several organizational and environmental factors that may affect employer provision of general skills training. We analyze data on employer provision of job training programs for core employees, drawn from a national sample of diverse work establishments. Contrary to the human capital hypothesis, company investments in general job skills training are very widespread, and not explained by variations in most organizational and environmental factors. We then explore the substantive differentiation of company-provided training programs into technical skills and social skills and find stronger evidence that several organizational structures and environmental conditions affect company investments in these types of job skills training programs. Finally, we conclude with a reassessment of the classic general-specific job skills hypothesis and speculations about future directions for job skills training theory and research.

Human Capital Theory

Classical human capital theory examines how changes in employee marginal productivity acquired through on-the-job training leads to subsequent growth in labor market earnings (Schultz 1961; Mincer 1958, 1962, 1994; Becker 1993). Assuming a perfectly competitive labor market, in which employers and employees both possess complete information and face no barriers to leaving jobs, the human capital model identifies how actors allocate the costs and returns in deciding whether to invest in two fundamental types of job-skills training: (1) *general skills*, such as reading and arithmetic, that increase a worker's marginal product for many other firms besides the employer providing the training; and (2) *firm-specific skills*, such as instruction

in operating unique machinery or servicing a specialized clientele, that have no impact on worker productivity useful to other organizations. In Becker's analysis of who pays for training involving these two types of job skills, the post-training wage paid to a worker who acquires additional general skills "would rise by exactly the same amount as the marginal product and the firms providing such training could not capture any of the return" (Becker 1993:34). Any company imprudent enough to pay for its employees' general skills training would find those better-skilled workers raided or poached by its competitors, who thus profit from the first firm's human capital investments. Consequently, no rational employer would pay for training programs from which it cannot expect to collect future economic returns, discounted at an appropriate interest rate. Instead, the employer shifts the full cost of any firm-provided general-skills instruction onto its trainees, typically by paying them during the training period at wage rates below the opportunity wages they could receive elsewhere in the labor market.

In contrast, because only the employer can benefit from increased employee productivity due to firm-specific training, workers have no incentive to invest their own resources to obtain such instruction, either directly or by accepting lower trainee wages. Therefore, the employer pays the full costs for firm-specific skills and collects a return on this investments from the higher profits subsequently generated by increased worker productivity. The trained employees also benefit, from higher post-training wages that are paid as premiums for staying with the sole firm capable of using their newly acquired specific skills. Whenever training involves a blend of general- and specific-skill contents, both firms and workers share the costs and benefits: "the fraction of costs paid by firms would be inversely related to the importance of the general component, or positively related to the specificity of the training" (Becker 1993:44).

Empirical research on company-sponsored job training in the human capital perspective emphasizes such issues as the sociodemographic attributes of workers who receive company job training (Lillard and Tan 1992), employees' post-training wage differentials and earnings growth (Bartel 1995; Veum 1999), the effects of general and specific training on productivity growth (Barrett and O'Connell 2001), and training consequences for employee job searches, tenure, and turnover (Zweimüller and Winter-Ebmer 2000). Because of a paucity of data on company training expenditures and difficulties in directly measuring transferable general skills and firm-specific skills, researchers have paid less attention to the types of job skills provided by firms and to the proportion of training costs borne by workers and their firms. Several recent studies suggested that substantial portions of company-provided training involve competencies easily transferable to many other employers, yet firms still financed such general-skills training and extracted subsequent productivity gains from their investments (Loewenstein and Spletzer 1998; Johannesen 1999; Bassi and Ludwig 2000; Machin and Vignoles 2001). Some labor economists modified Becker's original formulation to recognize possible distortions originating in labor market imperfections and institutions, for example, limited competition for particular skills, high job-leaving costs, union contracts, and minimum wages. If such labor mobility barriers lengthen a typical employee's post-training tenure and enable employers to pay wages below marginal productivity, then firms would finance a higher portion of general-skills training because their gains from increased worker productivity aren't completely lost by paying higher wages (Schonewille 2001).

Hypotheses about Company Training Investments

We draw from four perspectives to develop testable hypotheses that explain variation in company investments in formal training programs to provide employees with improved jobs skills. Economic theories emphasize the importance of external labor market supplies of skilled workers and employer demands for requisite job skills. Institutional approaches stress how peer organizations and regulatory associations generate pressures to comply with normative expectations about appropriate employee training programs. Human resource management strategies accentuate differences among employers' practices, policies, and philosophies regarding employment relations in the workplace. Finally, internal organizational structures may constrain the skill requirements and training opportunities for employees in organizations with complex divisions of labor. The following subsections develop each argument and state testable hypotheses about the relationships of these predictors to employer investments in formal job skills training programs. We present these generic hypotheses using a bivariate format that states each predictor's expected relationship to company training, regardless of the types of skills involved. Subsequently, we test these hypotheses in several multivariate equations, first examining their joint effects on general job skills, then on other job skills dimensions.

Supply and Demand for Job Skills. In recent years, technological innovations created skill biases in company employment practices by shifting employer demands for labor away from less-skilled toward more-skilled workers. Skill-upgrading transformations are driven mainly by workplace computerization and new communication technologies that necessitate improving employee human capital through education, training, and work experience (Adams 1999). Skill biases are especially pronounced in information-intensive industries, where firms seek competitive advantages by identifying critical knowledge, embedding it in new products and services, and integrating it into their business processes and practices. Some researchers

detected an accelerating skill bias trend since the 1970s, driven by “the development of skill-complementary technologies. The recent acceleration in skill bias is in turn likely to have been a response to the acceleration in the supply of skills during the past several decades” (Acemoglu 2002:7). Technological innovations that require employees to learn how to use sophisticated computer software and telecommunication equipment should induce employers to provide training programs to avoid obsolescence by keeping their workers’ job skills current.

Hypothesis 1: The greater the employee use of advanced technologies to perform their jobs, the more likely are organizations to invest in job skills training programs.

Mismatches between job-skill requirements and worker skill qualifications result when labor markets fail to supply sufficient skilled job applicants to meet increased employer demands. Substantial job/skill imbalances can negatively affect firm productivity, profits, and other organizational performance indicators (Goldberg, Highfill and McAsey 1998). Evidence from advanced industrial nations during the 1980s and 1990s suggested that rising imbalances contributed to growing wage inequality and higher unemployment (Nickell and Bell 1995). The option of training newly hired recruits or retraining current employees to meet increasing skill requirements may be more cost-efficient than some alternative methods of adapting to tight labor markets. The Census Bureau’s 1994 National Employer Survey found that two-thirds of companies observed rising skill requirements necessary to perform production or support jobs over the past three years. Among this group, 85% increased their training expenditures, compared to 58% of employers who said skill requirements had not changed. Companies are more likely to invest in formal job training programs to enhance their production and service

employees' human capital if the skills required to perform those jobs have increased substantially.

Hypothesis 2: The greater the increase in employee job skill requirements, the more likely are organizations to provide employee training.

Both skill biases and job/skill imbalances often worsen during business cycle phases that create labor shortages in particular industries or occupations. Tight labor market conditions occur whenever employer demand for workers with specific skill-levels exceeds the quantity supplied at the going market wage. Labor markets only slowly fill job vacancies, often reflecting the long lag-times of apprenticeships, vocational programs, and professional schooling. Ironically, if employers sharply bid up wages to attract new entrants or to poach current employees from their competitors, the rapidly escalating labor costs may curb further purchases of now higher-priced workers. One consequence may be cycles of expanding and contracting skilled labor, such as the market for natural scientists and engineers during the last three decades of the twentieth century (Lerman 1998). With its low unemployment and stagnant labor force demographics in the late 1990s, the booming U.S. economy confronted many shortages of highly skilled workers, as revealed in recurrent news headlines: "Industries Crying Out for Help Wanted" (Jones 1997) and "Labor Market Continues to Be Tight Despite a Slowdown in U.S." (Kulish 2001). In one survey of CEOs and CFOs at top firms, 90% reported that obtaining good workers was more difficult in 1998 than just three years earlier (Fox 1998). At the crest of a business cycle, either nationally or in specific industries, employers may be unable to find sufficiently skilled candidates to fill job vacancies at acceptable wages. Employer options for

plugging a labor shortage include leaving the openings unfilled and inducing skilled employees to extend their work hours. Alternatively, companies can retrain their current core employees in the technical and social skills necessary to implement new production and service delivery technologies.

Hypothesis 3: The greater the shortage of skilled labor, the more likely are organizations to provide employee training.

Training Institutionalization. Institutional perspectives in organization studies emphasize the impact of cultural and interorganizational constraints on organizational behavior, regardless of cost inefficiencies in productivity. Through institutionalization processes, the widespread use of specific forms of behavior “become more conventional and taken for granted as they develop over time, become more infused with value” (Scott and Meyer 1991:319). Institutionalization processes are manifested as prevalent cultural beliefs and values regarding the desirability of normative rules and regulations, which consequently constrain legitimate organizational behaviors. The institutional perspective argues that “much of the stimulus for training arises in structures and interests external to any given organization” (p. 318). Institutional norms are often expressed in the creation of institutional agencies (such as government bureaus or professional societies) that impose standards and constraints on organizational structures and activities through various requirements imparting “legal rules backed with sanctions, material incentives, or moral suasion” (p. 317). A company may initially implement an employee training program because of its perceived contribution to increased organizational productivity. But, as training grows more broadly valued within an organizational

field, and formally advocated by institutional agents, other employers conform to prevailing training practices despite the absence of demonstrable impacts on company productivity. Training institutionalization creates a preponderance of environmental agents -- labor unions, professional associations, regulatory agencies, vocational schools and colleges, and commercial training firms -- that encourage, pressure, and reward employers for providing employee training programs as a legitimated characteristic of the modern work organization. The legal environment also contributes to increased institutionalization of job skills training, for example, by mandating that firms provide sexual harassment and racial sensitivity training to all employees.

Hypothesis 4: The more developed the institutional training environment, the more likely are organizations to provide employee training.

Human Resource Management Strategies. The numerous technological changes that raised job skill requirements also transformed the workplace structures and employment policies of many U.S. firms desperately seeking competitive advantages in the globalizing economy. High performance workplace systems (HPWS) supplanted traditional bureaucratic hierarchies whose internal labor markets offered career promotions and lifetime job security, especially in manufacturing industries but also in many service-sector firms (Osterman 2000; Godard 2001). These sociotechnical components compelled substantial staffing flexibility to adjust production and delivery schedules rapidly in response to fickle customer demand for small batches of high-quality goods and services. Effective HPWSs also required appropriate employee hiring and training policies to procure a highly skilled, efficient workforce (Salzman 1998; Applebaum,

Bailey, Berg and Kalleberg 2000; Whitfield 2000). The staffing flexibility requirements of transformed workplaces produced a bifurcation among companies' human resource management (HRM) strategies. In place of the traditional *HRM job security strategy*, some companies followed a *HRM contingent workforce strategy* of hiring both permanent and contingent employees, while others adopted an *HRM employability strategy* of enhancing their employees' corporate human capital. By the end of the twentieth century, nearly one-third of the U.S. labor force worked in nonstandard jobs -- on-call work and day labor, temporary-help agency employment, independent contracting, other self-employment, or part-time work in conventional jobs -- at low wages without health insurance or pensions (Kalleberg, Reskin and Hudson 2000; Kalleberg 2000). "Permatemps" emerged in every economic sector from business services to high-tech industries: primarily young workers attached to temp agencies that allowed the contracting firms much staffing flexibility while avoiding many labor costs and liabilities (Jorgensen and Riemer 2000). Employers adopting an HRM contingent workforce strategy were typically less willing to invest in upgrading their nonstandard employees' job skills because the shorter work horizons meant that company investments in improved human capital could not subsequently be recaptured through enhanced productivity.

Companies following an HRM employability strategy placed heavier emphasis on improving employee job skills, despite the absence of a long-term employment relationship. In exchange for employees continuously demonstrating consummate initiative, ingenuity, and resourcefulness, firms promised only that the technological knowledge, social skills, and work experiences which workers acquired could improve their employment opportunities for subsequent projects and employers (Cappelli 1999). Workers were expected to develop and maintain a broader skill base, improve their communication and interpersonal skills, acquire the

capacity to move easily across functional areas, and collaborate with diverse people and teams. Abandoning an implicit employment security contract exchanging guaranteed jobs for employee commitment and loyalty, the employability strategy instead stressed “performance responsibility and continuous learning where employees take responsibility for a company’s competitiveness and their own learning and top management creates the overall context for renewal and ensures the employees’ ongoing employability. Employability in this context asks managers to feel responsible for protecting the jobs of their people by educating people which in return will enhance the overall organization’s competitiveness” (Ghoshal 2001). Given this emphasis on continuous employee acquisition of new career skills, organizations following an HRM employability strategy are much more likely than firms with either a traditional HRM security strategy or a HRM contingent workforce strategy to offer company job training programs to enhance their workforce’s skills.

Hypothesis 5: Organizations with an HRM employability strategy are more likely to provide employee training.

Hypothesis 6: Organizations with HRM job security or HRM contingent workforce strategies are less likely to provide employee training.

Complex Internal Structures. Organizations simultaneously differentiate and integrate employee work efforts through their internal division of labor. Occupational specialization requires the coordination of the skilled employees to achieve organizational goals of efficiently producing a core product or service. The integration and control of work activities grows increasingly problematic with larger organizational size and greater internal complexity. Firms

typically respond by establishing standard operating procedures, delegating discretionary decision making responsibilities to lower-level workers, and rewarding employees for effective performance. The internal structural complexity of an organization is reflected in its job formalization and internal labor markets. Formalization, a key dimension of bureaucratization, is the extent to which “the rules governing behavior are precisely and explicitly formulated and to the extent that roles and role relations are prescribed independently of the personal attributes of individuals occupying positions in the structure” (Scott 1998:25). Detailed written job descriptions and performance records exemplify workplace formalization. A firm internal labor market for a specific occupation (job family) typically consists of a formal job ladder with a bottom-level port of entry into the organization and opportunities for promotion to higher rungs (Althauser 1989). The rules defining job tasks and procedures for moving up a job ladder often require that employees obtain additional skills commensurate with their greater technical and supervisory responsibilities. Organizations with more complex internal structures, characterized by job formalization and internal labor markets, generally provide formal training programs to enable employees acquire new job skills required to perform effectively within a complex division of labor.

Hypothesis 7: The more complex the internal organizational structures, the more likely are organizations to provide employee training.

Data

This section describes the organizational dataset used to test the research hypotheses

We analyze data from a national survey of diverse work establishments, the 1996-97 National Organizations Study (NOS) (Kalleberg, Knoke, and Marsden 1999). The NOS was a computer-assisted telephone interview (CATI) survey conducted in 1996-1997 by interviewers from the Minnesota Center for Survey Research (MCSR) at the University of Minnesota. The sample was drawn from the Dun and Bradstreet (D&B) Market Identifiers list of approximately 15 million establishments. D&B stratified the sample into 40 categories of increasingly broader employee-size ranges, from 1-4 to 4,000-4,999 and 5,000 or more. Within each stratum, D&B selected cases for MCSR to interview that were sampled randomly with probability proportional to size (PPS). This procedure was designed to obtain a final sample whose size distribution would reflect the establishments experienced by typical employees. MCSR conducted most of the CATI interviews with the human resources manager or a functionally equivalent informant from each establishment; 11% of the completed interviews involved two or more informants. The survey completion rate was 54.6% of eligible establishments, of which 86% were done by CATI and 14% by mail questionnaire. The final sample contains data from 1,002 establishments. Completely independent organizations comprised 68.4% of the NOS establishments, and 31.5% were branches, subsidiaries, or other parts of a larger “parent” organization.

Measures

The primary purpose of the 1996 NOS was to investigate the relationships between establishments and other organizations for hiring temporary and contingent employees, and for training workers. To focus these activities on comparable employees across the diverse types of establishments, the principal investigators chose three generic “focal occupations.” After first

asking informants about the main product or service provided by the organization, the interviewer asked, “What are job titles for the employees who are most directly involved” with that product or service? If more than one job title was mentioned, the interviewer chose the title with the largest number of full- plus part-time employees as that establishment’s “core occupation.” For example, the core employees would be lawyers in a legal firm, assembly workers in an automobile plant, or professors in a university. The other two focal occupations were “managers, supervisors, or other administrators” and “those who do secretarial, clerical, or other office work.” Informants reported about core employees in 92.0% of the establishments, and about managers and clerical employees in 63.6% and 67.6%, respectively (an absence of data about a focal occupation could represent either no such employees or missing responses). The occupational breakdown among core employees is: 28.7% professional and technical; 15.2% managerial; 19.8% other nonmanual; 7.9% crafts; and 27.9% other blue collar occupations.

The NOS contains several measures of the extent and types of formal core occupation skill training programs provided by the establishments. Our initial measure of employer-provided training, used in the selection equation described in the next section, was based on NOS informant responses to the question: “In the past two years did [organization] provide any [core occupations] with formal job training?” *Any core training* is a dichotomous dependent variable, coded 1 for the presence of any formal core training program, 0 for no training program. For establishments providing formal training, informants were asked, “To what extent did [organization] train its [core occupations] to keep their skills current?” *Training to keep skills current* is a dichotomy, with “to a great extent” coded 1, and “to some extent” or “not at all” coded 0. Another dichotomous measure is *general skills training*, measured by responses to the item: “To what extent are the skills that [organization] provides to [core occupations] also useful

to other employers?” with “to a great extent” coded 1, and “to some extent” or “not at all” coded 0.

To test the research hypotheses about core employee skills training, we operationalized the independent variables as follows. For Hypothesis 1, core employee *computer usage* counts the number of affirmative responses to five applications: “Do any [core occupations] regularly use computers for word processing; recording or retrieving information; analyzing or interpreting information; writing new computer programs or applications?” *Increased skill requirements* of core employees (H2) is measured by: “In the past two years, have the skills required to perform [core occupation] jobs at an acceptable level increased, decreased, or remained the same in your organization?” For H3, *skill shortages* in the labor market for core occupations is based on NOS informant responses to the question: “How easy is it for [organization] to hire [core occupations] with the necessary skills...very easy, somewhat easy, not too easy, or not at all easy?”

Training institutionalization (H4) is an index summing agreement with three items: (a) “Are any of [organization’s] training programs subject to periodic reviews by outside accreditation or licensing organizations?” (b) “Does [organization] consult with any association of organizations in developing its training programs?” (c) “To what extent does [organization] pay attention to the training practices of other organizations...not at all, very little, somewhat, or very much?” Because these items were asked only when an establishment offered occupational training, it can be used only in analyses involving that subset of organizations.

Employers’ human resource management strategies were measured by three items: *HRM job security strategy* (H5) “Has your organization made any explicit or implicit commitment to its employees to avoid layoffs, except in extreme circumstances.” The two measures for H6 are: *HRM contingent workforce strategy*: “Your human resources management strategy divides the

workforce into permanent and nonpermanent employees” and *HRM employability strategy*: “Your organization offers employees training and skills that help them wherever they may work.” The job security item was a dichotomy, while responses to the other two HRM variables were recorded on four-point scales from strongly disagree to strongly agree.

To test H7, we used two measures of internal organizational structures: (1) *internal labor market*, the mean standardized score of the extent to which the establishment fills job vacancies in three occupations (core employees, managers, and clericals) from within and makes internal promotions; (2) *formalization*, the total count of five types of written documents (job descriptions; job performance records; employment contracts; personnel evaluation; hiring and firing procedures).

Finally, we used two sets of control variables: (1) three *organizational size* measures: the natural log of the total number of full-time (35 or more hours per week) plus part-time employees on the establishment payroll on June 1, 1996; a dummy variable if the establishment was part of a larger (“parent”) organization; and the natural log of the total employees of that parent organization (not including the establishment’s employees). (2) A set of nine dummy variables for the *industry group* in which the establishment produces its main product or service: agriculture; manufacturing; transportation and communication; wholesale; retail; finance, insurance and real estate; professional services; public administration; the omitted reference category is personal services.

Methods of Analysis

Because 38.4 percent of the NOS establishments provided no formal core employee training, the remaining organizations may comprise a biased sample for estimating the effects of the hypothesized predictors of types of job skills training. That is, differences among types of skills training provided by firms can be observed only when an employer offers a formal training program. We corrected for potential sample selection biases by applying the two-equation approach developed by Heckman (1979). The first stage involves a probit equation, using data on all establishments, which predicts the probability that an organization provides any core employee job training program. The coefficients from this selection equation are then used to compute an estimated value of the inverse Mills ratio (λ) for each observation, which captures the probability that an organization failed to provide training conditional on the risk of training. This variable is then included in the second-stage substantive equation, which estimates the unbiased effects of the hypothesized predictors on the types of core employee training. To avoid multicollinearity between both equations, we entered the set of industry dummy variables only in the first-stage probit selection equation. The specific methods used to estimate the second-stage substantive equations varied according to whether a job-skills training dependent variable is dichotomous (probit model) or continuous (OLS regression model). We note the specific estimation method used in discussing the results below.

Results for General Skills Training

The 1996-97 NOS offers strong evidence contradicting human capital theory expectations that employers will not invest in general job skills training of their employees. Among those establishments with formal core occupation training programs, 49 percent agreed that “to a great

extent” they provide skills “also useful to other employers,” while 41 percent agreed with this statement “to some extent.” Thus, only one employer in ten reported that their core employees received skills training that is “not at all” useful to other firms. Table 1 also casts doubt on the human capital proposition that workers pay the costs of company-provided general job skills by receiving reduced wages during their training period. As shown by the cross-tabulation, a large majority employers with core worker training programs (70 percent) disagreed that their core employees are “paid a higher wage or salary after completing their training.” The provision of a post-training wage increase does not vary significantly by the extent to which the core job skills are also seen as useful to other employers (chi-square = 1.92, $df = 2$, $p = .38$). Thus, the NOS data strongly imply that most employers invested in a substantial amount of general skills training for their core employees, and that these firms paid the training costs rather than requiring their workers to shoulder the training expenses.

To examine the hypotheses about organizational and environmental factors associated with employer provision of job skills training programs for core employees, we analyzed three dichotomous measures with appropriate multivariate equations. The first column of Table 2 presents the unstandardized coefficients from a probit selection equation that predicts which establishments provide of any type of core employee training program. Effects significantly different from zero in the population, based on a one-tailed t-test of the hypothesized relationship, are marked by asterisks denoting the probability of Type I error. Consistent with several research hypotheses, organizations are more likely to provide training if the skills required by core employees had recently increased (H2), the organization follows a human resource management employability strategy (H5), and exhibits a complex internal structure (H6), as indicated by both an internal labor market for core employees and job formalization.

However, the training selection process is unrelated to skill shortages in the external labor market for core workers and to extensive employee use of computer technologies. Neither the contingent workforce nor the job security HRM strategies variables are significant. (As noted in the measures section, the training institutionalization hypothesis cannot be tested in the selection equation because those items are available only for employers with core employee training programs.) Among the two sets of control variables, selection into core skills training is likelier for larger establishments and those belonging to a parent organization. Four industries are significantly more likely to train their core workers, relative to the omitted reference category (personal services): retail trade, whole trade, transportation-communication, and public administration. We do not use the industry dummy variables in the substantive equations that test hypotheses about the types of job skills training provided to core workers.

The second column of Table 2 displays the parameter estimates from a second-stage probit equation. Nearly 48 percent of the NOS employers that trained their core workers also indicated that the purpose was to keep their job skills current. Consistent with Hypothesis 1, the more extensive the core employees' use of computers, the more likely the organizations is to offer training to keep these skills up to date. Organizations adopting a HRM employability strategy (H5) and those operating in more heavily institutionalized training environments (H4) also train their core workers to keep their job skills current. The coefficient of the hazard rate estimated in the sample selection model does not differ significantly from zero.

Table 3 reports the results of a second-stage probit equation in which the dependent variable is the dichotomous measure of general skills training. Contrary to all except one hypothesis, none of the independent variables is significantly related to a great extent of company-provided general job skills training for core employees. The only significant predictor

is HRM employability strategy (H5), evidently indicating that companies with workforce policies emphasizing training and job skills helpful to their employees “wherever they may work” actually provide more general skills training than available in companies with either a job security or contingent workforce strategy. Among the control variables only two size measures are significant, with the negative signs indicating less general skills training is offered by larger establishments and by subunits of a parent organization.

Exploring Other Dimensions of Job Skills Training

The inability of human capital theory to anticipate the extensive company provision of general job skills training programs, coupled with the failure of most organizational and environmental indicators to explain significant empirical variation in general training, compelled us to explore alternative dimensions of job skills training programs. Job skills comprise the set of knowledge and behaviors required for workers to carry out their responsibilities and perform required tasks to a pre-defined standard of competence. Among the numerous schemes for classifying the diversity of job skills -- such as processing information, manipulating machinery, and communicating ideas -- one analytic perspectives seems to hold great potential for capturing fundamental variation in company-provided training programs. In this perspective, job skills are differentiated by their substantive content dimensions, according to technical or social proficiencies required for competent job performance. We discuss this conceptual framework and describe its measurement before we examine whether the hypothesized organizational and environmental factors affect variation the technical and social job skills training of core employees provided by the 1996-97 NOS establishments.

Occupation analysts have proposed numerous typologies to classify job skills for many purposes. Personnel administrators created occupational systems based on the employee qualifications required to perform the diverse tasks in their organizations' complex divisions of labor (Campbell and Knapp 2001). The U.S. Department of Labor Secretary's Commission of Achieving Necessary Skills (1991) identified five broad categories of competencies for successful transition of high school to work: resources, interpersonal, information, systems, and technology. The Labor Department's Employment and Training Administration replaced its *Dictionary of Occupational Titles* (which characterized worker functions by the well-known trinity of data, people, and things) with an O*NET database classifying job requirements and worker attributes, as well as the contents and contexts of work, according to 483 variables (U.S. Department of Labor 2001). Despite such evident job skill complexities, the theoretical and empirical literature on company job training largely disregarded possible multidimensionality among the substantive dimensions of formal job skills instruction. Surveys of both employees and employers rarely inquired into the reasons or purposes of training, which would permit classification of the programs' skill contents. Instead, researchers typically investigated the personal and organizational determinants of formal training incidence and intensity, including: numbers of training events and percentages of employees receiving it, duration of training programs, average expenditure per trainee, and formal sponsorship by corporations, vocational schools, community colleges, union apprentice programs, and commercial vendors (e.g., Taylor 1985; Frazis, Gittleman, Horrigan and Joyce 1998).

A notable exception was the 1993 Bureau of Labor Statistics' Survey of Employer Provided Training, which asked informants from 8,467 establishments about six types of training (Frazis, Herz and Horrigan 1995). Basic skills training occurred in barely 2 percent of the

workplaces, followed by apprenticeship (19%), orientation (32%), safety and health (32%), workplace-related (36%) and “job skills” training (49%). The latter category encompassed seven types of occupational skills: management; professional and technical; computer; sales and customer relations; clerical and administrative support; food, cleaning, protective, or personal services; and production-related skills. Apart from a table showing that each type occurred more often in larger than in smaller establishments (p. 9), the analysts did not explore other sources of variation in job skills training among workplaces. To our knowledge no previous project has investigated whether multiple latent factors underlie the diversity of occupational skills taught in company programs.

Taking a broader perspective than human capital’s conventional general-specific skills dichotomy, Francis Green (2000) proposed a fundamental conceptual distinction between technical skills and social skills in the context of company job training programs. A firm’s stock of human capital comprises both its employees’ technical know-how and their attitudes and behaviors towards work-effort norms that sustain a willing compliance with the organization’s work conditions. Because employee productivity is a joint function of these two types of job skills, employers make training investments to improve both technical and social competencies. Green posited three processes by which enhanced social skills added value to an organization: (1) by socializing employees to identify with and internalize a company’s philosophy and objectives; (2) by boosting worker commitment to stronger work efforts and to remaining employed at the firm; and (3) by developing behavioral norms of open communication and willingness to share information with supervisors and coworkers. In contrast to human capital theory, because social skills training strengthens employees’ work motivations and organizational commitments, even under perfect competition employers would have incentives

to pay for general skills training without necessarily increasing wages or suffering higher quit rates by their trained employees (Green 2000:260-263).

Formal definitions and substantive examples may clarify the analytic distinctions between technical and social skills. *Technical skills* are abilities to use tools, techniques, and specialized knowledge to carry out the methods, processes, or procedures required in a job. Employer investments in job training activities to improve employees' technical work skills seek to raise worker efficiency at turning raw inputs into finished outputs. As know-how acquired primarily through formal scientific, professional, or craft instruction, technical skills encompass diverse competencies, ranging from basic literacy and numeracy, to manual dexterity and information processing, to tacit knowledge about the firm's specific production techniques that reduces waste and enhances task completion. As examples, engineering skills involve applications of scientific principles to transforming physical materials, while cooking skills apply elementary understandings of nutrition and chemistry principles to food preparation.

Social skills are increasingly important for the successful implementation of technological innovations in machinery and work-flow designs, particularly in complex integrated production systems requiring extensive communication and coordination to achieve high-quality collective performances. Social skills encompass abilities to interact with customers, coworkers, and supervisors, as well as motivation to perform tasks at a high level, particularly by internalizing company-regarding norms favoring the "propensity to behave in a manner conducive to the firm's objectives" (Green 2000:251). Sometimes called "soft skills," they involve "skills, abilities, and traits that pertain to personality, attitude and behavior rather than formal or technical knowledge" (Moss and Tilly 1996:253). In-depth interviews at 56 Los Angeles and Detroit firms in four industries disclosed that heightened competitive pressures

increased the need for soft skills, even for entry-level jobs. However, young black males, whom many employers viewed as lacking such competencies, were disadvantaged during their pre-employment interviews (p. 258). A national survey of establishments revealed that personnel directors considered behavioral traits the primary hiring criterion for half of blue collar jobs (Osterman 1995). Particularly desirable social skills include punctuality, honesty, friendliness, enthusiasm, grooming, dependability, work attitude, willingness to learn, teamwork, and employee identification with and commitment to the employer. Employers appear to believe that social skills training can also boost employee productivity by reducing such undesirable behaviors as absenteeism, discretionary work effort (slacking), and job quitting.

To measure the social and technical job skills training provided by 1996-97 NOS establishment training programs, informants were asked: “To what extent was the formal training of (core occupations) used to teach or provide” eight types of skills: “skills or knowledge specific to (the organization); remedial skills in literacy, arithmetic, or English language; communication or interpersonal skills; team work skills; computer skills; safe use of equipment or tools; diversity sensitivity, for example, sexual harassment, race relations, or cultural differences; and management skills.” Responses to each item were recorded in three ordered categories, “not at all, to some extent, or to a great extent.”

We used confirmatory factor analyses to assess whether these eight skill content items reflected the hypothesized differentiation into technical and social training constructs. Because those indicators were ordinal measures, we used PRELIS to compute a matrix of polychoric correlations (see Table 4) and a matrix of asymptotic covariances among these correlations. We then jointly analyzed the latent factor structure among the indicators, using the weighted least squares (WLS) method in LISREL (Jöreskog and Sörbom 1996:25-29). As a baseline for

comparison, a confirmatory factor model specification in which all eight indicators loaded on a single latent construct produced a poor fit to the observed correlation matrix ($\chi^2 = 75.2$, $df = 20$, $p < .0001$). We dropped the remedial training indicator because it did not load highly on either one- or two-factor solutions. Next we specified a two-factor model, with the three indicators of technical training (firm-specific, computer, and equipment training) loading on one factor and the four social training indicators loading on the second factor. This model produced a somewhat better fit ($\chi^2 = 47.8$, $df = 13$, $p < .001$). Using the modification indices, a final model specification that correlated three of the error terms improved the fit to $\chi^2 = 15.8$, $df = 10$, $p = .10$. The root mean square error of approximate (RMSEA) was 0.034, below Cudeck and Browne's (1993) suggested 0.05 criterion of a "close fit" between model and data. The goodness-of-fit index (GFI) attained its maximum value of 1.00 and the adjusted goodness-of-fit index (AGFI) was 0.99. Figure 1 shows the parameter estimates from the completely standard solution for this final model. For the multivariate analyses reported below, we computed two social-skills and technical-skills scales by averaging the informants' responses to the respective item subsets specified in this two-factor confirmatory factor model. The scale means are 2.04 for social skills and 2.22 for technical skills, both higher than "to some extent."

The two columns of Table 5 display the unstandardized OLS coefficient estimates from regression equations for the social skills and technical skills training scales, controlling for sample selection bias using the equation in the first column of Table 2. Consistent with hypotheses about organizational and environmental influences on company job training, both training institutionalization (H4) and HRM employability strategy (H5) are associated with a greater likelihood of company-provided social skills training for core employees. Three other significant predictors are employee computer usage (H1), greater labor market skill shortages

(H3), and internal organizational complexity as measured by job formalization (H7). The technical skills equation contains fewer significant coefficients, but the hypothesized widespread employee use of computers (H11) is related to greater technical skills training. Two other significant factors are greater labor market skill shortages (H3) and more extensive training institutionalization (H4), both associated with a greater likelihood of company-provided technical training. Among the control variables, greater job formalization contributes to more social skills training, while larger establishments are more likely to provide technical skills training. The differentiated patterns of significant effects in the two types of substantive job skills equations in Table 5 underscore the importance of analyzing each dimension separately.

Conclusions

Tremendous changes during recent decades in labor markets and work practices elevated the importance of employee job skills and skill formation processes for employers competing in an increasingly global economy. Proliferating technological innovations, intensifying domestic and international rivalries, and organizational restructuring created high-performance workplaces that required more highly skilled workers capable of flexibly performing a wider array of specialized production and service activities. Employers required employees to assume greater accountability for the consummate execution of expanded job functions, particularly by mastering complex job tasks and managing multifaceted interdependencies with coworkers, supervisors, suppliers and customers. Less willing to rely on external labor markets to supply sufficiently educated and experienced workers, firms increasingly upgraded their workers' job skills to complement the constraints of transformed work systems. Whether acting unaided or

collaborating with external training vendors, organizations sponsored substantial instruction to improve employee efficiency in coping with the technological and interpersonal imperatives embedded in the new workplace arrangements.

Within the context of enormous social changes in both global markets and local workplaces, our inquiry into the job skills provided by company job training programs for core employees uncovered substantially greater complexity than anticipated by prior investigations. Analyses of a national sample of work establishments revealed multidimensional patterns with distinct organizational and environmental predictors. More than half of employers formally train their core employees and almost half of these programs are designed to keep their job skills current. Human capital theory's enduring emphasis on the degree of employee skill transferability across firms in the external labor market is insufficient to capture the variety of job skills that employers desire and sponsor in company training programs. Contrary to human capital theory expectations, but consistent with some previous research findings, the large majority of U.S. work establishments invested either "a great deal" or "to some extent" in general skills training, despite the acknowledged usefulness of those trained workers for other organizations.

Drawing from four explanatory perspectives, we developed several research hypotheses about the organizational and environmental sources of variation in company-provided job skills training for core employees, which we tested with multivariate equations controlling for potential selection bias. Only one hypothesis was supported by the results from the general skills training analysis, suggesting the inadequacy of human capital theory for explaining the training investment decisions of contemporary workplaces. Instead, following Francis Green's theoretical extension of the human capital approach, we found evidence that the substantive

contents of company job skills training programs are differentiated into separate technical skills and social skills components. Although highly correlated across organizations, both types of training reflect the distinct skill prerequisites that employers increasingly demand from production and service workers whose job performances and productivity are crucial to company survival and prosperity in a multifaceted global economy. The multivariate equations found support for several hypothesized effects of organizational and environmental factors on the social and technical skills contents of company core training investments. In particular, organizations requiring extensive employee computer usage, facing skill shortages in the external labor market, and operating in an institutionalized training environment were more prone to provide both social and technical skills training, while employers with a human resources management employability strategy placed greater emphasis on social skills training.

Our theoretical and empirical inquiry accentuates the importance of taking a broad perspective on explaining sources of company variation in training programs. Researchers should abandon the limited dichotomy of general versus firm-specific skills that has preoccupied human capital theorists for so many decades. Rather than continuing to maintain the untenable premise that employer-provided general skills training is irrational, researchers must recognize that contemporary work organizations regularly underwrite substantial amounts of general skills training for their most valuable workers, despite the possibility that they may be “fattenin’ frogs for snakes” to steal their investments in improved employee human capital.

Theory construction and empirical research efforts should concentrate on unraveling additional constituent dimensions of job skills training contents and on explaining their variability across employer training programs. For example, we know relatively little about how social and technical skills interact within contexts ranging from traditional bureaucratic

hierarchies to innovative high-performance work systems. We know even less about the implications of different types of job skills training for individual worker and collective organizational outcomes, such as psychological and behavioral commitment, employee career development, and company productivity and performance improvement. Job skills training occurs within broader contexts of changing organizational practices and policies, and are influenced numerous internal and external factors. Our analyses should contribute to a better knowledge about that economic, institutional, and structural forces impinging on employer decisions to invest in upgrading employee skills. But much creative research lies ahead before we gain a more comprehensive understanding of these important organizational functions.

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Table 1. Crosstabulation of Core Occupation Training Usefulness to Other Employers with Post-Training Wage Increase

Were (core occupations) paid a higher wage or salary after completing training?	To what extent are the skills that (organization) provides to (core occupations) useful to other employers?			Total
	Not at all	To some extent	Very great extent	
Yes	22.6	29.5	33.0	30.0
No	77.4	70.5	67.0	70.0
Total	100.0%	100.0%	100.0%	100.0%
(N)	(53)	(207)	(246)	(506)

Table 2. Unstandardized Coefficients in Selection Equation into Any Core Employee Job Training and Probit Equation to Keep Core Employee Skills Current

Independent Variables	Selection Equation	Keep Skills Current
Constant	-3.81*** (.49)	-2.39** (1.29)
Core employees use computers	-.04 (.04)	.12** (.05)
Increased core employee skill requirements	.33*** (.10)	.22 (.15)
Skill shortages for core employees	-.03 (.06)	.04 (.07)
Training institutionalization	--	.32*** (.07)
HRM employability strategy	.23** (.08)	.30** (.12)
HRM contingent workforce strategy	.09 (.06)	.03 (.07)
HRM job security strategy	-.09 (.11)	-.00 (.13)
Internal labor market	.42*** (.09)	-.11 (.16)
Job formalization	.16*** (.04)	-.02 (.07)
Log of employee size	.07* (.03)	.04 (.04)
Parent organization	1.05* (.48)	-.41 (.60)
Log of parent organization size	-.09 (.06)	.03 (.07)
Retail Trade	.89** (.28)	--
Wholesale Trade	.88* (.38)	--
Transportation-Communication	.85** (.32)	--
Public Administration	.79* (.36)	--
Agriculture	.43 (.33)	--
Finance, Insurance, Real Estate	.41 (.29)	--
Professional Services	.40 (.27)	--
Manufacturing	.37 (.37)	--
Lambda (λ)	--	.06 (.49)
Model χ^2 (df)	67.6***(19)	65.4*** (13)
Number of establishments	780	464

Numbers in parentheses are standard errors.

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

Table 3. Unstandardized Coefficients in Probit Equation for General Skills Training of Core Employees

Independent Variables	General Skills
Constant	-1.90 (2.03)
Core employees use computers	.06 (.05)
Increased core employee skill requirements	.23 (.18)
Skill shortages for core employees	.04 (.07)
Training institutionalization	-.04 (.07)
HRM employability strategy	.39* (.18)
HRM contingent workforce strategy	.04 (.08)
HRM job security strategy	-.15 (.14)
Internal labor market	.11 (.19)
Job formalization	-.01 (.08)
Log of employee size	-.03* (.04)
Parent organization	-1.40** (.60)
Log of parent organization size	.15* (.07)
Lambda (λ)	-.53 (.70)
Model χ^2 (df)	48.9***(13)
Number of establishments	433

Numbers in parentheses are standard errors.
Specification of selection equation is identical to Table 2.

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

Table 4. Polychoric Correlations Among Eight Training Content Measures ($N = 509$)

	Firm-specific	Remedial	Communication	Teamwork	Computers	Equipment	Diversity	Management
Firm-specific	1.00							
Remedial	0.21	1.00						
Communication	0.10	0.54	1.00					
Teamwork	0.17	0.32	0.70	1.00				
Computers	0.11	0.26	0.34	0.28	1.00			
Equipment	0.21	0.27	0.17	0.29	0.01	1.00		
Diversity	0.17	0.33	0.44	0.42	0.23	0.36	1.00	
Management	0.20	0.25	0.45	0.49	0.36	0.19	0.37	1.00

Table 5. Unstandardized Coefficients in OLS Regression Equations for Social and Technical Skills Training of Core Employees

Independent Variables	Social Skills	Technical Skills
Constant	1.33*** (.26)	1.78*** (.32)
Core employees use computers	.05*** (.02)	.05*** (.01)
Increased core employee skill requirements	-.05 (.05)	-.03 (.04)
Skill shortages for core employees	.05* (.02)	.04* (.02)
Training institutionalization	.07** (.02)	.05** (.02)
HRM employability strategy	.15*** (.04)	.06 (.04)
HRM contingent workforce strategy	-.01 (.03)	-.00 (.02)
HRM job security strategy	-.04 (.05)	.00 (.04)
Internal labor market	.03 (.05)	.03 (.05)
Job formalization	.07*** (.02)	-.02 (.02)
Log of employee size	-.02 (.01)	.03** (.01)
Parent organization	-.21 (.20)	-.17 (.17)
Log of parent organization size	.02 (.02)	.01 (.02)
Lambda (λ)	-.36*** (.06)	-.24** (.10)
Model χ^2 (df)	61.8*** (12)	42.8***(12)
Number of establishments	437	437

Numbers in parentheses are standard errors.
Specification of selection equation is identical to Table 2.

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .0$

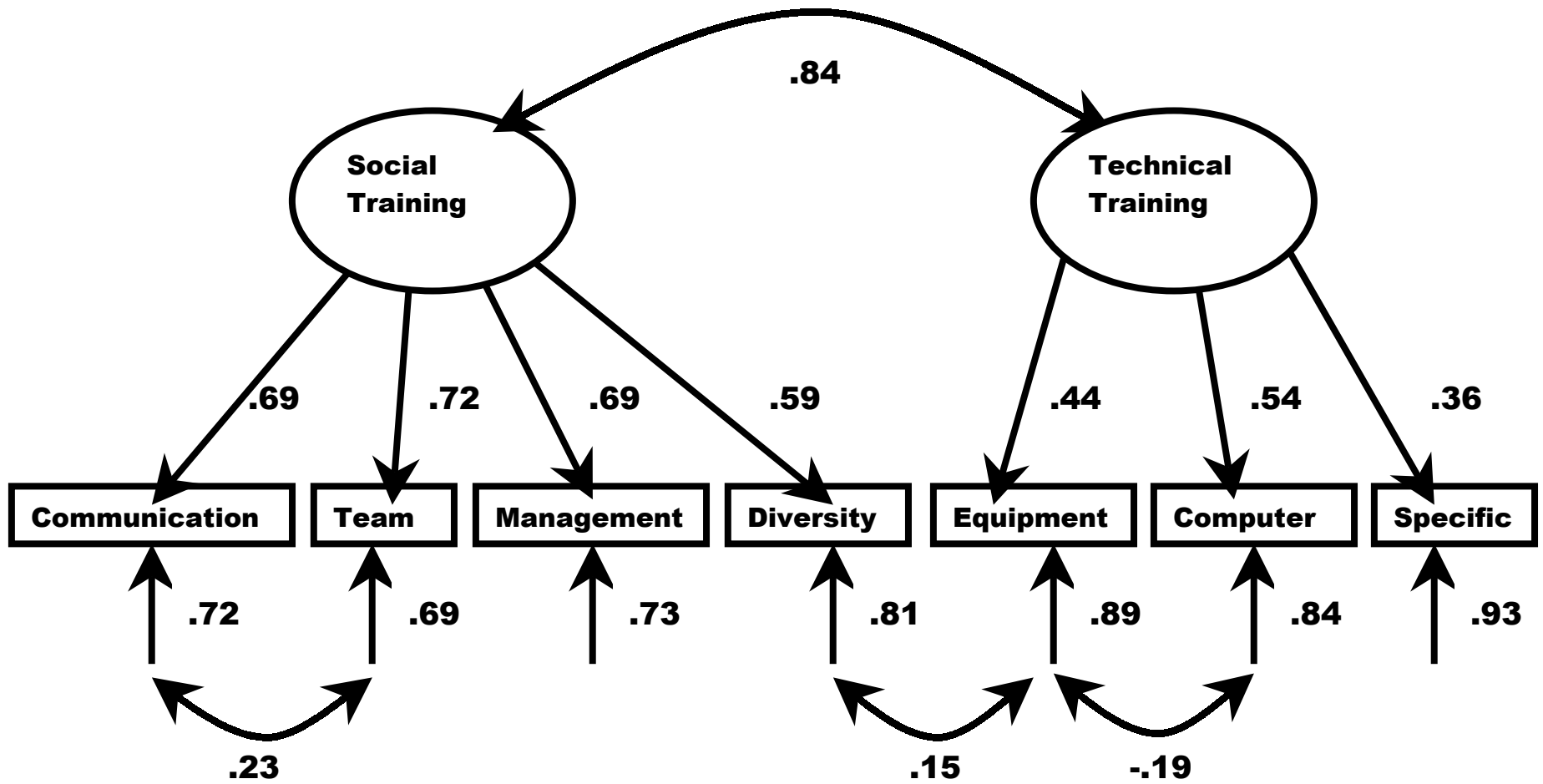


FIGURE 1. Completely Standardized Solution for a Two-Factor Model of Seven Job Training Skill Indicators