

**Cracking the Glass Cages?
Work Teams, Cross-Training and Management Diversity***

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COMMENTS ARE WELCOME.

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ABSTRACT

Since job segregation blocks career opportunities for women and minorities, work structures that expand opportunities for women and minorities to network and demonstrate their capabilities may increase their share in higher ranking jobs. The re-organization of work over the last two decades provides a test case. I examine whether the adoption of programs that counteract segregation, namely self-directed work teams and cross-job training, lead to higher managerial diversity. I analyze longitudinal data on workforce composition and the organization of work from a national sample of over 800 American work establishments between 1980 and 2002. The results show that teams and training programs that do not transcend job boundaries, such as problem-solving teams or job training, do not lead to increased managerial diversity. In contrast, when employers adopt self-directed teams or cross-job training, the proportion of white women and black women and men among managers increases. These unintended consequences buttress structural theories of inequality at work and suggest a new way for remedying inequality at work.

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INTRODUCTION

That the organization of work in America is changing is hardly news. Work is increasingly done by autonomous work teams, production and safety problems are more often discussed in problem-solving teams, and more and more employers provide their workers with training across jobs. While the scholarly mill is still at work exploring the meaning of these changes, studies based on a wide range of data sources indicate that they are more than a passing fad. By 2002, between 40% and 80% of medium and large American work-establishments had adopted at least one of these programs (Appelbaum, Bailey and Berg 2000; Black, Lynch and Krivelyova 2004; Handel and Levine 2004; Osterman 2000). Researchers debate the implications of these new teams and training programs for productivity, labor relations and workers' wages and satisfaction (Appelbaum et al. 2000; Cappelli and Neumark 2001; Ichniowski et al. 1996; Smith 1997; Vallas 2003a), but only rarely have their consequences for gender and racial inequality at the workplace been examined (Fernandez 2001; Ollilainen and Rothschild 2001; Smith-Doerr 2004; Smith 1996). Yet, given that some of these new programs increase integration between jobs, and given ample evidence that job segregation plays a role in constraining women's and minorities' careers, we should expect these new programs to have implications for gender and racial inequality as well.

Segregation in the workplace is sustained by a rigid division of labor and narrow job specialization. Within this structure, women and minorities are more likely than white men to be assigned to low skill, dead-end and undervalued jobs. These segregated jobs often become what can be termed 'glass cages' for disadvantaged workers, whose access to career opportunities is further limited in these jobs (Acker 1990; Blair-Loy 2001; Burt 1998; Kanter 1977; Knoke and

Ishio 1998; Reskin 1993; Reskin and Cassirer 1996). In contrast, recent research shows that work structures that relax narrow job definitions can broaden workers' exposure to other workers, managers, and work tasks, and so provide women and minorities with new tools for career advancement (Ollilainen and Rothschild 2001; Smith-Doerr 2004; Smith 1996). Building on these two insights, I examine whether the introduction of self-directed work teams and cross-job training leads to increases in the share of women and minorities in management ranks. These programs were not designed to change workforce demographics, but they create structured opportunities for women and minorities to undermine the career barriers put forth by segregation.

I use a unique dataset that combines information from a retrospective survey on the organization of work in more than 800 American work establishments merged with annual federal EEO-1 data on their workforce composition, between 1980 and 2002. Because the management category in these data includes all management levels, and because women and minorities are segregated into lower level jobs even within management, my research question is most accurately defined as whether the re-organization of work increases the representation of women and minorities at least at the lower ranks of management.

I analyze changes in managerial composition following the introduction of two key aspects of what is often called the "high performance" organization of work: teamwork and skill upgrade programs. Within each of these two categories, I examine two types of programs (see Figure 1). One type has the potential to counteract the effects of segregation for women and minorities as it relaxes narrow job boundaries. These are cross-functional work teams and cross-job training, both of which expose workers from different levels to other workers and jobs across the organization. The second type of programs do not have such potential: these are problem-solving teams that are usually composed of experts from different departments; and job training

programs, which were historically promoted as a way to facilitate women's and minorities' movement into management, but are not geared toward changing the organization of work.

If managerial diversity increases only after the adoption of programs that create opportunities to transcend horizontal job boundaries, then the relevance of changing the organization of work for reducing gender and racial inequality will be underscored. Such findings will buttress our theoretical understanding of job segregation as an engine of gender and racial inequality at work. They will also point to new ways for remedying inequality, which bolster organizational efficiency as well (Rapoport et al. 2001). While women and minorities have made much progress at the workplace, they are still under-represented among managers. As work in general, and good jobs in particular, increasingly become a key source of basic civil and welfare state rights in the U.S., ascriptive inequality at the workplace has important consequences for social inequality. At the same time, two of the major solutions for workplace inequality are coming under attack. Formalization of personnel decisions is in decline (Cappelli 1999), and diversity management shows mixed results (Edelman and Petterson 1999; Kalev, Dobbin and Kelly 2005; Krawiec 2003, p.29). In this context, finding new ways to increase the share of women and minorities in management is as important as ever.

'GLASS CAGES' AND THE NEW ORGANIZATION OF WORK

Despite significant progress of women and minorities at work, gender and racial segregation is still a defining feature of their employment. Research suggests several mechanisms through which this segregation restrains career outcomes. The concentration of women and minorities in lower level and marginal jobs reinforces negative stereotypes about their capabilities and aspirations (Fiske 1998; Kanter 1977; Reskin 2003; Tsui and O'Reilly 1989); limits their access to career opportunities, such as prestigious job assignments and

training (Baron and Newman 1990; Knoke and Ishio 1998; Steinberg, Haignere and Chertos 1990); restrains their ability to develop strategic networks and mentoring relations (Blair-Loy 2001; Burt 1998; Ibarra 1992; Ibarra 1995; Petersen, Saporta and Seidel 1998), and lowers their self-esteem and career aspirations (Kanter 1977; Reskin and Cassirer 1996; Ridgeway and Smith-Lovin 1999). The term ‘glass cages’ hence symbolically depicts segregated jobs that, due to the mechanisms described above, hinder career opportunities of workers from disadvantaged groups. Re-structuring work, so that jobs are not narrowly defined and workers have new opportunities to work with other people and demonstrate skill across the organization, can undermine the inhibiting effects of the segregated structure of jobs and improve the career chances of women and minorities.

The ideas of teams and job enrichment have been around at least since the 1930s, but its contemporary surge is usually traced to technological changes and accelerating international competition in the early 1980s. Inspired by Japanese and Western European experiences, managers and scholars viewed moving away from the Fordist model of production, toward team structures and skill development programs, as an effective way to improve quality and increase competitiveness (Appelbaum and Berg 2001; Piore and Sabel 1984). For workers, these changes carried the promise of providing more skilled jobs, higher wages and greater job security (Piore and Sabel 1984), though this hope has probably not materialized (Handel and Levine 2004; Osterman 2000). Among the abundant research on the topic, only a few researchers have examined these new forms of organizing work with questions of gender and racial inequality in mind (Daday and Burris 2002; Ollilainen and Rothschild 2001; Smith-Doerr 2004; Smith 1996).

In what follows, I describe the organizational changes at the heart of this research and, using existing evidence about their implications for women’s and minorities’ experiences at

work, I develop hypotheses about their possible effects on the proportion of white women, black women and black men in management. Employers did not adopt these programs with advancing women and minorities in mind. Yet, theory and qualitative evidence suggest that they should have this effect.

Team Based Work Organization

Few dispute the diffusion of team-based work structures in American workplaces over the last 20 years. Figure 2 shows the spread of self-directed work teams and problem-solving teams in a national survey of 810 medium and large American work establishments used for this research. Self-directed work teams spread from about 7% in the early 1980s to just below 40% of the surveyed establishments by 2002. In the median organization, 75% of core-job workers participated in such teams in 2002 (core-job is defined as the largest job category in the establishment). Problem-solving teams, a more modest transformation of work structures, have diffused from about 9% in the early 1980s to 65% of the employers in 2002, with a median of 50% of core-job workers participating. Similar trends are found in other longitudinal national surveys (Kelly and Dobbin 1997; Lawler, Mohrman and Ledford 1992; Osterman 2000).

Self-directed work teams.-- Self-directed work teams are considered the most far-reaching effort to transform the organization of work (Appelbaum and Berg 2001; Cappelli et al. 1997; Osterman 2000). These teams typically bring together workers from different jobs, which hold frequent meetings, assume joint responsibilities on work tasks, share knowledge and participate in decision making. For example, in a high-tech company, engineers, technicians and administrative assistants are members of a self-directed work teams. They meet a few times a week in groups to design and create new technologies (Daday and Burris 2002, p.12). In a bank, team members are jointly responsible for phone service and technical tasks (Ollilainen and

Rothschild 2001, p.153). And workers in a paper mill plan key activities and tasks on their own, assign and rotate jobs amongst themselves and assume greater responsibility for production, quality and safety (Vallas 2003a, p. 230). Some work teams undoubtedly do no more than impose production quotas on workers, with no real changes in the work routine (Smith 1997; Taplin 1995) Yet, to the extent that they are more than a 'sweat method', these teams may provide workers with important career resources: new opportunities to gain skill, demonstrate capabilities and form ties.

Qualitative research supports this view. Researchers find that such teams provide workers with opportunities to extend beyond their traditional job boundaries, to develop communication and decision-making skills (Smith 1996); to expand their networks and the physical setting in which they operate (Daday and Burris 2002; Ollilainen and Rothschild 2001; Smith-Doerr 2004; Vallas 2003a); to demonstrate hitherto unobserved capabilities, and to develop higher career aspirations (Berg, Kalleberg and Appelbaum 2003; Smith 1996). Below I detail some of this evidence.

Analyzing data on more than two thousands life scientists, Smith-Doerr (2004) finds that women are significantly more likely to be in supervisory positions when they work in bio-tech firms that are organized around project-based teams, compared to hierarchical organizations. The female scientists Smith-Doerr interviewed attributed this difference to the flexibility to work with more people and to the higher visibility of their skill and contributions in a team environment. In another context, a similar account was given by a human resources manager at a large auto-manufacturing firm:

I started as a security guard and climbed my way up to being a secretary, and then to a higher secretary, and in the last three years I am in this position in HR, EEO

representative, and an administrator of salaried personnel. It wasn't easy... I had to work hard to prove my talent. To make people see my talent. Because my job did not provide such opportunities, joining work teams was the best way for me to do that.... In general, I think that it is a good opportunity to interact with people, and with people in management and to show that you can do things.¹

As workers in teams demonstrate new capabilities, the *patterns* of interaction between workers in high and low level jobs may change too. Studying teams in a high tech company, Daday and Burris (2002) argue that the teaming environment appears to mitigate the exempt/non-exempt divide (which for the most part is also a gender divide). As one of their interviewees, an administrative assistant, attests, "non-exempt can now feel like they are not demeaned; they are treated as an equal part of the team" (p. 17).

Work in self-directed teams can also enhance workers' sense of self-efficacy and of personal and professional growth (Berg et al. 2003; Daday and Burris 2002). This was the case for the men (mostly non-white) and women who participated in teams studied by Smith (1996) and who, as a consequence of their team work experience, envisioned pursuing their own small businesses or moving to different, parallel or higher, positions inside the corporation.

It would be naïve to assume that gender and racial discrimination stops at the team's doorstep. Researchers find that men, and whites, continue to erect boundaries that exclude women and blacks within teams (Daday and Burris 2002; Ollilainen and Rothschild 2001; Sturm 2001; Vallas 2003a, p.235). Yet, evidence from qualitative research indicates that, compared to a more traditional work setting, work in self-directed teams provides new avenues for women and minorities to act against such gender and racial stereotypes and exclusion. First, simply by

¹ Communication with the author. June 15th, 2001.

demonstrating their capabilities, and second, by claiming equal treatment from team members as an essential component of team efficiency and success. For example, Ollilainen and Rothschild (2001) report that while the men continued treating the women in the team as secretaries, these women mobilized and demanded equal treatment as part of the team (p. 154). Such a request could not have been formulated absent the team context.

The new opportunities presented by the team structure, as discussed above, can translate into new career achievements of women and minorities (Ollilainen and Rothschild 2001, p.161; Smith 1996 p.178; Smith-Doerr 2004). If this is the case the following hypothesis will be confirmed:

H1a: The adoption of self-directed work teams will be associated with subsequent increases in the proportion of women and African-Americans in managerial ranks.

An important caveat to this hypothesized positive effect of teams on managerial diversity relates to the differences between the mechanisms shaping gender and racial inequality at work. First, white women are, on average, more educated than blacks and better positioned in organizations (Altonji and Blank 1999, pp. 3151-3155; Bell and Nkomo 1994), and consequently may be more likely to have the prerequisites for management positions. Second, social-psychological research shows that racial diversity, more so than gender diversity, can have a negative impact on team processes, such as communication and integration (Baugh and Graen 1997; Townsend and Scott 2001; Vallas 2003c; Williams and O'Reilly 1998, p. 115). These differences lead me to hypothesize that team-based work is less likely to erode racial boundaries than gender boundaries. In other words, I expect white women's share in management to increase more than blacks' following the adoption of self-directed work teams.

Problem-solving teams.-- An earlier team structure is best known as Quality Circles, or off-line problem-solving groups, which originated in the 'quality movement' of the early 1980s. These teams are less inclusive. They tend to include experts, who are mostly white and male, that who come together to address problems of raising quality, efficiency or safety (Batt 2004, p. 188; Cappelli et al. 1997, p. 90-92; Smith 1997; Vallas 2003a, p.232). Unlike self-directed work teams, then, problem solving teams have less potential to increase the exposure of women and minorities to new work tasks and people and so to counteract the negative effects of segregation. And if counteracting segregation is the mechanism at work here, we are less likely to observe an increase in managerial diversity following their adoption:

H1b: The adoption of problem-solving teams will not be followed by increases in the proportion of women and African-Americans in managerial ranks.

Cross-Training and Job Training

Another commonly cited aspect of the re-organization of work is developing workers' skills (Cappelli et al. 1997, p. 102; Piore and Sabel 1984). More and more employers are supplementing pre-labor market education by offering workers cross-job training and formal job training programs (Appelbaum and Berg 2001; Lynch and Black 1998; Osterman 1994; U.S. Department of Labor 1992). As Figure 3 shows, cross-job training and job training programs were offered in about 30% of the surveyed establishments in my data in 1980, compared to more than 85% in 2002 (see also Osterman 2000). Below I explain the differences between these two types of training and offer hypotheses about their effects on managerial diversity.

It is important to clarify here that by analyzing the effect of training I do not examine individual skill level. My research question is whether organizational changes, in the form of the adoption of job training and cross-job training programs, have been effective in bringing more

women and blacks into management in the last twenty years. Unlike the case for cross-training, increasing women's and minorities' representation in management was one of the initial goals of job training programs.

Cross-job training.— The content of these programs varies widely; while some report on cross-job training programs that enrich workers' skills and increase their motivation and job satisfaction (Adler 1992; Campion, Cheraskin and Stevens 1994; Ollilainen and Rothschild 2001), others describe them as “job intensification” methods (Smith 1997, p.322), where workers are pressured to perform more de-skilled work at a higher pace (Taplin 1995; Handel and Levine 2004, p. 6).

Similarly to self-directed work teams, cross-job training programs can undermine the isolating implications of job segregation. First, through job rotation, women and minorities can gain experience in new jobs, and get to demonstrate their capabilities and to be perceived by others as having “management potential”. Second, the presence of a job rotation programs can provide a justification for women and minorities to reach out and broaden their skills, ties and experience. Both these processes are exemplified in Ollilainen's and Rothschild's (2001) observations of a bank, where cross-job training was adopted. Even though the program was compromised by men's refusal to learn women's phone service jobs, women took the opportunity to gain new skills and learn how to perform multiple functions. As a result, the authors conclude, this “could provide a new organizational justification and an opportunity for lower-status women workers to outlearn, and perhaps even move into some of the higher-status tasks formerly reserved to men” (Ollilainen's and Rothschild, p.161. See Vallas 2003b, p. 235, for a similar scenario on a production line). Even Taplin's (1995, p. 35) gloomy description of cross-job training in a textile mill as a ‘sweat method’, suggests that supervisors came to

appreciate more some of their low-skill workers after they observed their performance across jobs. If this is the case we can expect that:

H2a: The introduction of cross-job training will be followed by an increase in the proportion of women and minorities in management.

Job training-- Job training provides workers with skills required for performing their job, or the next job up the ladder. To the extent that, due to pre-labor market processes, women and minorities have lower skill levels than white men, receiving job training from their employer can help them obtain better jobs, with better career prospects. Such logic stood behind some of the early adoptions of these programs. Affirmative action regulations, as established in Executive Orders 10925 and 11246, encourage employers to take active steps to promote the 'full realization of equal opportunity' of historically disadvantaged groups (Johnson 1965). Affirmative action and diversity consultants recommend that employers adopt skill training programs as an effective means for generating pools of women and minority employees qualified for management jobs (Glass Ceiling Commission 1995, p.47; Holzer and Neumark 1998; Stephanopoulos and Edley Jr. 1995). In 1974, for example, Kaiser Aluminum signed a contract with US Steelworkers to provide new training programs, which would open skilled crafts jobs to blacks. These programs became famous when, in 1979, the Supreme Court supported Kaiser in a reverse discrimination suit (Kaiser Aluminum and U.S. Steelworkers v. Brian Weber 443 US 193, 1979), upholding quotas for blacks in recruitment to these training programs.

If job training programs are to fulfill the goal of creating pools of women and minorities eligible for promotion, we could expect management diversity to increase after employers adopt such programs.

However, the spread of employer-provided job training has not been motivated solely by the desire to improve women's and minorities' labor market outcomes. During the 1980s and 1990s, facing intensified international competition, employers increased their provision of skill training as means for improving quality and productivity (U.S. Department of Labor 1992; Lynch and Black 1998). Studies indicate that employers indeed view training more as an investment in human capital than as means for equalizing opportunities; they find that employers tend to provide job training to workers they perceive as most likely to return the investment: the more educated workers and those they expect to have continued employment and high productivity. These preferences result in statistical discrimination against women and minorities (Hight 1998; Knoke and Ishio 1998; Lynch and Black 1998). Not surprisingly then, despite its potential to iron out pre-labor market disadvantages, research has shown that employer-provided formal job training exacerbates workplace inequality rather than reducing it (Appelbaum and Berg 2001; Baron and Newman 1990). Accordingly, I expect to observe that the adoption of job training programs does not bring more women and blacks into management:

H2b: The proportion of women and African-Americans in management will not increase following the adoption of a job training program.

Summary

The analysis below examines changes in gender and racial representation in management following the adoption of two types of workplace changes: team work and skill-upgrading programs. Within each type I compare two programs, one that is directed at re-structuring the traditional segregated structure of work (self-directed work teams and cross-job training) and one that is not designed to do so (problem-solving teams and formal job training) (see Figure 1). This comparison can give us a sense of the mechanisms at work: if only those programs that allow

workers to transcend job boundaries have an effect on managerial diversity, then the importance of this re-organization of work for gender and racial inequality will be underscored.

MEASURING ALTERNATIVE SOURCES OF MANAGERIAL DIVERSITY

Some organizational changes that are likely to accompany the adoption of teams and training programs may also affect management composition. In order to avoid misinterpretation of my results, I include in the analysis measures of those changes. To capture additional sources of confounding heterogeneity, I also include measures of other factors affecting management composition, related to organizations' structure, labor pools, and legal and economic environments. Note that because I employ a fixed effects analysis, factors that do not vary with time, such as industry or geographical location, cannot be included in the models, but are implicitly accounted for. Before I turn to discussing the modeling strategy, below I detail briefly the motivation for inclusion each of the additional measures in my analysis.

Complementary Organizational Changes

Management training program.-- Firms that adopt autonomous work teams may establish management and leadership training programs, with the idea of increasing workers' efficacy in these teams (Appelbaum and Berg 2001, p.104). The adoption of these programs can provide women and minorities a formal path and credential for entering the managerial pipeline.

Peer evaluations.-- Peer evaluations, where workers are evaluated by their co-workers, are common among firms with team structures. Researchers have found gender and racial bias in managers' performance evaluations (Elvira and Town 2001; Greenhaus, Parasuraman and Wormley 1990; Williams and O'Reilly 1998). Peer evaluations rely on a broader set of views, hence may be less biased (Smith-Doerr 2004) and may improve the promotion chances for women and minorities.

Work and family accommodations.-- Employers that adopt 'high performance' programs are also more likely to adopt work/family practices (Berg et al. 2003; Osterman 1995). Women are expected to benefit disproportionately from such support.

Reduction in force.— Downsizing of the establishment's workforce is likely to accompany changes in the organization of work (Osterman 2000) and may also affect managerial composition. Studies of downsizing, though not focusing on management jobs, suggest that blacks are more likely to be displaced than whites (Elvira and Zatzick 2002; Fairlie and Kletzer 1998; Farber 1997), while women seem to be less or equally likely as men to be displaced (Farber 1997).

Availability of managerial jobs.— Growth in managerial ranks has been shown to increase diversity (Blum, Fields and Goodman 1994). Konrad and Linnehan (1995) and Leonard (1990, p. 52) find that such growth positively affected white women more than African-Americans. Osterman (2000) finds that establishments with 'high performance work organization' have smaller managerial ranks. In these establishments it may be more difficult to hire managers from disadvantaged groups without hurting opportunities for white men (Baron, Mittman and Newman 1991; Tomaskovich-Devey and Skaggs 1999).

External hiring.— Freeman, Kellner and Ostroff (2000) find that workers participating in employee involvement programs are more satisfied and loyal to their firms (see also Appelbaum et al. 2000). Yet, it is plausible that employers that undergo re-organization may increase their external hiring of new managers, in search for managers who fit better with the new organization of work. Increased external hiring may affect managerial diversity, though it is difficult a-priori to say in what direction.

Organizational Structures

Personnel policies.-- Formal personnel systems are expected to limit managerial discretion and thereby curtail discrimination (Reskin 2000). Using data from the National Organization Survey, Reskin and McBrier (2000) find that formalization of HR decisions is associated with increased managerial diversity. Others contend that formalization exacerbates inequality by creating separate career trajectories for different groups (Baldi and McBrier 1997; Baron and Bielby 1985; Elvira and Zatzick 2002). Still others find that formalization is not associated with higher diversity, but ‘identity conscious’ affirmative action and diversity policies are (Edelman and Petterson 1999; French 2001; Holzer and Neumark 1998; Kalev et al. 2005; Konrad and Linnehan 1995). I thus include in the analysis measures for both formalization and ‘identity conscious’, affirmative action and diversity, programs.

Unionization.— To the extent that union contracts institutionalize seniority based rules they tend to favor white, and male, employees (Baron et al. 1991; Blau and Beller 1992; Milkman 1985. But see Leonard 1985). Yet, unions vary in composition and agendas. For example some unions have promoted work-family programs, which may enhance women’s careers (Kelly 2003; Osterman 1995). Here too the expected effect can go either way.

Organizational size.— Larger organizations are more visible and may be more concerned with appearing non-discriminatory. However, organizational growth may be an indication of success, rendering managerial jobs more desirable, and more likely to go to white men than to women and minorities (Reskin and Roos 1990). Research evidence is mixed (Baron et al. 1991; Bielby and Baron 1986), and so I do not specify the direction of the expected effect.

Workforce Demography

Diversity of managerial ranks.-- Managerial composition is said to be self-reproducing due to homosocial reproduction (Elliott and Smith 2004; Kanter 1977), social closure (Tomaskovic-Devey 1993) and social networks (Burt 1998; Reskin and McBrier 2000). Cohen and her colleagues (Cohen, Broschak and Haveman 1998) find that women are more likely to be promoted when some (but not most) of the positions above the focal job were filled by women. Elliott and Smith (2004) find that when they have the opportunity to do so, women and minorities too attain power through homosocial reproduction. I thus include measures of the gender and racial composition of top management.

Demographic composition of the internal and external labor pools.— Employers that operate in diverse internal and external labor markets have a more diverse pool of managerial candidates to draw from (Cohen et al. 1998; Reskin and Roos 1990; Shenhav and Haberfeld 1992) and may also face pressures to adopt norms of inclusiveness (Blum et al. 1994, p. 245). Finally, because women and minorities are more likely supervise of workers from the same demographic group (Smith 2002, p. 522), the composition of the non-managerial jobs in the establishment may affect managerial composition.

The Environment

Legal environment.-- Title VII of the Civil Rights Act of 1964 outlawed discrimination based on sex and race, and in 1965, Executive Order 11246 mandated covered employers to take “affirmative action” to end discrimination in employment. Research has established that employers who are more aware of the requirements of anti-discrimination regulations and those that experience Title VII litigation or affirmative action compliance reviews are more likely to

see increases in managerial diversity (Kalev and Dobbin Forthcoming; Leonard 1989; Leonard 1990; Skaggs 2001).

Unemployment .— High unemployment rates are expected to disadvantage women and minorities in the labor queue to managerial jobs (Reskin and Roos 1990).

Industry size.—Growing industries may provide more opportunities for women and minorities but they also indicate increased market success, which renders managerial jobs more attractive and more likely to go to white men (Reskin and Roos 1990). Because I already include measures of growth in the proportion of each group in the industry labor force (see ‘diversity of labor pools’ above), I expect growth in industry employment to be associated with increased presence of white men in management.

DATA AND METHODS

I analyze unique longitudinal data on 810 establishments’ annual workforce composition and employment practices, using fixed-effects models, to estimate changes in the proportion of managers who are white men, white women, black women, and black men following the adoption of teams and training programs between 1980 and 2002.

Data

The dataset employed for this study was assembled from two main sources: establishments’ annual workforce composition reports submitted to the EEOC between 1980 and 2002 and an original survey of these same establishments’ work and personnel structures. The data collection was conducted in collaboration with (identifying information omitted) and was funded by the National Science Foundation and the Russell-Sage Foundation.

The workforce composition data come from annual EEO-1 reports submitted to the EEOC by all private sector employers with more than 100 employees and government

contractors with more than 50 employees and \$50,000 worth of contracts². As required by federal law, these reports detail the sex, racial and ethnic composition of their workforce in nine broad occupational categories. These data were obtained for research purposes from the EEOC under an Intergovernmental Personnel Act (IPA) agreement³.

The broad occupational categories used by the EEOC obscure segregation within management, where women and minorities are more likely to be concentrated in lower-level positions. Accordingly, my analysis explores whether, following the re-organization of work, the share of women and minorities increases at least in lower level managerial ranks. But I cannot examine their mobility within management⁴. Yet, these reports provide the best available data for studying long term change in organizations workforce composition (see Robinson et al. 2005).

² Excluded employers, such as State and Local governments, primary and secondary school systems, institutions of higher education, provide different reports (EEOC n.d.)

³ EEO-1 data were obtained for 1971-2002. The 1970s were not included here because cross-functional work arrangements as such, began their diffusion in the early to mid-1980s, with high profile cases such as GM, Xerox and Corning transforming their organization of work. The pilot interviews confirm that when employers talk about cross-job training before the 1980s, these were part of executive programs.

⁴ Some argue that growth in managerial diversity is an artifact of the reclassification of clerical and lower level supervisory jobs as management jobs (Baron and Bielby 1985; Smith and Welch 1984) Re-classification is most likely to have occurred in the 1970s, the early years of the EEO-1 reporting requirement. Nonetheless, I excluded all organization-year cells in which there was a large change in the number of women or blacks in management (larger than 95% of the cases)

We drew a random sample of establishments from the EEO-1 data for the year 1999 (the latest year of data available at the time of sampling). The sample was stratified by the number of years the establishment appeared in the EEO-1 data to ensure a sufficient longitudinal perspective as well as variation in establishments' age. 50% of the establishments had to be in the data at least since 1992 and 50% since 1980. The sample was also stratified by size, with 35% of the establishments having less than 500 employees, and by industry, with food, chemical, computer and transportation equipment manufacturing industries, wholesale and retail trade, and insurance, business services, and health services. The sampling unit was an establishment (that is, a single location of a firm or a firm with single location), and only one establishment per parent firm was sampled.

Before composing the survey instrument, we examined the wording and findings of other employment surveys conducted in the last decade (in particular Appelbaum et al. 2000; Kelly 2000; Osterman 2000), as well as information about changes in work organization obtained from in-person interviews with human resources managers conducted in collaboration with Erin Kelly in 2000-2001. During 2002, trained interviewers at the Princeton University Survey Research Center completed 833 interviews with a response rate of 67%, which is higher than, or comparable to, similar surveys (Kalleberg et al. 1996; Kelly 2000; Osterman 1994; Osterman

and this did not affect the results. This is consistent with evidence that women's and minorities' entrance to management does represent a significant, if small, change in their status (for example, Jacobs 1992).

2000)⁵. The interviewees were mostly human resources managers with an average tenure of 11 years. Interviewees were asked whether a series of programs related to the organization of work had ever been adopted in their establishment, in what years they were first adopted and whether they were still in place. The survey questions also included information about related personnel practices and other organizational characteristics that are expected to affect managerial composition and so are included as control variables in this analysis. When the respondents did not know the year in which certain programs were adopted, we sent them a list of the unanswered questions at the end of the interview, so they could answer them after consulting their records or colleagues. For three of the four programs examine here 2% or less of the respondents did not know the years of adoption. For self-directed work teams this number was 4%. All missing values were imputed using OLS regression with industry, establishment age and type of establishment as covariates. In the analyses presented below, the coefficients of each of the variables of interests remain robust when no imputed data for each variable are included.

Upon completion of the phone interviews, we matched the survey data for each establishment with the corresponding annual EEO-1 records, and all identifying information was

⁵ Response bias was examined using logistic regression with industry, establishment status (a headquarters, sub-unit or stand-alone organization), size, government contract status and managerial composition (results are available upon request). Responding establishments were larger and had a larger proportion of white men in their managerial ranks than non-responding organizations. Size is included in the models as well as the composition of top management teams. All industries were equally likely to participate in the survey, excluding establishments from the business services industry, which were less likely to participate. The proportion of each industry in the final sample varies little, between 9.66% and 12.80%.

removed from the dataset to insure confidentiality. We added data on national, state and industry labor market characteristics from the Bureau of Labor Statistics' data sources. The final dataset used in this analysis contains 810 cases and 14,693 establishment-years, with a median of 23 years of data for each establishment⁶.

Dependent Variable – Managerial Diversity

The dependent variables are the proportion of white men, white women, African-American women, and African-American men among managers in an establishment, as calculated from the EEO-1 data. Between 1980 and 2002 the percent of white men in management declined from 75% to 62%, while white women grew from 19% to 26%, black women from less than 1% to 2% and black men from 2.4% to 3.1% (see Figure 4). The trends found here are consistent with the trends in the overall EEO-1 dataset and in the data from the Current Population Survey of the Bureau of Labor Statistics, but those datasets show larger gains for women and blacks because they include newly founded organizations, nonprofits, and government agencies.

Because there are large differences in the absolute magnitude of the change in the outcome variables across groups, I transformed these proportions to the log odds of each groups in management (Fox 1997:78).⁷ Using log (proportion), rather than log (odds), does not alter the results, but the distribution of log odds is closer to normal.

⁶ For 10 cases, useable EEO-1 data exist for less than 4 years. These cases are excluded from the analysis. For an additional 8 interviewed establishments, the survey data were unusable and for 5 cases the EEO-1 data were not useable.

⁷ Logit (i)=Log (Pi/1-Pi), where Pi is the proportion of group i among managers. The logit is undefined when Pi=0 or Pi=1. I thus substituted 0 with 1/2Nj, and 1 with 1-1/2Nj, where Nj is

Independent Variables - The Re-Organization of Work

I use four variables to measure different aspects of the re-organization of work: self-directed work teams, problem-solving teams, cross-job training and formal job training (defined as, other than ‘on-the-job training’). The variables are based on answers to the survey questions pertaining to adoption of these programs and the years in which they operated in the core job. Core job was defined as the largest job category in the establishment. The questions pertained only to the core job category rather than to the entire establishment to maintain consistency in measuring across establishments and in relation to other programs and policies involved in the analysis (Osterman 1994). The variables are binary, coded as “1” in every establishment-year cell since the year of adoption of each program and “0” before the program is adopted and after it is revoked, if relevant. Self-directed work teams were adopted by 40% of the establishments, at the median year of 1992, and overall 18% of the establishment-year spells in my data have these teams. Problem solving teams were adopted by 65% of the establishments, in 1991 as a median year, and 30% of the establishment-year cells in my data have them. Both cross-job training and job training programs were adopted by about 85% of the establishments in my data, and the median year of adoption was 1985. About 50% of the establishment-year spells in my data have cross-job training programs and 55% have job training program.

Independent Variables - Other Factors Affecting Managerial Composition

the number of managers in establishment j (Hanushek and Jackson 1977; Reskin and McBrier 2000). The results of my analysis are robust to different strategies for substituting zeros. I chose the one that kept the distribution uni-modal and closest to normal. I also included a dummy variable that equals 1 when there were no managers from the focal group. The results are also not sensitive to whether this variable is included.

All the independent variables in the analysis are measured annually and are lagged, that is, they are measured in the year before the dependent variables. Table 1 presents the means, standard deviations, definitions and data source for all variables employed in the analysis. Organizational characteristics that do not vary with time, such as industry and location, are not included, but are accounted for by organization fixed effects.

Complementary organizational changes-- Management training programs, peer evaluations and reduction in force are based on survey data and are measured as binary variables. *Work-family accommodations* counts four work-family factors: paid maternity leave, paid paternity leave, policy allowing flextime, and top management support for work-family programs. The *availability of managerial jobs* is measured using EEO-1 data on the number of managerial employees. *External hiring* is measured as the percent of external hires to management in the last two years, and is based on a survey question asked in 10 years intervals (2002, 1992, 1982). Values for intervening years were interpolated using a linear function. This variable is multiplied by 10 for ease of presentation of the coefficients.

Organizational characteristics--. *Human resources policies* are measured by three variables, based on survey data. First is a count variable of policies formalizing HR decisions: hiring, promotion and discharge guidelines; job descriptions, promotion ladders, performance evaluations, pay grade systems, and internal job posting. Second is a count of diversity programs, including diversity training, diversity evaluations, diversity personnel and diversity mentoring and networking. Last is a binary variable denoting the presence of an annual affirmative action plan. *Unionization* is based on survey data and is measured as a binary variable. *Organizational size* is measured using EEO-1 data on the total number of employees in the establishment.

Workforce demography--. *Diversity of managerial ranks* is measured as the percent of women and African-Americans in the top 10 executive positions, based on survey data. We asked about the percent at 10 year intervals and interpolated values for intervening years. Also, based on data from the EEO-1 reports I include a variable coded as 1 when there are no members of the focal group in management. The *diversity of the establishment's internal labor pool* is measured as the proportion of the focal group in non-managerial jobs, based on the EEO-1 reports. *Diversity of the establishment's external labor pool* is measured using annual data from the Current Population Survey on the percent of each demographic group in the industry and state labor forces. Industry employment variables are logged.

Organizational environment--. *Legal environment* is measured in several ways. A binary variable, based on EEO-1 data, denotes whether the establishment is a government contractor subject to affirmative action regulations. Second, a count variable, based on survey data, counts the establishment's experience with three types of anti-discrimination enforcement: EEOC charges, Title VII law suits and affirmative action compliance reviews (for each type it counts 1 if experienced, zero if not). Finally, based on the survey data, a binary variable, on the presence of an in-house attorney, measures managers' awareness to the legal environment.

Unemployment is measured with the yearly state unemployment rate, and *industry size* is measured as total annual industry employment. Both come from the Bureau of Labor Statistics.

Method

The four dependent variables examined in this study are parts of the same whole - the sum of management jobs in an establishment at a certain year - and so their error terms are expected to be correlated. Under these conditions, ordinary least squares would produce unbiased and consistent estimators, but not efficient. I thus use Seemingly Unrelated Regression, a

generalized least squares estimation that takes into account this covariance between the errors (Felmlee and Hargens 1988; Zellner 1962)⁸. This estimation also allows me to perform a formal test of the hypothesis that the self-directed work teams will be more beneficial for eroding gender barriers compared to racial barriers (Kalleberg and Mastekaasa 2001; Zellner 1962).

An important concern in the analysis of organizational changes is establishing reliable estimates that are not biased by unobserved heterogeneity. I address this concern by using a fixed-effects specification for both establishment and year (Hicks 1994; Hsiao 1986; Western 2002) and by including a series of control variables that may affect the outcome variable. I also conduct several sensitivity analyses, which I discuss later on.

Establishment fixed-effects capture the influence of unmeasured characteristics of individual establishments that do not change with time and affect both the independent and the outcome variables. For example, a progressive organizational culture may cause organizations to experiment with new work programs and also to promote more women and minorities. Having establishment fixed effects in the model increases my confidence that an unobserved factor of that sort does not drive my results. This model specification is achieved by subtracting the values of each observation from the establishment's mean (Hsiao 1986, p. 31)⁹:

$$y_{it} - E(y_i) = \beta \{ x_{it-1} - E(x_i) \} + \delta D_{t-2} + \{ u_{it-1} - E(u_i) \}$$

⁸ Available in Stata using the sureg command. The substantive results in this paper are not sensitive to the choice between this GLS estimation and an OLS estimation.

⁹ The intercept in these models is not an explanation of the 'between unit' or over-time variance. It is simply a characterization of the variance that attempts to minimize the 'true' explanation, or a measure of the 'specific ignorance', as opposed to the 'general ignorance' captured by the error term (Maddala 1977; Sayers 1989)

where y is a vector of outcome variables, x is a vector of time varying variables, D is a vector of dummy variables for $t-2$ years (the first year, 1980 is omitted and the last year 2002 is included only for calculating the outcome variable), E denotes a mean, i denotes an establishment and t denotes year. This transformation is equivalent to including in the model 810 dummy variables, one for each establishment in the data. By virtue of this definition, fixed effects estimation models only within-establishment variation, hence only variables that change over time are included in the analysis.

Year fixed effects are included to capture unobserved heterogeneity that is associated with the mere passage of time and affects all establishments in the same way, such as national cultural, or legal, changes. Finally, to capture establishment-specific heterogeneity that varies with time, I include in the analysis a series of control variables that measure factors found in the literature to be associated with the restructuring of work and/or with managerial composition. The motivation for inclusion each of these variables is discussed above.

The establishment and year fixed-effects also offer an efficient means of dealing with the non-constant variance of the errors (heteroskedasticity) that stems from the cross-sectional and temporal aspect of the pooled data (Sayrs 1989)¹⁰. To examine the robustness of my results to within-unit serial correlation, I corrected for AR(1) using the Cochrane-Orcutt method,¹¹ which multiplies the equation for time $t-1$ by the auto-correlation coefficient, ρ , and subtracts it from the equation for time t : $y_t - \rho y_{t-1} = (1 - \rho)\beta_0 + (x_t - \rho x_{t-1}) \beta_1 + u_t - \rho u_{t-1}$. The results of the analysis and the main argument of the paper are robust to this correction.

¹⁰ Using the Huber-White robust standard errors did not change the results of the analysis.

¹¹ Available in Stata using the xtregar procedure.

Additional sources of unobserved heterogeneity can come from the unbalanced nature of the data (30% of the establishments enter the dataset after the first year of data, 1980) if the reason that an establishment is not in the data, for example its size or age, is correlated with the outcome variable. To verify that the results are not driven by the selection of establishments into the data, I replicated the analysis using a balanced sub-sample of establishments; the results were substantially similar to those of the main analysis reported here.

FINDINGS

My analysis provides strong evidence that some – but not all – of the new practices associated with the re-structuring of work also increase sex and racial diversity in the management ranks. First, as hypothesized, the programs that alleviate the career barriers put forth by segregated job structures – namely, self-directed work teams and cross-job training - have significant positive effects on the proportion of white women and black women and men in management. In contrast, and as hypothesized, programs that do not offer workers new opportunities to transcend job boundaries– problem-solving teams and job training – do not have these effects. The results also indicate that racial barriers are more resistant to change than are gender barriers. The effect of self-directed teams on black women is significantly smaller than on white women, and problem-solving teams have an adverse effect on black men’s and black women’s share in management. Below I discuss the findings in greater detail.

Table 2 includes the results of the full model. The percent change in the odds of a group in management that is associated with a change in an independent variable is calculated by exponentiating its coefficient β as follows: $[\exp(\beta) - 1] * 100$. When the coefficient is smaller, in absolute value, than 0.1, the percent change can be calculated simply as $\beta * 100$. The error of such approximation is about 0.005. The R^2 statistics reported in this table represent the percent of the

variance explained by the predictors, when excluding the unique effects of each establishment. The log-likelihood ratio test shows that adding measures of teams and training programs to the baseline model (presented in Appendix Table A) significantly increases the percent variance explained by the model. The discussion below focuses first on the results pertaining to the main variables of interest.

Team-Based Work

The analysis presented in Table 2 shows that adopting self-directed teams, but not of problem-solving teams, has a significant effect on the managerial composition of these establishments. If we multiply the coefficients by a 100, we can interpret them roughly as the mean percent change in the odds of each group in management associated the adoption of a program, net of variance coming from the control variables and the unobserved stable characteristics of each establishment. After the adoption of self-directed work teams in an establishment, the odds of white men in management are lowered by an average of 8%, the odds of white women in management increase by an average of about 9%, and those of black women and men increase in about 3.5% and 5% respectively. A X^2 test indicates that the estimated effect of self-directed teams on white women is significantly larger than the estimated effect on black women at a level of 5% ($X^2 = 3.98$, with 1 *d.f.*, $p < 0.046$), but not significantly larger than the effect on black men ($X^2 = 1.86$, with 1 *d.f.*, $p < 0.173$). At least as it pertains to women, racial barriers are less easily reduced by the introduction of autonomous team work.

As suggested in hypothesis H1b, and in contrast to self-directed work teams, the adoption of problem-solving teams is not followed by improvements in the status of women and racial minorities in the workplace. In fact black women's odds in management are lowered by 3% on average, and black men's by 6%, after the adoption of problem solving teams. The magnitude of

these estimates is comparable to the positive estimates following the adoption of self-directed work teams. Does this mean that when both programs are adopted, there will be no change in the proportion of black men and women in management, or is there an added value of having both programs at place? To examine this question, in a separate model, I included an interaction term for self-directed work teams and problem solving teams. Having both these programs at the same time has a weak positive effect on black women, significant only at the 10% level of confidence ($B=.053$ $SE=.029$) and no effect on black men ($B=.024$ $SE=.031$). In others words, there is no added value for having both types of programs at the same time¹².

As discussed above, problem-solving teams do not counteract the negative effects of job segregation. They are more likely to include experts and higher-ranking workers, who are usually white and male. In this sense, problem-solving teams are likely to improve the chances of other workers (white men or women) to expand their networks and move into management, leaving black workers disadvantaged. Note that the coefficient for white men is not significant but not negative.

Cross-Training and Job Training.

According to the analysis presented in Table 2, cross-job training programs have positive effects on both gender and racial diversity in management. On average, introduction of cross-job training significantly reduces the odds of white men in management by about 7.5%, and increases the odds of women and blacks in management by about 4%. These programs have the potential to reduce career barriers that women and minorities often face, by allowing workers to network and demonstrate capabilities beyond their narrow job definitions. These results suggest

¹² Coefficients of the interaction analysis for white men and women show no significant effects as well. Full results are available upon request.

that job rotation may indeed translate to new mobility opportunities for women and minorities (Ollilainen and Rothschild 2001; Smith 1996).

The analysis shows that the share of women and blacks in management does not increase following employers' adoption of job-training programs (Knoke and Ishio 1998; Lynch and Black 1998). None of the coefficients of for job training is significant. Despite the initial intent to use job training as means for helping women and minorities advance, employers' adoption of these programs does not undermine sources of disadvantage for women and minorities. As previous research suggests, it is likely that the provision of these training reflects, rather than corrects, the segregated structure of work: employers are more likely to offer this training to highly valued workers. And these are more likely to be white and male.

What do these coefficients mean in relation to changes in the proportion of women and minorities in management between 1980 and 2002? Because the log odds transformation is not a linear transformation, the magnitude of changes in the proportion of each group in management associated with each program will vary according to the starting point, the baseline proportion (Fox 1997:78). For example, we learn from Table 2 that white women's odds in management increase by an average of 9% following the adoption of self-directed teams ($B=.081$). To evaluate the increase in their proportion among managers lets assume that their baseline proportion (that is, their proportion before the adoption of the program) is 7.2% – as is the case in the first quartile in my sample. In this case, the coefficient $B=.081$ translates to an increase of 8.8% in the proportion of white women among managers, bringing it up to 7.8%¹³. If we used the

¹³ To evaluate the magnitude of the effect as a percent change in the proportion of a focal group in management I use the following calculation: $\Delta P_{ij}/P_{ij} = [\exp(L_{1ji}) / (1 + \exp(L_{1ji})) - (\exp(L_{0ji}) / (1 + \exp(L_{0ji})))] / (\exp(L_{0ji}) / (1 + \exp(L_{0ji})))$, where j denotes the focal demographic group

sample mean as the baseline proportion, which is 23% white women among managers, the same coefficient ($B=.081$) would translate to an average increase of 7% in their proportion in management, or an increase of 1.6 percentage point, from 23% to 24.6%.

Table 3 summarizes the magnitude of the changes in the proportion of each group among managers following the adoption of teams and training programs, based on the sample mean of each group as a baseline. The sample means are presented at the top of Table 3. For each program, three rows are presented. The first row, entitled ‘estimated proportion with the program,’ includes the predicted mean proportion of each group among managers, after the adoption of a program. These predicted values are calculated using the coefficients in Table 2, and the sample mean as the baseline. Although the real baseline value varies for each organization, I use the sample mean for the purpose of the example. The second and third rows sum up the differences between the baseline means and the predicted means. These differences are associated solely with the adoption of a program. In the second row these differences are presented in terms of percent change in the proportion of each group among managers, and the in third row they are presented in terms of percentage point change in this proportion. For example, the mean proportion of white men in management in the sample is 67.9%. Adopting self-directed work teams is estimated to reduce this mean to 66.2%, net of all the other variables included in the analysis and the establishments fixed effects. This means a decline of 2.5% in their

and i is the focal program. L_{0ji} is the log-odds of group j in management before the unit change in D_i (that is, before the adoption of program i) and $L_{1ji}=L_{0ji}+B_{ij}$, and is the log-odds of group j in management after the unit change in D_i (after adoption), with B_{ij} being the regression coefficient, estimating the percent change in odds associated with adoption of program i in the model for the j group (Petersen 1985).

proportion in management, or of 1.7 percentage points, is associated solely with the adoption of these teams. To evaluate this change in context we need to remember that during the entire period under study the proportion of white men in management declined by 13 percentage points, from 75% in 1980 to 62% in 2002. To give another example, the proportion of black women among managers is expected to increase from 1.4% to 1.45% due to the adoption of self-directed work teams or cross-job training, which translates to an increase of 3.5% in their share, or 0.05 percentage points. Overall between 1980 and 2002, the share of black women in management grew from .8% to 2%, a 1.2 percentage point increase.

Other Factors Affecting Managerial Composition

The analysis includes variables measuring other changes that may accompany the adoption of teams and training programs, as well as other factors that affect managerial composition. Coefficients for these variables, presented in Table 2, are generally consistent with expectations based on theory and previous research. I briefly discuss here some of these results. Of the organizational changes that may accompany the adoption of teams and training programs, management training program has a positive effect on the share of white women in management, adding peer reviews shows no significant effect on managerial diversity, and work family accommodation have the expected effect of increasing the proportion of women managerial ranks. Downsizing shows a positive effect on women in management and no effect on black men. These results are inconsistent with what we know from individual level data about sex and race differences in vulnerability to downsizing, and may indicate that there are intervening organizational factors that shape downsizing results. Increased availability in managerial jobs has a positive effect on white women in management, at the expense of black men and women. More external hiring to management has a negative effect on the share of black men in management.

Formalization of human resources does not seem to increase managerial diversity. This result is anticipated by mixed evidence from past research regarding different aspects of formalization (Baldi and McBrier 1997; Reskin and McBrier 2000). Consistent with previous studies, affirmative action and diversity programs have positive effects on managerial diversity, as well as experiencing anti-discrimination enforcement and having an in-house legal counsel. An increase in the percent of women and minorities in the top management team is followed by an interesting pattern of gender-by-race homophily: an increase in the proportion of women in top management has a positive effect on the share of white women in management but not of black women's. Both black women and black men benefit from an increase in the proportion of minorities in top management. Black women therefore do not benefit from a 'double advantage' of being both women and black. Finally, a rise in unemployment hurts the odds of women in management, lending support to queuing theory.

Confounding Factors and Unobserved Heterogeneity

As discussed above, the model specification, with fixed effects for each establishment and year, accounts for two possible sources of bias: unobserved differences between adopters and non-adopters that do not change with time, and unmeasured heterogeneity that is correlated with the passage of time and affect all organizations alike (such as changes in societal attitudes or legal environment). This specification by itself does not rule out the possibility that exogenous changes – such as, the arrival of a new CEO concerned about 'progressive' organization of work and management composition, or a decline in profits –lead to changes in the organization of work and, at the same time, lead to changes in the access of women and blacks to management. I try to rule out this possibility in three ways. First, is through the research design: that only two of the four innovations examined here show effects on managerial diversity increases my

confidence that these effects are not caused by a latent factor, as all four programs I examine are often adopted as part of what is often called ‘high performance re-organization’ (for example, Cappelli et al. 1997, chapter 3). For example, if the ‘real’ factor was a new CEO infatuated with new progressive management, we would expect to see positive effects for problem-solving teams as well. Second, as discussed above, I include in the analysis a series of variables that may be associated both with the adoption of new forms of work organization and with changes in managerial diversity; these are work/family programs, diversity programs, management training, peer review evaluations, external hiring and workforce and managerial reduction. That the effects of programs that counteract segregation are observed despite the inclusion of these related changes in the analysis provide further support to my interpretation of the findings. Third, as detailed as the list of control variables in this model is, the models may still subject to omitted variable bias. I hence performed an additional analysis (results are available upon request) where I added binary variables as proxies for the occurrence of an unmeasured event before the adoption of each program. These variables pick up unobserved heterogeneity that varies with time – such as an arrival of new CEO, or unmeasured financial or technological change - that may have led both to the adoption of a certain program and to the observed change in managerial composition. I performed this sensitivity analysis with proxy events assumed as occurring at two and three years prior to the adoption of each of the four teams and training programs examined here, in models parallel to those in Table 2.¹⁴ If the results in Table 2 are spurious, adding a proxy variable for an event occurring before, say, the adoption of self-directed work teams, should cause the coefficients for these teams to decline in size and/or become non-significant, and the proxy variable should show significant effects in the same direction as the original

¹⁴ Results of all unreported analyses are available from the author upon request.

coefficients (Snyder 2003). As expected, the coefficients of interest and the standard errors remained robust to the inclusion of these proxy variables, and neither of the proxy variables had significant coefficients. These analyses add to my confidence that the observed relationship between the re-organization of work and managerial diversity is not spurious.

DISCUSSION AND CONCLUSION

A product of early management ideologies, job control unionism and government intervention in labor markets during World War II (Baron, Dobbin and Jennings 1986; Shenhav 1995), the modern workplace has been traditionally structured around a rigid division of labor and narrow job definitions. As early as 1980, Baron and Bielby used the term ‘new-structuralism’ in stratification research to put forth an agenda for inequality research that would focus on the understanding that “the relationship between structure and attainment is intimately tied to the organization of work” (1980:738). In the words of Baron (1984) “the division of labor among jobs and organizations generates a distribution of opportunities and rewards that often antedates, both logically and temporally, the hiring of people into those jobs” (Baron 1984:38). Feminist scholars illuminate the gendered and racialized aspects of this system, where white masculinity is reproduced and women and minorities are relegated to low-level and undervalued positions (Acker 1990; Nkomo 1992) with limited opportunities to be evaluated for their management capabilities, to build strategic networks and to sustain career aspirations (Baron and Bielby 1985; Kanter 1977; Reskin and Cassirer 1996).

If gender and racial disadvantage is (at least partially) rooted in structure, then the re-organization of work could reduce it. Analyzing data from a national sample of more than 800 work establishments on their organization of work and managerial composition over the last 20 years, I find that moving away from a segregated job structure – by adopting self-directed work

teams and job-rotation programs – is followed by an increase in the gender and racial diversity of management. These results are net of the effect of other organizational changes that commonly accompany the adoption of these programs, such as job training programs, family friendly policies and management training programs. While it would be naïve to assume that gender and racial biases cease to exist in a re-structured work setting, or to ignore the possibility that teams and cross-training programs constitute new ways for extracting more work from labor, my findings support the notion that such re-structuring provides workers with better career opportunities.

These findings are important on a number of fronts. First, they lend strong support to structural theories of inequality (Acker 1990; Baron and Bielby 1980; Kanter 1977). Though they are unintended outcomes of the transformation of work, these findings are not surprising. They strongly resonate with evidence from qualitative research that workers in self-directed work teams and in cross-job training achieve greater exposure at the workplace, gain experience in other jobs and develop higher self-esteem (e.g. Ollilainen and Rothschild 2001; Smith-Doerr 2004; Smith 1996). This transformation of work, it seems, interrupts social processes that reproduce inequality. One plausible path to promotion in this context could perhaps be that women and minorities use their new networks to learn about, and obtain, lateral moves to jobs with better career ladders than their own (DiPrete and Soule 1988). Especially in an economy where careers become more dependent on broadening occupational boundaries through experiences in other domains (Cappelli 1999; Piore 2002, p. 275), it is likely that workers will be able to translate their experience across jobs to career mobility.

Second, it is also telling that the adoption of job training programs does not seem to undermine gender and racial inequality. At first glance, this finding appears somewhat

unexpected. According to human capital theory, women's and minorities' lower positions at work reflect their lower skill levels. Consistent with this reasoning, proponents of affirmative action have promoted employers' training programs as a means for improving the career chances of women and minorities (Glass Ceiling Commission 1994). Yet, research has shown that women are less likely to receive such training, exactly because of their segregation in positions that are not eligible for training (Knoke and Ishio 1998). It is hardly surprising, then, that job training programs do not lead to higher managerial diversity in my analyses. This does not mean that women and minorities are not in need of training. They may very well be. Rather, it suggests that effective organizational endeavors to remedy inequality should include altering the structure of work that locks women and minorities in jobs that are ineligible for such training.

Third, by analyzing white women, black women and black men separately, my findings explore different gender-by-race stratification mechanisms (Elliott and Smith 2001). First, black women's, but not black men's, gains from the transition to team-based work are significantly smaller than white women's. Perhaps this is due to sex segregation, whereby white and black women compete for the same managerial jobs, and so the gains of white women in management come at expense of black women. Second, blacks, both men and women, but not white women, experience adverse effects from the introduction of problem-solving teams. This may reflect a pattern where highly valued employees – usually white and male – are more likely to participate in problem-solving teams (Batt 2004; Vallas 2003b) and to benefit from enhanced promotion opportunities that participation in these teams may convey. Another possible explanation of these adverse effects is suggested by evidence that problem-solving teams (but not self-directed work teams) are accompanied by increased tension at the workplace (Applebaum et al. 2000, p.177; Vallas 2003b). It is plausible that racial boundaries, more than gender boundaries, are redrawn in

such a context (Vallas 2003c). While these findings leave more to be explored, they strongly indicate that we need to learn more about the interplay between organizational mechanisms and the intersection of gender and race (Browne and Misra 2003; Vallas 2003c).

The implications of my findings go beyond the organizational adoption of self-directed work teams or job-rotation programs. They point to a viable way for remedying gender and racial bias that advances a dual agenda of workplace efficiency and equality (Rapoport et al. 2001). Ever since the passage of the Civil Rights Act and affirmative action requirements in the 1960s, employers have been experimenting with ways to increase the representation of women and minorities in the workforce and in management. The formalization of human resources policies is one prominent solution (Reskin 2000), but researchers (Baldi and McBrier 1997; Elvira and Town 2001) as well as the Supreme Court (*Griggs v. Duke Power Co.*, 401 US 424, 431-2, 1971) have found it to be far from a panacea. Diversity experts have recommended formal networking and mentoring programs aimed at catalyzing strategic social relationships for disadvantaged workers. Research has shown weak, and often negative, effects of these programs on diversity outcomes (Carter 2003; Friedman and Craig 2004; Kalev et al. 2005). In contrast, my study shows that transforming the organizational structures that reproduce gender and racial bias among managers and that hinder the formation of strategic social ties is effective in increasing managerial diversity.

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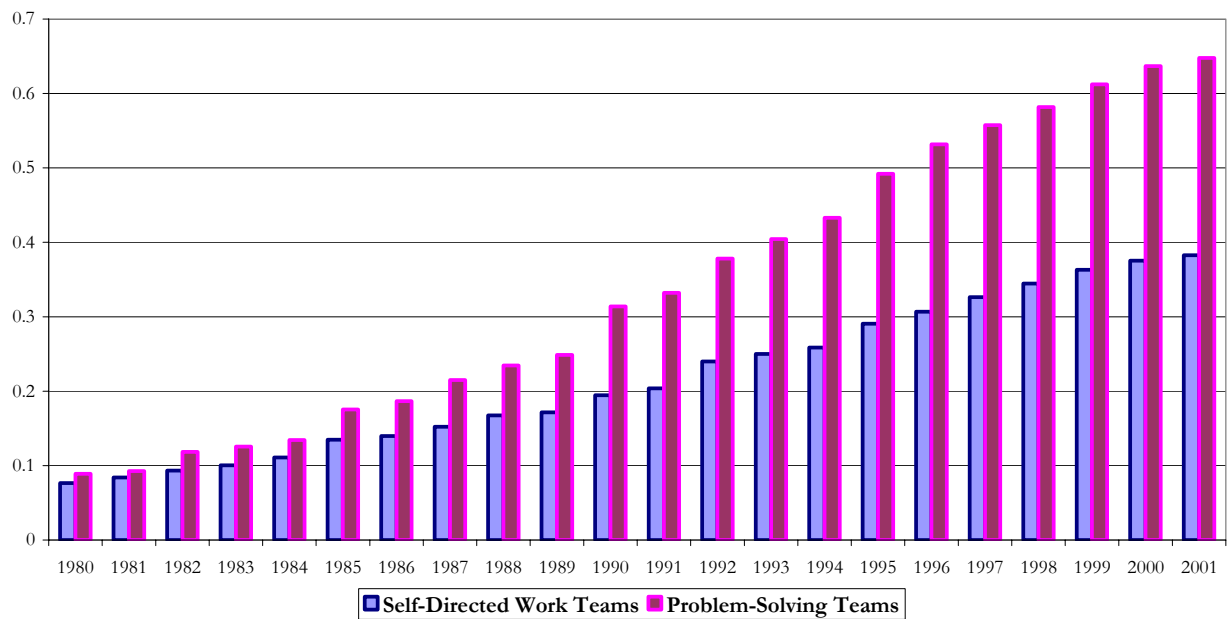
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Figure 1: Types of Organizational Change

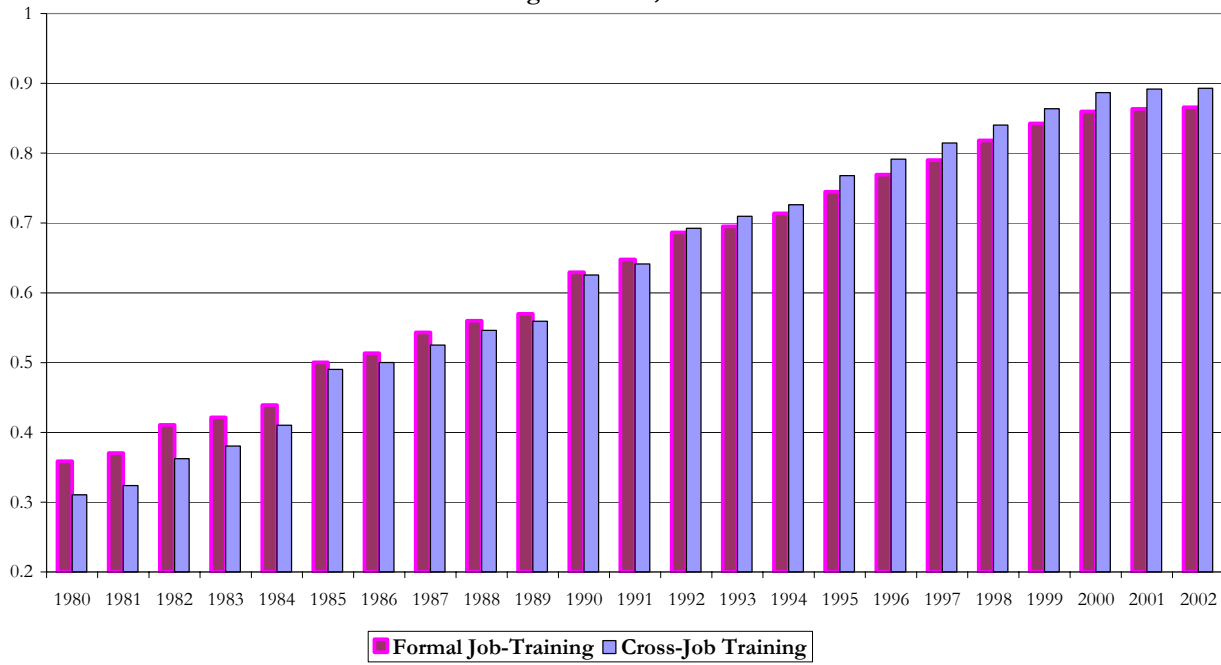
		TEAMS	TRAINING
RE-STRUCTURING OF WORK?	YES	Self-directed work teams	Cross-job training
	NO	Problem-solving teams	Job Training

Figure 2 - Prevalence of Self-Directed Work Teams and Problem-Solving Teams in American Organizations, 1980-2002



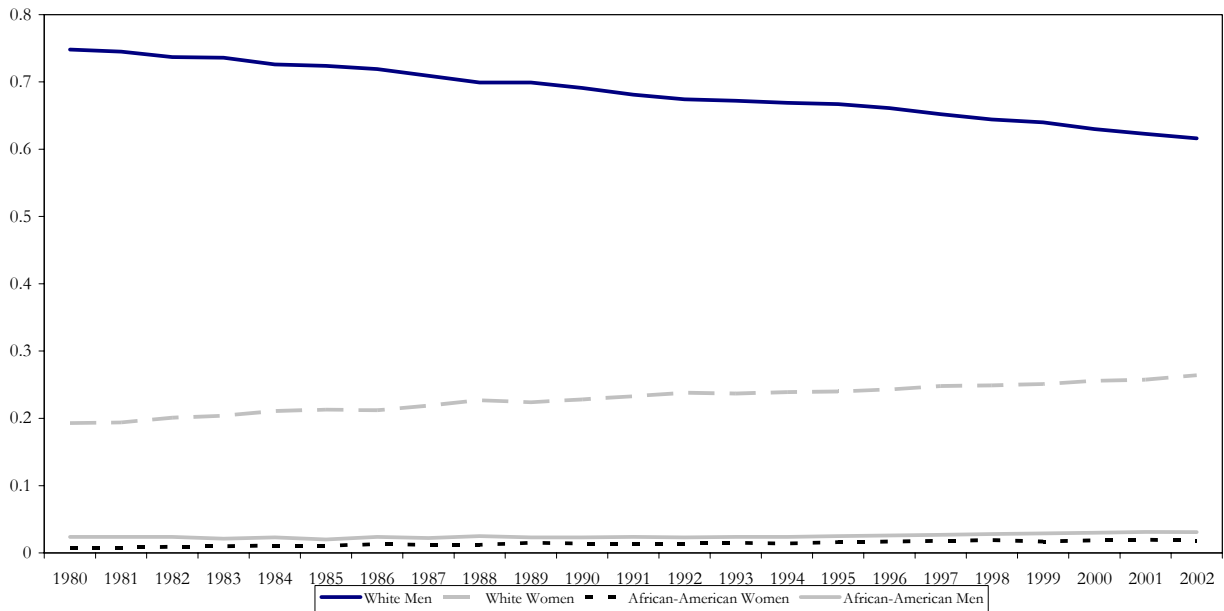
Source: Princeton University Human Resources Survey 2002. Max N=810.

Figure 3 - Prevalence of Formal Job Training and Cross-Job Training in American Organizations, 1980-2002



Source: Princeton University Human Resources Survey 2002. Max N=810.

Figure 4 - Proportion of White Men and Women and African-American Men and Women among Managers, 1980-2002



Source: EEO-1 reports for 1980-2002 sampled for the Princeton University HR survey 2002. Maximum N = 810.

**Table 1 - Means and Standard Deviations of Variables Used in the
Analysis of Managerial Workforce Composition.* N=14,693**

	Mean	S.D.	Min	Max	Type	Data Source
Outcome Variables:						
Proportion of white men among managers	0.684	0.231	0.000	1.000	Continuous	EEO-1
Proportion of white women among managers	0.231	0.210	0.000	1.000	Continuous	EEO-1
Proportion of Black women among managers	0.013	0.038	0.000	0.556	Continuous	EEO-1
Proportion of Black men among managers	0.025	0.055	0.000	1.000	Continuous	EEO-1
Team Structures:						
Self-Directed Work Teams	0.176	0.381	0	1	Binary	Survey
Problem-Solving Teams	0.297	0.457	0	1	Binary	Survey
Skill Upgrade:						
Cross-job training	0.558	0.497	0	1	Binary	Survey
Formal Job-Training	0.501	0.500	0	1	Binary	Survey
Complementary Organizational Changes:						
Management Training	0.444	0.497	0	1	Binary	Survey
Peer Evaluations	0.118	0.322	0	1	Binary	Survey
Work-family accommodations	1.049	0.996	0	4	Count ¹	Survey
Organizational Downsizing	0.225	0.418	0	1	Binary	Survey
Percent managerial jobs in the establishment	0.126	0.092	0	100	Continuous	Survey
Percent management hiring that is external	56.693	29.773	0	100	Continuous	Survey
Organizations' Structures						
Formalized personnel policies	4.454	2.245	0.000	8.000	Count ²	Survey
Affirmative-action plan	0.503	0.500	0	1	Binary	Survey
Diversity programs	0.358	0.792	0	4	Count ³	Survey
Union agreement	0.248	0.432	0.000	1.000	Binary	Survey
Establishment size	753.516	972.482	13	14195	Continuous	EEO-1
Workforce Composition						
Percent women in top management	16.933	22.959	0	100	Continuous ⁴	Survey
Percent minorities in top management	3.471	9.490	0	100	Continuous ⁴	Survey
Prop. of white men among non-managers	0.403	0.247	0	0.982	Continuous	EEO-1
Prop. of white women among non-managers	0.377	0.247	0	1	Continuous	EEO-1
Prop. of Black women among non-managers	0.058	0.095	0	0.886	Continuous	EEO-1
Prop. of Black men among non-managers	0.053	0.089	0	0.940	Continuous	EEO-1
No white men in management	0.005	0.074	0	1	Binary	EEO-1
No white women in management	0.094	0.291	0	1	Binary	EEO-1
No Black women in management	0.686	0.464	0	1	Binary	EEO-1
No Black men in management	0.533	0.499	0	1	Binary	EEO-1
Proportion industry labor force that is white male	0.434	0.147	0.145	0.711	Continuous	CPS
Proportion industry labor force that is white female	0.323	0.140	0.129	0.624	Continuous	CPS
Proportion industry labor force that is black female	0.040	0.018	0.014	0.097	Continuous	CPS
Proportion industry labor force that is black male	0.042	0.023	0.005	0.098	Continuous	CPS
Proportion state labor force that is white male	0.380	0.060	0.116	0.502	Continuous	CPS
Proportion state labor force that is white female	0.358	0.066	0.093	0.496	Continuous	CPS
Proportion state labor force that is black female	0.042	0.029	0.001	0.186	Continuous	CPS
Proportion state labor force that is black male	0.049	0.035	0	0.201	Continuous	CPS
Organizations' Environment						
In-house legal counseling	0.303	0.460	0	1	Binary	Survey
Government contract (Subject to Affirmative Action)	0.486	0.500	0	1	Binary	EEO-1
Legal enforcement of anti-discrimination	0.948	1.019	0	3	Count ⁵	Survey
Unemployment rate	6	2	2	18	Continuous	CPS
Industry employment	3961	2904	996	11458	Continuous	BLS
Year	1991	6	1980	2001	Continuous	EEO-1

* All independent variables, excluding the proportion of managerial jobs, are measures one year before the outcome variables.

¹ Includes paid maternity leave, paid paternity leave, policy allowing flexible working hours and top management support for work family balance.

² Includes adoption of formal HR department, written hiring, promotion and discharge guidelines, written job description, written promotion ladder, written performance evaluations, pay grade system and internal posting of jobs.

³ Includes diversity committee, diversity training, diversity networking, mentoring, diversity evaluation for managers and diversity staff.

⁴ Percents were obtained in 10 years intervals from 1982-2002. Values for years in between were interpolated using a linear function.

⁵ Includes affirmative action compliance review, EEOC charges and discrimination-law suits.

Table 2 - Fixed Effects Estimates of the Log Odds of White Men and Women and African-American Women and Men in Management after Adoption of New Forms of Work Organization, 1980-2002.

Unstandardized coefficients from a seemingly unrelated regression, standard errors in parenthesis.

	White Men	White Women	Black Women	Black Men
<u>Team Work</u>				
Self-Directed Work Teams	-0.081 ** (0.019)	0.087 ** (0.020)	0.035 * (0.018)	0.048 * (0.019)
Problem-Solving Teams	0.014 (0.014)	0.024 (0.015)	-0.031 * (0.013)	-0.058 ** (0.014)
<u>Skill Upgrade</u>				
Cross-Job Training	-0.076 ** (0.016)	0.044 * (0.017)	0.033 * (0.016)	0.040 * (0.018)
Job-Training	-0.005 (0.016)	0.007 (0.017)	0.017 (0.015)	-0.002 (0.017)

Table 2 continued on next page

** p<0.01; * p<0.05; (two tailed test)

Table 2 (Continued)

	White Men	White Women	Black Women	Black Men
<u>Complementary Organizational Changes</u>				
Management Training Program	0.002 (0.015)	0.040 ** (0.015)	0.003 (0.014)	-0.017 (0.015)
Peer Review Evaluations	0.007 (0.018)	0.013 (0.019)	0.011 (0.018)	0.032 (0.018)
Work-family accommodations	-0.036 ** (0.008)	0.029 ** (0.008)	0.018 * (0.007)	-0.005 (0.008)
Organizational Downsizing	-0.025 (0.016)	0.070 ** (0.022)	0.080 ** (0.015)	0.024 (0.016)
Percent managers in establishments	-1.357 ** (0.103)	0.823 ** (0.110)	-2.919 ** (0.098)	-2.191 ** (0.101)
Percent management hiring that is external (*10)	0.007 (0.004)	-0.002 (0.004)	-0.002 (0.004)	-0.013 ** (0.004)
<u>Organizations' Structures</u>				
Formalization of personnel decisions	0.002 (0.004)	-0.007 (0.004)	-0.012 ** (0.004)	-0.007 (0.004)
Affirmative-action plan	-0.045 ** (0.017)	0.029 (0.018)	-0.003 (0.016)	0.040 * (0.017)
Diversity programs	-0.046 ** (0.009)	0.059 ** (0.009)	0.043 ** (0.008)	0.015 (0.009)
Union agreement	-0.086 * (0.035)	-0.019 (0.038)	-0.019 (0.034)	0.037 (0.036)
Establishment size (log)	-0.096 ** (0.012)	0.041 ** (0.013)	-0.549 ** (0.012)	-0.342 ** (0.013)
<u>Workforce Composition</u>				
Percent women in top management	-0.002 ** (0.000)	0.004 ** (0.001)	0.001 (0.001)	-0.003 ** (0.001)
Percent minorities in top management	-0.001 (0.001)	-0.003 (0.002)	0.008 ** (0.001)	0.013 ** (0.002)
Proportion of focal group in non-managerial jobs	1.058 ** (0.048)	1.217 ** (0.054)	0.475 ** (0.116)	1.533 ** (0.136)
Flag: no focal group in mgmt	-0.360 ** (0.046)	-0.221 ** (0.013)	-0.579 ** (0.012)	-0.156 ** (0.007)

(Table 2 continued on next page)

Table 2 (Continued)

	White Men	White Women	Black Women	Black Men
White men in industry labor force (log)	0.400 ** (0.086)	-0.240 ** (0.090)	0.123 (0.082)	0.151 (0.088)
White women in industry labor force (log)	-0.037 (0.059)	0.235 ** (0.063)	0.151 * (0.056)	-0.084 (0.061)
Black women in industry labor force (log)	-0.042 (0.022)	0.037 (0.024)	-0.023 (0.021)	0.051 * (0.023)
Black men in industry labor force (log)	-0.058 * (0.025)	0.048 (0.026)	0.030 (0.024)	0.008 (0.025)
White men in state labor force	0.192 (0.350)	-0.097 (0.370)	-1.349 ** (0.333)	-0.020 (0.359)
White women in state labor force	-0.493 (0.294)	1.070 ** (0.312)	-0.439 (0.280)	0.056 (0.302)
Black men in state labor force	1.080 (0.720)	-0.378 (0.761)	-1.049 (0.687)	-1.614 * (0.740)
Black women in state labor force	-0.943 (0.604)	2.638 ** (0.639)	1.200 * (0.580)	0.245 (0.620)
<u>Organizations' environment</u>				
In-house legal counseling	-0.059 * (0.024)	0.104 ** (0.025)	0.023 (0.023)	0.074 ** (0.024)
Government contract	-0.013 (0.019)	0.039 * (0.020)	-0.036 * (0.018)	0.040 * (0.019)
Legal enforcement of anti-discrimination	-0.034 ** (0.008)	0.050 ** (0.008)	0.002 (0.007)	0.015 (0.008)
Unemployment rate	0.023 ** (0.004)	-0.026 ** (0.004)	-0.011 ** (0.004)	-0.002 (0.004)
Industry employment	0.023 ** (0.005)	-0.053 ** (0.005)	-0.007 (0.005)	-0.014 ** (0.005)
R-sq	0.2215	0.1936	0.2362	0.1305
N	14693	14693	14693	14693
Chi-sq	4464	3661	4635	1970
Number of parameters	53	53	53	53
Log Likelihood Ratio test	Chi-sq (16)=84.01 Probability >Chi=0.000			

Note: All independent variables are lagged by one year, excluding the proportion of managerial jobs. The analysis includes 20 variables for the years 1981-2001 (1980 is the omitted year and 2002 is included in the analysis only for calculating the outcome variable).

** p<0.01; * p<0.05; (two tailed test)

Table 3: Estimated Average Differences in Managerial Composition Following the Adoption of Teams and Training Programs (Based on the Sample Mean Proportion of Each Group in Management).

	White Men	White Women	Black Women	Black Men
Baseline - mean proportion in management	0.679	0.233	0.014	0.025
Self-directed work teams				
Estimated proportion with the program	0.662 **	0.246 **	0.0145 *	0.026 *
Percent difference due to the program	-2.5%	5.6%	3.6%	4.8%
Percentage point difference due to the program	-1.70	1.30	0.05	0.12
Problem Solving Teams				
Estimated proportion with the program	0.683	0.234	0.0136 *	0.024 **
Percent difference due to the program	0.6%	0.4%	-2.9%	-5.6%
Percentage point difference due to the program	0.40	0.10	-0.04	-0.14
Cross-job training				
Estimated proportion with the program	0.663 **	0.238 *	0.0145 *	0.026 *
Percent difference due to the program	-2.4%	2.1%	3.6%	4.0%
Percentage point difference due to the program	-1.60	0.50	0.05	0.10
Job training				
Estimated proportion with the program	0.680	0.231	0.0153	0.025
Percent difference due to the program	0.1%	-0.9%	9.3%	0.0%
Percentage point difference due to the program	0.10	-0.20	0.13	0.00

* p<.05; ** p<.01

Appendix Table 1 - Fixed Effects Estimates of the Log Odds of White Men and Women and African-American Women and Men in Management after Adoption of New Forms of Work Organization, 1980-2002. Baseline Model

Unstandardized coefficients from a seemingly unrelated regression, standard errors in parenthesis.

	White Men	White Women	Black Women	Black Men
<u>Complementary Organizational Changes</u>				
Management Training Program	0.002 (0.015)	0.043 ** (0.015)	0.002 (0.014)	-0.020 (0.015)
Peer Review Evaluations	-0.002 (0.018)	0.025 (0.019)	0.014 (0.017)	0.034 (0.018)
Work-family accommodations	-0.041 ** (0.008)	0.034 ** (0.008)	0.021 ** (0.007)	-0.003 (0.008)
Organizational Downsizing	-0.032 * (0.016)	0.062 ** (0.017)	0.082 ** (0.015)	0.024 (0.016)
Percent managers in establishments	-1.339 ** (0.104)	0.795 ** (0.110)	-2.920 ** (0.098)	-2.186 ** (0.101)
Percent management hiring that is external (*10)	0.007 * (0.004)	-0.003 (0.004)	-0.003 (0.004)	-0.014 ** (0.004)
<u>Organizations' Structures</u>				
Formalization of personnel decisions	-0.001 (0.004)	-0.005 (0.004)	-0.010 ** (0.004)	-0.006 (0.004)
Affirmative-action plan	-0.053 ** (0.017)	0.037 * (0.018)	0.001 (0.016)	0.043 * (0.017)
Diversity programs	-0.046 ** (0.008)	0.059 ** (0.009)	0.043 ** (0.008)	0.015 (0.008)
Union agreement	-0.079 * (0.035)	0.027 (0.038)	-0.022 (0.034)	0.034 (0.036)
Establishment size (log)	-0.096 ** (0.012)	0.042 ** (0.013)	-0.549 ** (0.012)	-0.343 ** (0.012)
<u>Workforce Composition</u>				
Percent women in top management	-0.002 ** (0.001)	0.004 ** (0.001)	0.001 (0.001)	-0.003 ** (0.001)
Percent minorities in top management	-0.001 (0.001)	-0.002 (0.002)	0.008 ** (0.001)	0.013 ** (0.002)
Proportion of focal group in non-managerial jobs	1.060 ** (0.048)	1.226 ** (0.054)	0.469 ** (0.116)	1.539 ** (0.136)
No focal group in mgmt	-0.362 ** (0.046)	-0.223 ** (0.013)	-0.579 ** (0.012)	-0.156 ** (0.007)

(Appendix Table 1 continued on next page)

Appendix Table 1 (Continued)

	White Men	White Women	Black Women	Black Men
White men in industry labor force (log)	0.402 ** (0.086)	-0.246 ** (0.090)	0.126 (0.082)	0.155 (0.088)
White women in industry labor force (log)	-0.039 (0.059)	0.236 ** (0.063)	0.153 * (0.056)	-0.083 (0.061)
Black women in industry labor force (log)	-0.039 (0.022)	0.034 (0.024)	-0.024 (0.021)	0.050 * (0.023)
Black men in industry labor force (log)	-0.056 * (0.025)	0.045 (0.026)	0.031 (0.024)	0.010 (0.025)
White men in state labor force	0.189 (0.350)	-0.133 (0.370)	-1.327 ** (0.332)	0.032 (0.359)
White women in state labor force	-0.557 (0.295)	1.143 ** (0.311)	-0.424 (0.280)	0.080 (0.302)
Black men in state labor force	0.957 (0.720)	-0.266 (0.761)	-0.995 (0.687)	-1.553 * (0.740)
Black women in state labor force	-0.992 (0.605)	2.678 ** (0.639)	1.233 * (0.576)	0.286 (0.620)
<u>Organizations' environment</u>				
In-house legal counseling	-0.058 * (0.024)	0.104 ** (0.025)	0.023 (0.023)	0.074 ** (0.024)
Government contract	-0.011 (0.019)	0.035 (0.020)	-0.036 * (0.018)	0.041 * (0.019)
Legal enforcement of anti-discrimination	-0.035 ** (0.008)	0.052 ** (0.008)	0.001 (0.007)	0.012 (0.008)
Unemployment rate	0.024 ** (0.004)	-0.028 ** (0.004)	-0.011 ** (0.004)	-0.002 (0.004)
Industry employment	0.023 ** (0.005)	-0.051 ** (0.005)	-0.007 (0.005)	-0.015 ** (0.005)
R-sq	0.2191	0.1917	0.2355	0.1290
N	14693	14693	14693	14693
Chi-sq	4415	3616	4615	1940
Number of parameters	49	49	49	49

Note: All independent variables are lagged by one year, excluding the proportion of managerial jobs. The analysis includes 20 variables for the years 1981-2001 (1980 is the omitted year and 2002 is included in the analysis only for calculating the outcome variable).

** p<0.01; * p<0.05; (two tailed test)