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High-Quality Work, Job Satisfaction, and Occupational Injuries

Julian Barling
Queen's University

E. Kevin Kelloway
St. Mary's University

Roderick D. Iverson
Simon Fraser University

The authors investigated whether and how 1 element of a high-performance work system, namely high-quality jobs (composed of extensive training, variety, and autonomy), affects occupational injuries. On the basis of data from the Australian WIRS95 database (N = 16,466; Department of Workplace Relations and Small Business, 1997), high-quality jobs exerted a direct effect on injuries and an indirect effect through the mediating influence of job satisfaction. Conceptual, methodological, and practical issues are discussed.

Occupational safety is a major issue for employees, and how management deals with this issue is of both academic and practical significance. The most frequent organizational approaches used to produce a sufficient level of safety have focused on the optimal design of equipment (i.e., an ergonomic approach), adherence with government-imposed standards (i.e., a legislative approach), or compliance with the terms of collective agreements. The modal response to safety issues from a managerial perspective has been reactive, emphasizing the importance of management control on the one hand and employee compliance on the other (Barling & Hutchinson, 2000; Reason, Parker, & Lawton, 1998). This approach emphasizes rule enforcement, the punishment of infractions, and incentives for achieving predetermined safety goals, all of which are consistent with a control-oriented approach to management (Arthur, 1994). Our objective in this study was to investigate the degree to which certain job characteristics associated with high-performance work systems influence safety outcomes.

The theoretical foundation of high-performance work systems is derived from viewing employees as a source for competitive advantage (Pfeffer, 1998). There are three basic assumptions that govern this view: (a) Employees are considered to be a resource that is difficult to imitate (Barney, 1991; B.E. Becker & Huselid, 1998); (b) there is a significant investment in human capital via increased employee skills, information, motivation, and latitude (Guthrie, 2001); and (c) the human resource practices are mutually reinforcing in that the "whole is greater than the sum of its parts" (Wood & Wall, 2002, p. 352). Thus, high-performance work systems are employee centered and based on employee involvement and empowerment (Lawler, 1992). Employees develop skills and competencies, gain greater control over their jobs, are more cooperative and creative, and are more effective in their efforts (Tomer, 2001).

In reviewing the high-performance work systems literature, Ramsay, Scholarios, and Harley (2000) noted that there was a consensus among researchers as to the causal link with performance. These authors concluded that the "associations reflect a causal link which flows from practices through people to performance" (Ramsay et al., 2000, p. 503). Whitener (2001) proposed a social exchange and norm of reciprocity framework (Blau, 1964; Homans, 1961) to explain the motivational process of high-performance work systems. Essentially, human resource practices are viewed as a personalized commitment to employees by the organization. Employees then reciprocate positive attitudes and behaviors to the organization (Tsui, Pearce, Porter, & Tripoli, 1997). In addition, drawing on social exchange and interdependence theories (Kelley & Thibaut, 1978), Farrell and Rusbult (1981) formulated an investment model. From their perspective, these practices may be interpreted as rewards or as investments that are inextricably tied to the job. Hackman and Oldham's (1980) framework also explains the process by which human resource practices are linked to job satisfaction (defined as "a pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences," Locke, 1976, p. 1300). The job characteristics associated with high-performance work systems enable employees to experience meaningfulness in their work, greater responsibility in their job, and better use of their knowledge and skills, leading to increased satisfaction and safety in their jobs (e.g., Berg, 1999; Godard, 2001a; Havlovic, 1991). A common theme that permeates through

Julian Barling, School of Business, Queen's University, Kingston, Ontario, Canada; E. Kevin Kelloway, Department of Management, St. Mary's University, Halifax, Nova Scotia, Canada; Roderick D. Iverson, Faculty of Business Administration, Simon Fraser University, Burnaby, British Columbia, Canada.

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Correspondence concerning this article should be addressed to Julian Barling, School of Business, Queen's University, Kingston, Ontario K7L 3N6, Canada. E-mail: jbarling@business.queensu.ca

these three approaches is that high-performance work systems create better work environments for employees, leading to improved quality of work life. In our study, we expected these characteristics to increase job satisfaction and to decrease employee injuries.

There is now a burgeoning body of empirical data showing the superiority of high-performance work systems in producing organizationally valued outcomes. For example, commitment-oriented systems and high-performance work systems are associated with lower turnover rates (Guthrie, 2001), employee earnings in the steel and apparel industries (Bailey, Berg, & Sandy, 2001), and both higher productivity and corporate financial performance (Huselid, 1995). At the employee level, there is also evidence to indicate that high-performance work systems increase job satisfaction (Berg, 1999) and decrease employee fatigue (Godard, 2001a). The consistency of these findings across different outcomes invites speculation as to whether high-performance work systems might also affect occupational safety. Accordingly, the aim of this study was to investigate whether any beneficial effects of high-performance work characteristics would extend to occupational safety. What is important is that there are now indications that a global high-performance work system affects safety directly at the company level and indirectly at the employee level (Zacharatos & Barling, 2001).

At this stage, there is little consistency in the literature about what constitutes a high-performance system. Pfeffer (1998), for example, included employment security, selective hiring, extensive training, teams and decentralized decision making, contingent compensation, information sharing, and reduced status distinctions in his framework. Bailey et al.'s (2001) framework comprises three elements, namely (a) providing employees with opportunities to participate in decision making, (b) incentives to encourage employees to do so, and (c) human resource practices to ensure skill development. Patterson, West, and Wall (2001) presented skill development and job enrichment as two separate but related bundles. Other conceptualizations offer no greater uniformity (e.g., Fitz-enz, 1997; Ramsay et al., 2000; Whitefield, 2000; Wood, 1999). Given these differences, what remains consistent is the presence of multiple, mutually reinforcing management practices or bundles (Huselid, 1995; Wood & Wall, 2002). In this study, we assessed specifically whether and how one such bundle, namely high-quality work, is associated with occupational safety. Because this bundle is measured at the individual level, we examined the job characteristics associated with high-quality work.

High-quality work provides the employee with the means (through extensive training) and the opportunity (via task variety, defined as the degree to which an individual engages in a range of job activities, and autonomy, defined as the degree to which an individual has influence over his or her job) to do great work. Some researchers have included job quality as a component of a high-performance work system (e.g., Bailey et al., 2001; Ramsay et al., 2000). Wheatley's (1997) observation that people cannot be directed to perform perfectly but instead must be engaged both cognitively and emotionally so that they want to perform perfectly might explain why high-quality work is important in predicting occupational safety.

There are several factors supporting a link between high-quality work and occupational safety. First, autonomy is a critical aspect of high-quality work. But for autonomy to be used successfully, employees must have the required skills, pointing to the importance of prior training (Goodman & Garber, 1988; Parker & Wall, 1998). Moreover, safety training has been considered an important element of total quality management (Minter, 1995). Second, greater autonomy is also associated with increased participation in decision making, which may lead to better decisions about safety. Third, and perhaps most important, greater job autonomy and control allow individuals over time to focus not just on fault remediation, but also on prevention, which would have a significant impact on safety in the longer term (Wall, Jackson, & Davids, 1992).

In addition, extensive training and autonomy have been associated with enhanced safety. Safety training is of obvious importance to occupational safety and is one of the most extensively researched and widely practiced initiatives to effect occupational safety.[1] Indeed, reviews of well-designed research demonstrate the positive effects of safety training (e.g., Colligan & Cohen, in press; Hale, 1984). Simply stated, employees can acquire the knowledge and skills necessary to perform the job safely from safety training. Nonetheless, the content of the training is only one factor in determining safety. Extending the intervention to include both job-specific safety training and a more extensive safety orientation that focuses on health and safety rules and procedures, on-site job hazards, and engineering and administrative controls is also associated with reduced workplace injuries (Kinn, Khuder, Bisesi, & Woolley, 2000).

Of course, organizations frequently go beyond the specific confines of safety training, focusing on the broad range of skills that employees will require for all aspects of their jobs. Although safety-specific training can be expected to exert direct effects on safety, extensive training will also affect safety indirectly through the mediating effect of job satisfaction. Saks' (1996) research demonstrated the pervasive effects of extensive training. Both the amount of training and the perceptions of the helpfulness of training were found to influence trainees' job satisfaction. The positive relationship between training and job satisfaction is well established in the literature (Birdi, Allan, & Warr, 1997; Trevor, 2001). Because training is considered to be a major investment in human capital (G. Becker, 1964), employees become more valuable to the employer. Employees acquire greater competencies to control their work, leading to greater satisfaction. In addition, increased training allows employees to engage in problem-solving activities (Osterman, 1995), making their jobs safer. Zohar (1980) also showed that whether management is perceived to offer safety training out of a commitment to employee well-being versus the need to satisfy external requirements (e.g., government regulations, collective agreements) is critical to its effectiveness. Consequently, providing employees with the means for working safely through extensive training exerts both direct and indirect effects on occupational safety.

Offering task variety and autonomy goes beyond extensive training, affording employees the opportunity to use what they

[1] It is important to note that we are not equating high-quality work to total quality management (TQM). We concentrated on the characteristics surrounding quality work rather than on the philosophy and practices that support TQM such as customer focus, continuous improvement, and statistical processes control systems (Douglas & Judge, 2001).

have learned, and maximizes their safety; there are some data to support this notion. In a study of blue-collar manufacturing employees, Iverson and Erwin (1997) observed routinization to predict occupational injuries over time. Other factors such as boredom on the job have also been associated with injuries (Frone, 1998). As noted by Fisher (1993), boredom can provoke unsafe working practices by employees engaging in risk-seeking behavior. In another study, role ambiguity, which would limit the extent to which employees understand fully what is required by the job, was found to be associated with reported injuries experienced by nurses (Hemingway & Smith, 1999). In contrast, job autonomy, which requires that employees concentrate on their jobs, exerts both direct effects (Shannon et al., 1996) and indirect effects (through the mediating effect of job satisfaction) on safe working (Probst & Brubaker, 2001). Simard and Marchand (1997) showed that a participative management style was the best predictor of the extent to which employees were proactively involved in their own safety as opposed to merely complying with external safety regulations. Their study also provides some support for the possible indirect effects of job quality because the participative style also predicted two other variables that are critical for occupational safety, namely group cohesion and intragroup cooperation (see Goodman & Garber, 1988). Thus, we predict that a high-quality job will be directly and indirectly associated with occupational safety.

Two additional issues remain to be considered. The first addresses the nature of the mediating variable. As indicated above, we predict that high-quality jobs will exert indirect effects on occupational safety (see Figure 1). The question that emerges, however, is the nature of any variables through which such effects will be mediated. Consistent with our social exchange (Farrell & Rusbult, 1981; Whitener, 2001) and job characteristics (Hackman & Oldham, 1980) framework, we focused on the nature of global employee job satisfaction as the mediator. As discussed previously, there is substantial theoretical and empirical support for the impact of high-quality work characteristics on job satisfaction (e.g., Berg, 1999; Godard, 2001a; Saks, 1996). It is further proposed that job satisfaction will lead to greater safety behavior. Applying the theoretical frameworks of Kanfer and Ackerman (1989), Eysenck and Calvo (1992), and Sanders and Baron (1975), Probst and Brubaker (2001) offered insights into explaining this relationship. The cognitive resources framework of Kanfer and Ackerman (1989) suggests that in any task there are only finite cognitive resources that can be dedicated to on-task activities (e.g., productivity, quality, and safety), off-task activities (e.g., interacting with coworkers), and self-regulating activities (e.g., monitoring issues such as high-quality work). When the work system is of low quality, employees are disengaged from their on-task activities and channel their cognitive resources toward self-regulating activities. Conversely, in high-quality work systems, which are associated with increased employee satisfaction, "these cognitive resources can be solely devoted to the demands of safety and production" (Probst & Brubaker, 2001, p. 142). Integral to understanding this process are the three factors of safety motivation, defined as (a) the motivation to both perform a job safely and exhibit safety behaviors (Hofmann, Jacobs, & Landy, 1995; Neal, Griffin, & Hart, 2000), (b) safety knowledge (defined as the understanding of safe operating procedures and involvement in safety training, Hofman et al., 1995), and (c) safety compliance (defined as the adherence to safety procedures and policies; Neal et al., 2000). Essentially, when job satisfaction is increased, on-task activities are enhanced, leading to greater attention to safety motivation, knowledge, and compliance (Probst, 2002).

Figure 1. Proposed direct and indirect effects of high-quality work on workplace injuries.

Eysenck and Calvo (1992) proposed an alternative approach. According to the processing efficiency theory, anxiety causes worry (e.g., decreased job satisfaction), which leads to the impairment of performance on tasks that require high attention or short-term memory demands. This is especially the case for concurrent tasks such as performance and safety. Given the nature of high-quality work, attention to performance and safety activities is not compromised by employees (Wickens, 1992). Finally, Sanders and Baron (1975) in their distraction–conflict theory, proposed that distraction impairs performance on complex tasks such as adherence to occupational safety. Deriving from these two theories, we also expect that employees experiencing job dissatisfaction are more likely to display lower safety motivation and knowledge, and as a consequence, lower safety compliance (Probst, 2002).

The job satisfaction–safety link is strongly supported in the empirical literature. In a study of army hospital employees, Mosesman (1996) found that job satisfaction differentiated significantly between injured and noninjured workers. A similar result was reported by Ready, Boreskie, Law, and Russell (1993), who used a sample of nurses. Probst and Brubaker (2001) found job satisfaction to predict safety knowledge and motivation over time. Finally, Holcom, Lehman, and Simpson (1993) also observed that job satisfaction predicted the accident potential of municipal employees. Thus, on the basis of the theoretical and empirical rationale, we argue that job quality will affect occupational injuries directly, as well as through job satisfaction.

Finally, much prior research predicting workplace accidents or injuries has used a binary variable focusing on the presence or absence of accidents, lost-time incidents, or injuries (e.g., Kaminski, 2001). In contrast, we focused on a trichotomous outcome variable, reflecting employees who had experienced no injuries, those who had experienced an injury that required no time off from work (what Zohar, 2000, referred to as a "micro-accident"), and those who suffered an injury that resulted in 1 or more days of lost time. Focusing on such a trichotomous outcome variable increases the variance in the outcome measure and takes account of more of the information inherent in the phenomenon.

Method

Participants

Participants in this study were the 16,466 employees for whom complete data for all study variables were available from the 1995 Australian Workplace Industrial Relations Survey (AWIRS95; Department of Workplace Relations and Small Business, 1997) database. AWIRS95 randomly selected employees from a stratified sample of 2,001 workplaces employ-

ing a minimum of 20 employees. Data on age (15–20 years = 1, 21–24 years = 2, 25–29 years = 3, 30–34 years = 4, 35–39 years = 5, through 55 years or over = 9) and education were categorized at source (primary school = 1, 11 years of education = 2, completed secondary school = 3, basic vocational qualifications = 4, skilled vocational qualifications = 5, diploma = 6, undergraduate degree = 7, and graduate degree = 8). The mean age of the present sample (55% men) was 4.97 (*SD* = 2.21), with the mean level of education being 4.33 (*SD* = 2.20).

Measurement

We measured high-quality work with eight items. Two items assessed the extent of training received, both of which used a yes–no response format ("The employer provided job training last year" and "The employer provided occupational health and safety training last year"). One item, "I do lots of different tasks in my job," assessed task variety and was rated on a 3-point scale (1 = *agree,* 2 = *neither agree nor disagree,* 3 = *disagree*). The last five items assessed employee autonomy: "In general, how much influence or input do you have about . . . [a] The type of work you do, [b] How you do your work, [c] When you start and finish work, [d] The pace at which you do your job, and [e] Decisions which affect you at this workplace?" Each of these five items were rated on a 4-point scale (1 = *A lot,* 2 = *Some,* 3 = *A little,* and 4 = *Don't know*). Wherever necessary, scores were recoded so that high scores reflected high job quality. The reliability of this eight-item scale was satisfactory (α = .76).

Job satisfaction was assessed with three items, namely "I am satisfied with management treatment," "This is a good place to work," and "I often think about leaving this job," all of which were rated on 3-point scales (1 = *agree,* 2 = *neither agree nor disagree,* 3 = *agree*). The three items were coded so that high scores reflected high levels of job satisfaction. Given the limited number of items (see Cortina, 1993), the reliability of this three-item scale was high (α = .76).

The occupational injuries measure was constructed from two separate questions. The first question asked respondents to indicate whether they had experienced an injury in the past year; 2,222 respondents (15.59%) had. Thereafter, only those individuals who had experienced an injury were asked the number of days they were off from work as a result of the injury. Of the 16,466 participants, 14,244 had experienced no injuries in the prior year, 1,185 had experienced an injury that required no time off from work, and 1,037 had experienced an injury that required 1 or more days away from work.

Results

In each of the regression analyses that we computed, a group of variables were entered on the first step as covariates. In this way, the effects of age, gross pay, total hours worked per week (Kinn et al., 2000), and occupational grouping and gender (as dummy variables) were controlled statistically. Ordinal regressions were computed for all analyses in which injuries was the outcome variable because of its trichotomous nature (no injuries, microinjuries, lost-time injuries). In contrast, linear regression was computed when job satisfaction was the outcome variable.

The decision to control statistically for gender, age, gross pay, occupation and the total number of hours worked was supported by the many significant correlations in this study between these variables and high-quality work, job satisfaction, and occupational injuries (see Table 1). We also examined the three major relationships of interest within each occupational group (see Table 2).

Multiple regression analyses were computed to test Baron and Kenny's (1986) first criterion for mediation; ordinal regression analyses were computed to assess the second and third criteria. The results of these analyses are presented in Table 3. First, after covarying the effects of the control variables, job quality predicted job satisfaction significantly (accounting for 9% of the variance), satisfying the first criterion (namely that the predictor variables are associated with the mediator). Second, the same pattern of findings was yielded in assessing the second criterion (namely, that the predictor variable is associated with the outcome). Specifically, after again covarying the effects of the control variables, job quality predicted injuries significantly. Finally, an assessment of the third criterion required an analysis of the difference in the regression coefficients when injuries were regressed on the independent variables with and without controlling for the mediator variable. Table 3 reveals that the effects of high-quality jobs on occupational injuries are partially mediated by job satisfaction, because the significant effect of this predictor is reduced substantially when job satisfaction is controlled (Wald = 54.678 vs. 10.828, respectively).

As a formal test of these observations, we conducted Sobel tests for indirect effects (Sobel, 1982) by using the calculator presented at http://quantrm2.psy.ohio-state.edu/kris/sobel/sobel.htm (accessed November 5, 2001). The results supported a significant indirect effect of job quality on injuries (Sobel = 10.81, $p < .01$) after controlling for job satisfaction.

Discussion

The results of this study show clearly that high-quality work has direct and indirect (via job satisfaction) effects on occupational injuries. We proposed social exchange, investment, job characteristics, and cognitive resources frameworks to explain these rela-

Table 1
Descriptive Statistics and Intercorrelations for All Variables Included in the Analyses

Variable	*M*	*SD*	1	2	3	4	5	6
1. Gender	1.44	0.50						
2. Age	4.97	2.21	−.11**					
3. Gross pay	11.70	5.51	−.36**	.27**				
4. Total hours worked	39.99	13.64	−.29**	.10**	.56**			
5. High-quality work	2.72	0.81	−.02**	.05**	.30**	.17**		
6. Job satisfaction	6.56	1.99	.06**	.07**	−.01	−.05**	.26**	
7. Injuries	1.20	0.53	−.06**	−.00	−.06**	.03**	−.12**	−.13**

Note. N = 16,446.
** $p < .01$.

Table 2
Correlations Among Major Study Variables by Occupational Group

Occupational group	*N*	Satisfaction–injury	Job quality–injury	Satisfaction–job quality
Laborers	2,318	−.20	−.05	.22
Plant and machine operators	1,541	−.17	−.05	.27
Sales and personal service workers	2,131	−.17	−.04	.29
Clerical workers	3,183	−.09	−.03	.28
Tradespersons and apprentices	1,479	−.09	−.11	.32
Paraprofessionals	2,071	−.14	−.09	.30
Professionals	2,822	−.07	−.08	.27
Managers	1,456	−.02	−.07	.36

tionships. Focusing first on the direct effects of high-quality work, it is apparent from the research of Wall and his colleagues (e.g., Wall et al., 1992; Parker & Wall, 1998) that when employees have access to jobs that provide them with opportunities for autonomy, their increased involvement over time promotes learning, provides feedback from the job, enables them to become more proactive, heightens problem-solving, and enables preventive action. Second, turning our attention to the indirect effects of high-quality work, there is ample evidence to show that job satisfaction is enhanced when employees believe that the organization is investing in them (e.g., Berg, 1999; Godard, 2001a). In turn, employees who experience higher levels of satisfaction work more safely (Ready et al., 1993) and enjoy a greater safety orientation (Probst & Brubaker, 2001).

As in any study using archival data, measurement issues emerged in this research (Godard, 2001b). One potential limitation of the current research is the use of a single-item measure of unknown reliability (i.e., occupational injuries), and two issues in this regard should be noted. First, this is a common problem encountered when using archival data, and the costs of using single item variables must be weighed against a major strength of most archival databases, namely access to large randomly drawn samples. In all these cases, however, concern remains that the domain under investigation may not be sampled appropriately. Second, single-item measures are used routinely in other areas, such as absenteeism, in which the precise nature of the measure does not lend itself to multiple measures (Johns, 1994).

Other questions concerning the measurement of the outcome variable also warrant consideration. First, it might be argued that basing the outcome solely on self-reports could compromise the integrity of the data. However, Grunberg et al. (1996) argued forcefully that there are no plausible reasons or incentives for employees to intentionally falsify injury reports to independent investigators. In contrast, there may be convincing reasons to conclude that objective data supplied by management could systematically and significantly underestimate the real extent of injuries (e.g., Collinson, 1999; Conway & Svenson, 1998; Parker, Carl, French, & Martin, 1994; Pransky, Snyder, Dembe, & Himmelstein, 1999; Veazie, Landen, Bender, & Amandus, 1994). In any event, because of the population-based nature of the sample,

Table 3
Results of Regression Analyses Testing the Proposed Model Through the Implementation of Baron and Kenny's (1986) Three Criteria

	Criterion 1		Criterion 2		Criterion 3	
Predictor variable	*SE*	β	*SE*	Wald	*SE*	Wald
Gender	0.19	.047**	0.06	0.115	0.06	0.770
Age	0.03	.072**	0.01	1.531	0.01	0.033
Gross pay	0.01	−.053**	0.01	6.964**	0.01	9.515**
Total hours worked	0.01	−.064**	0.01	31.401**	0.01	20.977**
Laborers	0.17	−.037	0.27	4.609**	0.28	3.718*
Plant and machine operators	0.17	−.014	0.27	9.771**	0.28	8.147*
Sales and personal service workers	0.17	−.037	0.27	0.073	0.28	0.156
Clerical workers	0.17	−.095**	0.27	9.364**	0.28	10.823**
Tradespersons and apprentices	0.17	−.028	0.27	8.603**	0.28	6.900**
Paraprofessionals	0.17	−.083**	0.27	0.241	0.28	0.014
Professionals	0.17	−.100**	0.28	6.338**	0.28	7.833**
Managers	0.17	−.053**	0.30	12.430**	0.31	13.005**
Job satisfaction	—	—	—	—	0.01	200.960**
High-quality work	0.03	.325**	0.04	54.678**	0.05	10.828**
	$R^2 = .10$		$R^2 = .10$[a]		$R^2 = .11$	

Note. Dashes indicate that data were not calculated because they were irrelevant.
[a] Because the outcome variable (injuries) is ordinal, traditional R^2 values do not apply. Therefore, we report the Nagelkerke pseudo R^2 (Nagelkerke, 1991) for Criteria 2 and 3 as a measure of effect size.
* $p < .05$. ** $p < .01$.

collecting individual-level safety data from single organizations would not have been feasible. It remains for future research, however, to consider creatively how different sources of injury data (e.g., self-report, medical records, organizational records, workers' compensation data) can be used (Eisenberg & MacDonald, 1988). Second, although we acknowledge that exclusive reliance on self-reported data may artificially inflate the size of relevant relationships because of common method variance, this occurs infrequently in practice (Crampton & Wagner, 1994). Third, it might be suggested that single source data could result in a monomethod bias effect. However, this is unlikely to have occurred in this study because monomethod bias would serve to artificially inflate relationships between the variables, enhancing the likelihood of finding support for full mediation because of inflated correlations, whereas the data supported a partial mediation effect.

One of the major reasons we focused on a trichotomous outcome variable rather than the more dichotomous approaches that typify research on occupational safety was to ensure that injuries that do not require time off from work, and which would be ignored if the outcome focused only on the presence or absence of lost-time injuries, would be reflected in the data. The rationale underlying this approach was supported because there were slightly more injuries requiring no time off from work than there were injuries requiring lost time (n = 1,185 vs. n = 1,037, respectively).

The effects we reported in this study are modest, typically accounting for approximately 10% of criterion variance, raising the possibility that the large sample size resulted in the identification of trivial effects. On the basis of both statistical and substantive considerations, we suggest that this is not the case. First, whereas a large sample substantially enhances the power of a statistical test, the sampling strategy in this study was designed to maximize respondent heterogeneity (i.e., by giving an accurate depiction of the population), which reduces the power of statistical tests. Second, our use of a three-category outcome (i.e., injuries) also results in reduced power when compared with a continuous measure. Third, because of the nature of the outcome variable, a small effect may have enormous practical significance. Finally, we suggest that our use of injuries as the outcome of interest meets the criteria of a variable that is difficult to influence and, therefore, presents a case in which a small effect may be impressive (see Prentice & Miller, 1992).

We noted that it is possible that the results are at least partially attributable to job content (i.e., more dangerous jobs may also be lower in quality). An examination of the correlations across occupations (see Table 2) suggests some variation in these relations across occupational groups. However, we were unable to discern a meaningful pattern to the variation and suggest that future research focus further on this issue. Over and above these concerns, measurement issues are important because the use of multiple regression to assess mediation assumes that the mediator be measured without error (Baron & Kenny, 1986). Although the reliability of the job satisfaction variable was high given the limited number of items (Cortina, 1993), some degree of measurement error remains. Nonetheless, the effects of measurement error would be to bias the results conservatively because measurement error in the mediator variable would serve to potentially underestimate the effects of the mediator and overestimate the effects of the independent variable on the dependent variable. Because the current findings provided strong support for partial mediation with respect to high-quality work, concern about any detrimental effects of measurement error is lessened. Nonetheless, future research must still investigate whether the current findings can be replicated by using more comprehensive measures.

Several suggestions for further research emerged from the current findings. First, although our job-quality scale included aspects of extensive training, task variety, and autonomy, other aspects of high quality (such as teams and decentralized decision making; Pfeffer, 1998), which may also be critical to job performance, remain to be included. As a result, our results underestimate the real effect of job quality on occupational safety. Second, our measure of the mediator was by necessity very broad. This is appropriate in the initial stages of research; Campbell and Stanley (1966) initially noted that the development of science naturally requires the continual refinement of the experimental variable. It now remains for future research in this area to assess more specifically whether and how other variables, such as trust in management, organizational commitment, as well as safety specific variables, such as perceived safety climate and safety behaviors (Barling, Loughlin, & Kelloway, 2002; Zohar, 2000), mediate the relationships uncovered in this research. Third, there is some need to expand the measurement of occupational safety. This could be achieved by focusing on behavioral (e.g., safety-related events such as slipping; Barling et al., 2002) and attitudinal (e.g., safety climate; Zohar, 2000) variables, as well as events such as near misses (Hemingway & Smith, 1999). For example, Zacharatos and Barling (2001) focused on a range of safety-related attitudes, namely safety compliance, safety initiative, safety knowledge, and safety motivation, which they labeled "personal safety orientation." Last, future research needs to account for the effects of other elements of high-performance work systems (e.g., motivation, skill development) and to investigate such effects longitudinally in light of findings that show significant effects of empowerment over time (e.g., Patterson et al., 2001).

In conclusion, the results of the current study demonstrate that high-quality jobs affect occupational injuries directly and through the mediating effects of job satisfaction. These findings are of conceptual, methodological, and practical significance. They enhance our understanding of occupational safety, extend our understanding of the diverse range of behaviors that are influenced by high-performance work factors, present opportunities for future research, and offer management practitioners an indication of additional ways in which occupational safety may be advanced.

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