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Enhancing corporate compliance with worksite safety and health legislation

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Abstract

Introduction: A 2-year prospective study evaluated the effectiveness of a managerial training program to enhance corporate compliance with statewide worksite safety and health regulations. The program offered participants information about regulatory requirements and emphasized organizational and environmental strategies for reducing occupational injuries and illnesses. **Objectives:** To assess the effects of a train-the-trainer program on business managers' knowledge of statewide occupational safety and health legislation and on levels of corporate compliance with regulatory requirements. **Methods:** Forty-eight small- and medium-sized companies participated in the training sessions during the first year of the study. These firms were compared with 46 control companies that did not receive the training until the conclusion of the study. **Results:** Participation in the program was associated with higher levels of corporate regulatory compliance 12 months after the training sessions were held (controlling for baseline levels of corporate compliance with the regulations). Program effects on compliance levels were mediated by posttraining changes in managers' knowledge of regulatory requirements. **Conclusions:** The REACH OUT training program raised managers' awareness of and corporate compliance with statewide worksite safety and health regulations. **Impact on Industry:** Smaller companies face greater challenges than larger ones in developing and maintaining worksite safety and health programs. Barriers to regulatory compliance, especially in small- and medium-size companies, should be identified and removed to enhance the efficacy of these programs. © 2001 National Safety Council and Elsevier Science Ltd. All rights reserved.

Keywords: Worksite safety and health legislation; Small businesses

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1. Introduction

The 2-year prospective study reported in this paper evaluated the effectiveness of a managerial training program to enhance corporate compliance with statewide safety and health regulations within small- and medium-sized companies. The issues addressed in this research are important for at least three reasons: First, prior efforts to implement and evaluate worksite safety and health programs have focused primarily on large corporations rather than on small- ($n \leq 200$) or medium-size ($n = 201 - 500$) firms. Consequently, small- and medium-sized businesses remain a relatively understudied and underserved population within the worksite health and safety literature (cf. Chenoweth, 1995; Stokols, McMahan, & Phillips, 2001; Wilson, DeJoy, Jorgensen, & Crump, 1999). Second, the present research incorporated a prospective quasi-experimental design in which half of the participating companies were randomly chosen to participate in the training program during the study period, whereas the remaining firms comprised a comparison group that received the training after all pre- and posttraining data were collected. Third, the training intervention was found to increase corporate awareness of and compliance with statewide injury and illness prevention regulations and, as such, has direct implications for future worksite health and safety programming efforts within small- and medium-size firms.

Regulatory interventions are designed to enhance community members' health behaviors and outcomes over extended periods. Because of their broad scope, legislative initiatives have certain advantages over individually targeted programs aimed at reducing a person's risks for injury and illness (cf. Stokols, 1996). Along these lines, McKinlay (1975) observed that "one stroke of effective health legislation is equal to many separate health intervention endeavors and the cumulative efforts of innumerable health workers over long periods of time." Indeed, several legislative programs to promote public health, such as California's tobacco tax (Proposition 99) to reduce smoking and laws mandating the use of vehicular child safety seats, raising the legal age for alcohol purchase and drivers' licensure, and lowering vehicle speed limits, have been empirically evaluated and shown to be effective in achieving specified health promotion objectives (e.g., the reduction of smoking prevalence and traffic-related fatalities; Breslow & Johnson, 1993; Fawcett, Seekins, & Jason, 1987; National Safety Council, 1987; Williams, Karpf, & Zador, 1983).

In the field of worksite safety and health, however, regulatory efforts to prevent occupational injuries and illnesses have not been evaluated for their health and financial outcomes. For example, the state of California enacted Senate Bill (SB) 198 in 1989, which took effect in July 1991. This legislation requires businesses not only to report and evaluate accidents, but also to actively promote health and disease prevention efforts at the workplace. According to SB198, California businesses employing 10 or more workers must establish, implement, and maintain a worksite injury and illness prevention program (IIPP). The SB198 regulations mandate several required components of an effective IIPP including: (a) identification of the person responsible for implementing the

program, (b) identification and evaluation of workplace hazards, (c) correction of unsafe conditions and work practices, (d) a training program to instruct employees in both general and job-specific safe work practices, (e) communication between employers and employees on health and safety matters, (f) procedures for ensuring that employees comply with safe work practices, (g) IIPP-related record keeping, and (h) investigation of occupational injuries and illnesses.

To date, little information exists about the effectiveness of this statewide initiative to promote occupational safety and health. In fact, certain problems relating to the legislation were noted by government officials, including low rates of compliance with the law among small businesses and the potentially negative impacts of SB198 on California's economy (California Senate Committee on Industrial Relations, 1992). This documented gap between statewide implementation of worksite safety and health laws on the one hand, and the lack of compliance with those laws by small- and medium-sized businesses on the other, highlights the need to develop effective strategies to increase regulatory compliance among business organizations as a means of enhancing the well-being of individual workers, organizations, and society as a whole (Lefebvre & Rochlin, 1997).

This paper presents the findings from a prospective longitudinal study designed to develop and evaluate a model training program for enhancing corporate compliance with SB198 within small- and medium-sized firms. This train-the-trainer program offered participants information about the requirements of SB198, and about organizational and environmental strategies that they can enact within their companies to reduce work-related illnesses and injuries, as required by the law. Under the auspices of this study, representatives from several businesses based in Los Angeles and Orange Counties attended training sessions during the first year of the study. These organizations were compared with control companies that did not receive the training until the conclusion of the study.

1.1. Theoretical orientation

The training program was developed from a multidisciplinary perspective linking theoretical constructs drawn from the fields of social ecology, occupational safety and health, and worksite health promotion. Social ecological analyses of worksite wellness not only address intrapersonal factors that affect individuals' health behavior, but also environmental determinants of behavior and well-being (Stokols, 1992). For example, McLeroy, Bibeau, Steckler, and Glanz, (1988) stress the importance of analyzing the links among intrapersonal, interpersonal, organizational, community, and public policy factors that influence the effectiveness of health and safety programs implemented within "host" organizations and agencies. Other researchers working from a social ecological perspective also emphasize the impact of physical–environmental factors, as well as organizational and interpersonal processes, on worksite health (Moos, 1979; Stokols, Allen, & Bellingham, 1996; Stokols, Pelletier, & Fielding, 1996). In keeping with an integrative and comprehensive approach to workplace health, our use of the term *worksite safety and health* (or *worksite health and safety*) in this discussion

encompasses both the environmental health protection orientation of occupational health and safety research, as well as the behavioral and lifestyle change emphases of the health promotion field. We believe that both perspectives are essential for the development of effective IPPs (cf. DeJoy & Southern, 1993; Green & Ottoson, 1999) although, clearly, the SB198 regulations and the training program developed in this study gave more explicit emphasis to worksite safety and injury control than to traditional lifestyle-change strategies of employee health promotion.

The design and evaluation of the training intervention incorporated several elements of a social ecological approach to worksite safety and health. First, host organizations rather than individual employees were the principal units of analysis in this study. Thus, the research focused on organizational criterion variables such as levels of corporate regulatory compliance and company-wide health outcomes, rather than on individual workers' behavior and health outcomes.¹ To assess these company-level criteria, worksite safety and health coordinators participating in the training program completed an extensive survey of health-related policies, programs, and outcomes within their firms. Also, managers were trained to evaluate unsafe physical environmental conditions such as slippery floors or malfunctioning equipment, and to work within their company's organizational structure to implement key policies and procedures such as injury investigation, compliance with safety regulations, disciplinary policies, and employer–employee communication.

Moreover, consistent with a social ecological perspective, the training program incorporated both behavioral change (active) and environmental enhancement (passive) strategies by highlighting the equivalent importance of employees' safety and health practices (e.g., regular use of protective equipment when working with hazardous materials, proper lifting techniques), as well as environmental circumstances (e.g., safety-related signage, proper lighting, ergonomics) that contribute to employee health and organizational effectiveness (Williams, 1982).

¹ In addition to the organization-level data reported in this study, information about the health behaviors and outcomes of individual employees were gathered at 18 firms that had volunteered on their participant interest forms to serve as case study companies. The 18 companies were selected because they had a "match"—another company that produced similar goods and services. Half of these firms were randomly assigned to the intervention group and the other nine to the nontraining group. All case study companies were visited by research team members both before and after the training sessions were held to permit onsite observations of health and safety hazards and corporate efforts to comply with SB198. During their visits to each site, the research team completed a checklist of proper safety signage, workers' use of personal protection devices, ergonomic features, fire safety procedures, and the overall quality of the work environment. Findings from the individual employee surveys administered at the 18 case study companies are summarized in an earlier report (Wells, Stokols, McMahan, & Clitheroe, 1997).

Analyses of the organization-level data reported in this paper were conducted both with and without the case study companies included in the sample, to evaluate the possible influence of case-study participation (e.g., testing effects) on the company-level data analyses. For all of the principal data analyses reported here, there were no differences in the pattern of findings observed between the samples that included or excluded the case study companies.

The content of the training program also addressed several of the intrapersonal, interpersonal, and community/public policy factors that are key elements of an ecological approach to worksite safety and health. With regard to community and public policy factors, the design, implementation, and evaluation of the training program focused on the mandated requirements of statewide legislation, namely, California's Worksite Illness and Injury Prevention Law (SB198). The training program was organized around a first-letter acronym (REACH OUT) designed to convey the essential requirements of SB198 in simple, nontechnical terms. Prior research on perception and memory suggests that acronyms can serve as effective mnemonic devices to simplify highly technical, complex information and to enhance individuals' recall of that information following their initial exposure to it (Bellezza, 1996). Moreover, the use of first-letter acronyms has been shown to be one of the more effective mnemonic techniques (Nelson & Archer, 1972; Perewiznyk & Blick, 1978).

At an interpersonal level, the training sessions incorporated role-playing exercises and time for group discussion among the participants from several companies, thereby affording opportunities for review and integration of the information presented by the program leader. Prior evaluations of train-the-trainer programs aimed at increasing participants' knowledge and compliance with right-to-know regulations (both within healthcare settings and public agencies in the US and Canada) have found that participatory discussions and group exercises can enhance the effectiveness of train-the-trainer programs (Elias, Yassi, Kennedy, & Andres, 1992; Miles, 1992).

Finally, although organizations served as the principal units of analysis for this study, several intrapersonal variables, such as worksite safety and health coordinators' attitudes, beliefs, and knowledge of statewide regulations were regarded as essential for the success of the intervention, owing to the coordinators' pivotal role as change agents within their companies. Thus, the training program was designed to evaluate and enhance coordinators' knowledge of the requirements of SB198, and to emphasize the potential health and financial benefits of effective compliance with those requirements. A number of earlier studies have demonstrated that the link between informational programs designed to change the beliefs, attitudes, and behavior of audience members, and subsequent levels of compliance demonstrated by those individuals, can be strengthened by incorporating "multiple-act" rather than "single-act" behavioral criteria, all of which are specific to the behaviors recommended in the initial informational appeals (Fishbein & Ajzen, 1974, 1975; Weigel & Newman, 1976; Wicker, 1969). Accordingly, the present study used a 16-item index of organizational behavior covering all of the requirements mandated by SB198 to assess postintervention levels of corporate regulatory compliance.

1.2. Hypotheses

On the basis of the theoretical assumptions drawn from social ecology and earlier studies of mnemonics and attitude-behavior congruence, this study hypothesized that those companies whose representatives attended the training

sessions in Year-1 would manifest greater efforts to comply with the legislative requirements of SB198, improve employee health status, and reduce organizational health costs, than those firms that did not receive the training in Year-1. Thus, we predicted a significant main effect of the training program on levels of corporate regulatory compliance, employee well-being, and corporate health costs.

At the same time, we hypothesized that the main effects of the intervention would be moderated by certain organizational or contextual circumstances at each worksite, and mediated by the personal characteristics of the worksite safety and health coordinators who attended the training sessions and were responsible for implementing the SB198-mandated requirements for worksite injury and illness prevention. Specifically, we predicted that organizational or workforce size would be an important predictor of a company's readiness to implement the requirements of SB198 following their participation in the training sessions. This hypothesis is consistent with the findings from earlier studies of worksite health and safety programming, indicating that larger organizations offer a greater variety of employee wellness and disease prevention programs and are more likely to implement recommended health and safety programs following their exposure to health educational interventions (Association for Worksite Health Promotion, W.M. Mercer, & USDHHS, 1999; Fielding & Piserchia, 1989; USDHHS, 1993).

Finally, we predicted that the responsiveness of each participating company to the information and recommendations presented in the training sessions would be influenced by the personal characteristics of the worksite safety and health coordinator who attended the training program. Specifically, we hypothesized that the scope of the coordinator's responsibility for implementing IPPs at the worksite would moderate the effects of the training program on corporate regulatory compliance and on organizational outcomes relating to health insurance claims and employee illness and injury rates reported at each company. Also, we predicted that changes in the coordinator's knowledge of the requirements of SB198 over the course of the study would mediate the effects of the training program on corporate regulatory compliance and health outcomes. Thus, companies whose coordinators became more knowledgeable about SB198 during the study were expected to report higher levels of posttraining regulatory compliance and improvements in employee and organizational health outcomes than those whose coordinators did not demonstrate higher levels of knowledge of SB198.

2. Method

2.1. Participants

A randomly drawn list of 700 businesses in Los Angeles County and Orange County was obtained from a survey mailing service. The list included both manufacturing and nonmanufacturing firms located in Los Angeles and Orange Counties, whose sizes ranged from 2 to 750 employees. Information about the study was sent to all 700 companies on the list. The initial letters inviting

companies to participate were addressed to the worksite safety and health coordinator at each firm. For a company to participate, the letter first had to reach the individual responsible for worksite health at the firm. Next, that individual had to personally provide, or secure from the business owner or manager, permission for the company to participate in the survey.

Of the 700 firms contacted, 110 returned completed participant interest forms to the research team indicating their willingness to become involved in the study. Of those 110, 91 completed the initial background questionnaire, yielding an overall response rate of 13% from among the 700 randomly selected companies. The company response rate is lower than the rate of response normally expected for surveys of individual respondents contacted during non-work hours. Engaging the participation of company representatives during their regular work hours and sustaining their participation over the course of a longitudinal study, however, poses certain challenges that do not arise when individuals are surveyed during non-work hours.

Because this study treated companies rather than individuals as the sampling unit, and in view of the lack of earlier prospective studies of worksite safety and health programs conducted in small business settings, the investigators concluded that the lower-than-usual response rate was acceptable. The decision to carry the reported 2-year study to completion, despite the sampling constraints encountered over the course of the investigation, reflects the principal purpose of this research: namely, to establish the efficacy of a potentially valuable health and safety intervention for small firms, rather than to generalize population parameters from our sample of participating companies. The criteria for drawing an adequate sample of business organizations participating in evaluative studies of worksite safety and health programs, thus, may be quite different than those that apply when conducting surveys of individual respondents.

During the recruitment phase of the study, the investigators also obtained lists of businesses from two local chambers of commerce and sent participant interest forms and background questionnaires to 33 companies in the Santa Ana Chamber of Commerce and 60 companies in the Irvine Chamber of Commerce. This procedure yielded an additional 25 background questionnaires, 19 from the Santa Ana Chamber of Commerce, and 6 from the Irvine Chamber of Commerce, for a response rate of 27%. Also, public service announcements were presented via radio and newspapers yielding 35 more background questionnaires. In addition to the 91 randomly selected firms, the contacts with local chambers of commerce and media announcements of the study identified another 60 nonrandomly drawn companies that expressed interest in participating in this research.

The 60 nonrandomly identified firms were initially kept separate from the 91 randomly drawn companies for statistical comparison on several demographic variables (i.e., company size; average age of employees at each firm; age, gender, and salary level of the worksite health coordinator at each firm). Statistical analyses testing the major hypotheses were conducted first on the random sample and, subsequently, on the combined sample ($N=151$) to evaluate potentially different patterns of findings within these groups. The two samples were found to

be equivalent on key demographic criteria and, therefore, combined as a basis for testing the major hypotheses of the study.

Of the original 151 companies, 80 participated in the training sessions, while the remaining 71 firms were assigned to the control group. By the end of the study, 119 of the original 151 companies had completed all surveys at both time points (pre- and postintervention) and had fulfilled all requirements for participation. Of those 119 companies, 25 companies were eliminated from the analyses. Twenty-two companies were eliminated due to the attrition of coordinators over the course of the study, and three companies had too many employees ($n > 500$ employees) to be considered a small- or medium-sized firm.² Consequently, the findings presented in this paper are based on the data provided by a total of 94 small- and medium-sized businesses.

2.2. Procedures

Once the companies had volunteered to participate and had completed the initial background questionnaire to assess their current knowledge of and compliance with SB198, they were randomly assigned to either the treatment group or the control group using a random numbers table. The treatment group (comprised of 48 firms) was invited to attend a training session, whereas the control group (comprised of 46 firms) was not invited to attend a training session until the end of the study. Training sessions were held at hotels in Long Beach, Irvine, and Anaheim, CA. Each session was held in the morning for approximately 3 hours. Training sessions for control group companies were held in Long Beach at the conclusion of the study. Control-group companies that were unable to send representatives to the final training session received a REACH OUT Training Video and Notebook by mail.³

The training session consisted of a verbal presentation describing the eight major components of the SB198 legislation using the REACH OUT acronym as a mnemonic device; a corresponding notebook; a skit illustrating correct and incorrect procedures for investigating a worksite accident; a demonstration showing proper and improper techniques for lifting heavy objects; and small group discussions of the safety procedures currently employed at each of the participating companies. Each of the letters included in the REACH OUT acronym was the first letter of a keyword or phrase representing the eight major requirements of the legislation. An advantage of using first-letter keyword acronyms is that they reduce a large amount of detailed information (as specified in the SB198 legislation) to a smaller number of regulatory “headings” or themes (Bellezza, 1996; Nelson & Archer, 1972; Perewizynik & Blick, 1978). The keywords referred

² If the company representative who attended the training session left the firm during the course of the study, data provided by the new contact person (e.g., on the follow-up and/or final questionnaires) were not included in the panel analyses since that employee had not participated in the initial training program.

³ Copies of the REACH OUT training video can be obtained from the authors.

to in the acronym were: *Responsibility assignment, Evaluation procedures, Accident investigation, Corrective action, Hazard prevention training, Obeying the law, Understanding through communication, and Tracking and record keeping.* Participants were asked to complete a pretest assessing their knowledge of the SB198 requirements just before the training session, and a posttest assessing their knowledge of SB198 at the conclusion of the training session.

2.3. Telephone surveys

A telephone survey was conducted 3 months after the treatment companies attended the REACH OUT training sessions to assess participants' recall of the REACH OUT acronym and their perceptions of how useful the training had been for their company. They also were asked to describe any SB198-related changes they had initiated at their companies after receiving the training. From among the 80 companies that initially received the training, a total of 61 individuals (one per participating company) completed this survey. A separate phone survey was conducted to determine why some companies had dropped out of the study. Individuals representing 50 companies that had expressed an interest in participating in the study, but either failed to complete the initial background questionnaire or withdrew from the project after completing that survey, participated by phone in this exit interview.

2.4. Measures

Company coordinators were asked to complete three in-depth questionnaires: a background questionnaire, a follow-up questionnaire, and a final questionnaire. The background questionnaire was distributed to participants before they attended the training session. The follow-up questionnaire was distributed 4 months after the training session. The final questionnaire was distributed 12 months after the training session. The three questionnaires incorporated many of the same items and were used to assess changes in coordinators' SB198-related knowledge and compliance with the legislation over time.

The surveys included questions pertaining to company characteristics (e.g., number of employees, the number and type of health and safety programs offered by the firm); coordinator characteristics (e.g., their knowledge of SB198, the scope of their SB198-related responsibilities, and the average amount of time spent on SB198 responsibilities each week); levels of corporate compliance with the requirements of SB198; and a variety of organizational outcomes measured through a series of open-ended questionnaire items.

One organizational outcome analyzed in this study was the total dollars paid by the company during the preceding year for employee health insurance claims, divided by the number of workers employed at that firm. Other organizational outcomes included the number of worksite injuries reported at each firm during the preceding year, the number of employee workdays lost during this period due to reported injuries, and the number of employee workdays lost due to illnesses

reported during this period. All of these variables were adjusted by the number of employees working at each firm, before performing the statistical analyses that tested the major hypotheses of the study.

The knowledge of worksite safety and health coordinators about the requirements of SB198 was measured with a 7-point Likert scale that asked, “How familiar or informed do you feel you are now with the requirements included in SB198?” where 1 = *completely unfamiliar* and 7 = *completely familiar*. The scope of the coordinators’ SB198-related responsibilities was measured through 10 yes–no items that were included in the background and final questionnaires. These items asked whether or not the coordinator was responsible for tasks such as program administration, conducting routine safety inspections, evaluating hazards, and training employees on health and safety issues. Cronbach’s alpha (coefficient of internal reliability) was .81 for this scale.⁴

The knowledge and scope of responsibility items did not specifically assess respondents’ formal training in either occupational safety and health or health promotion (e.g., lifestyle change) strategies. In telephone surveys and discussions with company representatives at training sessions, however, we found that most had little formal training in worksite health and safety programming. In contrast to large corporations, small- and medium-size firms often lack in-house experts in occupational safety and health. Thus, a large number of the participants in this study characterized themselves as general office managers with multiple responsibilities (e.g., payroll, marketing, facility management), only one of which was worksite safety and health. Moreover, some of the managers participating in our study commented that the SB198 legislation was so vague and difficult to understand that they felt they were “starting from scratch” in their efforts to comprehend and implement these regulations. These views were expressed at the outset of the study by respondents participating in both the training (treatment) and nontraining (control) groups. In fact, no baseline (Time-1) differences were found in levels of knowledge of SB198 and scope of health and safety responsibilities at work between respondents in the treatment and control groups.

Corporate compliance with the SB198 legislation was measured with a scale of 16 yes–no items that were included on the background and final questionnaires. These items assessed issues such as whether or not the company had a written IIPP, had a person responsible for implementing the IIPP, had a method for identifying unsafe procedures, provided health or safety training for their employees, and communicated regularly with employees about safety matters.

⁴ The coordinators’ scope of responsibility at their companies for implementing the requirements of SB198 was assessed using a multi-item scale that was administered during both the Background and Follow-up Surveys. The items included in this scale assessed whether the coordinator was responsible for: (1) health and safety program administration; (2) job safety training; (3) keeping employee health records; (4) managing health and safety records; (4) conducting accident investigations; (5) evaluating workplace hazards; (6) implementing regulatory compliance procedures in general and (7) SB198-mandated tasks in particular; (8) conducting routine safety inspections; and (9) whether or not the coordinator (respondent) was explicitly identified in the company’s written injury and illness prevention program as the person responsible for administering the IIPP.

The scale was scored from 0 = *very low corporate compliance* to 16 = *very high corporate compliance*. Cronbach's alpha for the coordinator's assessment of corporate compliance with SB198 was .82.⁵

To assess the level of convergence between the company coordinators' and researcher's ratings of corporate regulatory compliance, research team members made onsite visits to a randomly selected subset of 18 (from among 94) firms that had agreed to participate in a case-study comparison of matched treatment and control companies (see footnote 1). Correlations were computed on two sets of postintervention compliance scores: those completed by a member of the research team at each of the case study companies, and those provided by the health and safety coordinators at each of the corresponding sites. Those case study firms having complete data on both researchers' and coordinators' ratings of company compliance with IPPP requirements were included in the correlation analyses. The researcher's ratings of compliance were assessed using a 13-item scale included in the observational checklist from the case study site visits (Cronbach's $\alpha = .72$). The 13 items contained in the researcher's compliance scale were a subset of the 16 items included in the health and safety coordinators' compliance scale. Coordinators' and researcher's compliance ratings were found to be positively correlated [$r(12) = .74, P < .006$].

2.5. Analyses

The first set of analyses consisted of a series of zero-order correlations to examine the relationships among the major predictor, moderator, mediator, and outcome variables identified in this study. These analyses examined levels of association between variables such as company size, number of health and safety programs made available to employees prior to the training session, the coordinator's knowledge of SB198 prior to the training, the amount of coordinator time spent on SB198 training prior to the training, and corporate compliance with SB198 prior to the training.

The second set of analyses was a series of hierarchical regression equations to test the effects of the training program on coordinator knowledge of SB198, corporate compliance with SB198, and organizational outcomes. These analyses also examined the effects of increased knowledge of SB198 on corporate compliance. In these regression analyses, baseline levels of coordinators' knowledge

⁵ The Corporate Compliance Scale, administered during both the Background and Follow-up Surveys, included the following 16 items: "Your company: (1) has a written Injury and Illness Prevention Plan; (2) has a person responsible for the IPPP; (3) conducted a comprehensive survey of workplace hazards; (4) conducts routine safety inspections; (5) prepared a checklist to identify unsafe conditions; (6) has a method for identifying unsafe procedures; (7) has a procedure for correcting accidents; (8) conducts accident investigations; (9) provides safety or other health-related training; (10) has safety training in general work practices; (11) provides job-specific safety training; (12) communicates regularly with employees about safety matters; (13) has written health and safety policies; (14) rewards employees for safe work practices; (15) has a written disciplinary program; and (16) maintains health and safety records."

about the requirements of SB198 and their assessments of corporate compliance prior to receiving the training program were entered at Step 1 as covariates to control for differences among companies on these dimensions. Comparative analyses of the randomly ($n=53$) and nonrandomly ($n=41$) selected companies were conducted to evaluate potential differences between these samples.

The third set of analyses consisted of a series of regression equations designed to assess the degree to which changes in coordinators' knowledge of SB198 over the course of the study mediated the effects of participating in the training program on levels of corporate compliance with SB198, and on organizational outcomes relating to health insurance claims and employee illness and injury rates reported at each company. These analyses followed the procedures for testing mediational relationships described by Baron and Kenny (1986). This method calls for a series of regression analyses that were carried out separately for each of the dependent variables pertaining to corporate compliance with SB198, health insurance claims, and employee illness and injury rates. The first step regresses the mediator (changes in coordinator's knowledge of SB198) on the independent variable (participation in the training program at time-1). At this step, the criteria for mediation require that the independent variables significantly affect the mediator.

The second step regresses the dependent variable (corporate compliance with SB198, health insurance claims, employee illness and injury rates) on the independent variable (participation in training at Time-1). At this step, the criteria for mediation require that the independent variable significantly affect the dependent variables. The third and final step regresses the dependent variables on both the independent and mediator variable. At this step, the mediator variable must significantly affect the dependent variable. In addition, the effect of the independent variable on the dependent variable should be reduced when the mediator variable is entered with it in the third equation (as compared to the second equation, where the mediator variable is not entered in the analysis). For each step of the analyses outlined by Baron and Kenny (1986), baseline levels of coordinators' knowledge about the requirements of SB198 and corporate compliance with SB198 prior to the training intervention were entered as covariates in the regression equations prior to the predictor and mediating variables.

3. Results

3.1. Characteristics of the sample

The 1985, 1992, and 1999 National Surveys of Worksite Health Promotion Activities, which measured the prevalence of occupational safety as well as health promotion programs, excluded companies with fewer than 50 employees (Association for Worksite Health Promotion et al., 1999; Fielding & Piserchia, 1989; USDHHS, 1993). By contrast, 44% (or 41) of the companies participating in this study employed between 3 and 47 individuals. Another 31% (or 30) of the companies employed between 51 and 100 workers. An additional 13% (or 12) of

the companies employed between 102 and 194 workers, and the remaining 9% (or 11) of the companies employed between 200 and 550 workers. Manufacturing companies comprised 33% of the study sample ($n=31$), with the remaining 67% ($n=63$) designated as nonmanufacturing firms.

A series of chi-square and t test analyses were run to assess possible differences between the 53 randomly and 41 nonrandomly selected companies in the sample. No significant differences were found between the randomly and nonrandomly drawn businesses on the dimensions of company size, average age of employees at each firm, and with regard to the worksite health and safety coordinators' age, gender, salary level, and number of years employed at their firms. However, the coordinators' ratings of their company's compliance with SB198 (prior to the training intervention) were higher in the randomly selected companies ($X=4.96$) than in the nonrandomly selected firms ($X=3.58$), $t(91)=4.67$, $P<.001$. Therefore, baseline (pretraining) levels of corporate compliance were entered as covariates to control for company differences on this variable in all regression analyses of posttraining compliance levels. Also, regression analyses of the major outcome variables were run separately for the randomly selected companies and the combined sample (randomly plus nonrandomly selected firms) to assess potentially different findings among these groups.

3.2. Correlations between company size and worksite safety and health programming

Correlations between corporate size (number of workers employed at each firm) and levels of worksite safety and health programming were computed. Consistent with the findings of earlier national surveys, corporate size was positively associated with the number of employee safety and health programs offered by the firm prior to the training intervention [$r(93)=.31$, $P<.002$], the amount of time spent by the company on training programs related to SB198 prior to the intervention [$r(84)=.21$, $P<.05$], pretraining levels of corporate compliance with SB198 [$r(93)=.28$, $P<.006$], and coordinators' knowledge of SB198 prior to the intervention [$r(92)=.30$, $P<.003$].

3.3. Utility of the training program assessed at 4-month follow-up

Individuals who attended the training sessions were called 4 months after they attended these sessions and asked about the usefulness of the training program and about their companies' efforts to improve regulatory compliance with SB198. Of the 61 trained companies represented in this survey, 31 reported that they found the training program to be *very useful* and 28 reported that the sessions were *useful* or *somewhat useful*. Only two of the respondents indicated that the training sessions had not been useful.

Also, 22 of the 61 respondents (36%) reported that they had made efforts to improve their company's compliance with SB198 four months after their participation in the training program. Examples of these efforts included the development of

a written injury and illness prevention plan for the firm, the posting of health and safety information at the worksite, and the development of a corporate health and safety committee. Moreover, although respondents' understanding of the SB198 requirements (represented by each letter of the REACH OUT acronym) improved significantly by the conclusion of the training session (on six of the eight acronym letters), 75% of the 61 respondents surveyed 3 months later were unable to recall the regulatory requirements represented by one or more of the acronym letters.

An additional telephone survey was conducted to determine why companies that had initially expressed interest in participating in this study either failed to complete the initial background questionnaire or subsequently withdrew from the project after completing that questionnaire. Fifty companies participated in this exit interview. The most frequently noted reasons for companies dropping out of the study were: "too much time required for participation" (cited 28 times); "company already complies with SB198" (cited 21 times); "the initial contact person left the company in the last three months" (cited 14 times); "the company felt overly burdened by excessive health and safety legislation" (cited 12 times); and "lack of support from upper management" (cited 8 times).

3.4. Effects of participating in the training program on coordinators' knowledge of SB198

We hypothesized that coordinators' participation in the training sessions would enhance their knowledge of the regulatory requirements of SB198, and that increased knowledge would be associated with higher levels of corporate compliance with SB198 and improved organizational and employee health outcomes. To assess the effects of participation on coordinators' awareness of SB198, changes in coordinators' knowledge scores before and after the intervention were regressed against dummy coded participation scores (where 1 = *did not participate* and 2 = *did participate*). A significant main effect for participation in the training sessions was found, indicating that the health and safety coordinators at participating companies demonstrated greater gains in knowledge of the requirements of SB198 than those from the nonintervention companies [$F(1,89) = 4.78, P < .03; \beta = .23$] (Table 1).

Table 1
Change in respondents' perceived knowledgeability about SB198 as a result of participating in the "REACH OUT" training program

Participation in the training program	<i>n</i>	Change in perceived knowledgeability	
		Mean	S.D.
Did not participate	45	0.51	1.44
Did participate	46	1.20	1.54

Larger means indicate greater increase in respondents' perceived knowledgeability about SB198 between the pre- and posttraining phases of the study. Change score reflects difference in perceived knowledgeability between the baseline and 12-month follow-up questionnaires.

Participation main effect, $P < .03$.

A series of regression analyses were run to assess possible interactive effects between participation in the training program and a number of personal characteristics of the health and safety coordinators on changes in coordinators' knowledge of SB198 before and after the training sessions were held. No interactive effects were found between participation in the program and coordinators' age, gender, access to information about SB198 outside the training program, their scope of responsibility for implementing worksite health and safety programs, or the number of years they had spent in their current job. Also, no interactive effects between participation in the training program and organizational size were found on the knowledgeability-change scores.

3.5. Effects of increased knowledge of SB198 on corporate regulatory compliance

Changes in levels of corporate compliance occurring before and after the training intervention were regressed on the pre–post change scores for coordinators' knowledge of SB198. As predicted, a significant main effect of coordinators' increased knowledgeability on levels of corporate regulatory compliance was found, showing that improved knowledgeability about the requirements of SB198 predicted greater positive changes in levels of corporate compliance between the pre- and postintervention phases of the study [$F(1,89) = 12.94, P < .001; \beta = .35$] (Table 2).

3.6. Interaction between participation in the training program and coordinators' baseline knowledge about SB198 on postintervention levels of corporate compliance

A regression analysis was performed to assess the possible interaction between coordinators' baseline knowledge of SB198 and their participation in the training program on postintervention levels of corporate regulatory compliance. In this analysis, coordinators' baseline levels of knowledge, their

Table 2

Change in the level of corporate compliance with SB198 as a result of respondents' increased knowledgeability about SB198

Increase in perceived knowledgeability about SB198	<i>n</i>	Change in level of corporate with SB198 compliance	
		Mean	S.D.
Low	43	0.65	3.18
High	48	2.27	4.30

Larger means indicate greater increase in corporate compliance with SB198 between the pre- and posttraining phases of the study. Compliance change scores reflect the difference between baseline and 12-month follow-up levels of corporate compliance with SB198. Regression analysis incorporated continuous knowledgeability-change scores as the predictor variable. The mean scores in this table reflecting low and high levels of change in corporate compliance with SB198 are based on a median split of the continuous knowledgeability-change scores.

Increase in perceived knowledgeability main effect, $P < .001$.

participation in the program, and the interaction between these scores were incorporated as the predictor variables. Coordinators' baseline (preintervention) ratings of their company's compliance with SB198 were entered at Step 1 as a covariate. Their postintervention ratings of corporate regulatory compliance on the final questionnaire (12 months after the intervention) served as the dependent variable.

Main effects for both preintervention knowledge of SB198 and participation in the training sessions were found, indicating that levels of corporate compliance were highest among highly knowledgeable coordinators [$F(2,90)=42.61$, $P<.001$; $\beta=.82$] and among those whose companies participated in the program [$F(3,89)=30.08$, $P<.001$; $\beta=.68$]. In addition, the interaction between baseline knowledge and participation in the program was significant, indicating that posttraining differences among participating and nonparticipating companies on corporate regulatory compliance were greatest among health and safety coordinators who reported low levels of knowledge of SB198 at baseline. Among highly knowledgeable coordinators, the differences between participating and nonparticipating companies on regulatory compliance ratings, taken 12 months after the intervention, were negligible [$F(4,88)=27.82$, $P<.001$; $\beta=-.99$].

3.7. Mediation of training effects on corporate regulatory compliance and health outcomes by changes in coordinators' knowledge of SB198

A series of regression analyses was performed to determine whether changes in coordinators' knowledge of SB198 over the course of the study mediated the effects of the training program on corporate regulatory compliance and organizational health outcomes. No significant main effects of the intervention were found on organizational health outcomes, including the levels of per capita health insurance claims and employee illness and injury rates reported at each company. Therefore, regression analyses to assess the mediational role of changes in coordinators' knowledge of SB198 were not run on these measures of organizational health outcomes.

As noted earlier, significant effects of the training program, coordinators' baseline levels of knowledge of SB198, and the interaction term for these variables were found on postintervention levels of corporate compliance with SB198 (see Table 3). To assess whether or not changes in coordinators' knowledge of SB198 occurring after the intervention mediated the effects of training on corporate compliance levels, an additional regression analysis was performed in which coordinators' knowledge of change-scores were forced into the equation at Step 2 (following baseline corporate compliance scores entered at Step 1), ahead of the measure of coordinators' baseline knowledge of SB198 (Step 3), the dummy-coded measure of participation in the training program (Step 4), and the interaction term for participation in the training session and coordinators' baseline knowledge of SB198 (Step 5). With the knowledge change-scores included in the equation, the main effect for participation in the program was no longer significant, suggesting that changes in coordinators'

Table 3

Effects of participation in “REACH OUT” training program and respondents’ baseline knowledgeability about SB198 on corporate compliance with SB198 at 12-month follow-up

Participation in the training program	<i>n</i>	Level of compliance with corporate SB198 at 12-month follow-up	
		Mean	S.D.
Did not participate			
Low knowledgeability	28	7.61	5.86
High knowledgeability	18	13.33	3.38
Did participate			
Low knowledgeability	23	12.26	4.06
High knowledgeability	24	13.58	1.72

Larger means indicate higher level of corporate compliance with SB198 at 12-month follow-up. Regression analysis incorporated continuous baseline knowledgeability scores as the predictor variable. The mean scores in this table reflecting low and high levels of change in corporate compliance with SB198 are based on a median split of the continuous pretraining knowledgeability scores.

Participation main effect, $P < .001$.

Knowledgeability main effect, $P < .001$.

Participation \times Knowledgeability interaction effect, $P < .001$.

knowledge of SB198 during the study mediated the effect of training on levels of corporate regulatory compliance (in accord with the criteria for statistical mediation; cf. Baron & Kenny, 1986).

4. Discussion

The findings from this study provide partial support for the hypotheses stated earlier. First, company size was positively correlated with baseline levels of corporate regulatory compliance, coordinators’ knowledge of SB198 prior to the training sessions, and the number of employee health and safety programs offered by the firm. These findings are consistent with the data from earlier national surveys indicating the positive relationship between corporate size and worksite health and safety programming (Association for Worksite Health Promotion et al., 1999; Fielding & Piserchia, 1989; USDHHS, 1993).

Based on the findings from earlier surveys, we hypothesized that larger-sized companies would demonstrate greater readiness than smaller firms to adopt the recommendations outlined in the training program. However, the predicted interactions between corporate size and participation in the program on changes in coordinators’ knowledge of SB198, and their reported levels of corporate compliance with SB198, were not found. Irrespective of corporate size, participation in the training led to positive changes in worksite health and safety coordinators’ knowledge of the requirements of SB198. Moreover, those coordinators reporting the greatest gains in knowledge of SB198 reported higher levels of positive change in corporate regulatory compliance between the pre- and postintervention phases of the study.

Participation in the training program also was associated with higher levels of corporate regulatory compliance 12 months after the training sessions were held (controlling for baseline levels of corporate compliance with SB198). The greatest differences between the participating and nonparticipating companies in reported levels of corporate regulatory compliance following the intervention were evident among those coordinators who rated themselves as least knowledgeable about the requirements of SB198, prior to the training program. This interaction between participation in the program and coordinators' baseline knowledge of SB198 suggests that train-the-trainer programs focusing on corporate compliance with worksite safety and health regulations are of greatest benefit to those companies whose coordinators are least knowledgeable about the regulations to begin with.

The hypothesis that training effects on corporate regulatory compliance are mediated by posttraining changes in coordinators' knowledge of SB198 was supported. When knowledge-change scores were entered into the regression equation prior to the training participation code and the postintervention measure of corporate compliance with SB198, the main effect of training on the compliance scores, originally significant, was rendered nonsignificant. This pattern of findings fits the criteria for statistical mediation noted earlier (Baron & Kenny, 1986).

Whereas some of the hypotheses were supported, the predicted main effects of training on organizational levels of employee injury and illness insurance claims and incidence rates could not be evaluated reliably in this study. Specifically, the archival data pertaining to corporate injury and illness insurance claims and incidence rates (e.g., the OSHA 200 logs) were not available or not provided by several of the companies participating in the study. Thus, missing data on organizational health outcomes and health costs precluded an empirical test of the training intervention on these criteria. The potential effects of worksite safety and health training programs on these organizational health and financial outcomes remain to be evaluated in future research.

The findings reported in this study are more suggestive than conclusive, in view of the methodological limitations noted earlier. As described earlier, we observed a higher than anticipated attrition rate among some firms due to insufficient time for participation in the study and changes of worksite health and safety coordinators between the pre- and postintervention phases. Moreover, the research team was unable to assess whether those companies participating in the study were significantly different from those choosing not to participate. The participating companies may have been more aware of SB198, and more motivated to comply with its requirements, than those that declined to participate. Thus, the generalizability of the reported findings is limited to a sample of companies that were interested in learning more about SB198, presumably willing to make efforts toward improving levels of organizational compliance with the legislation, and able to devote the time required for participation in the study. Finally, as noted earlier, we were not able to obtain company-level archival data on employee injury and illness rates, and per capita levels of workers' health insurance and disability claims from several of the firms participating in the study.

The above-noted methodological limitations are balanced by certain strengths of the research, including the use of: (a) a prospective quasi-experimental research design to evaluate a potentially useful worksite safety and health training program within small business settings; (b) covariance analyses to control for preintervention levels of the major outcome variables; (c) exit interviews to obtain information from those firms that chose to withdraw from the study prior to its completion; and (d) statistical comparisons of corporate compliance ratings provided by worksite health and safety coordinators and outside members of the research team. The significant positive correlation between coordinators' and the researcher's ratings provides some convergent validation of the regulatory compliance measure used in this study.

Considering both the methodological strengths and limitations of this study, the reported findings are important for several reasons. First, they suggest that the REACH OUT training program prompted positive efforts by worksite health and safety coordinators to improve corporate levels of regulatory compliance (reported at the 4-month follow-up) and also resulted in significant posttraining changes in coordinators' knowledge of SB198 and levels of corporate compliance (at 12-month follow-up).

Second, in contrast to earlier studies of worksite safety and health, the present research focused on the needs and experiences of small- and medium-sized firms. The findings indicate that smaller companies face greater challenges than larger ones in developing and maintaining worksite safety and health programs. The results also suggest that small- and medium-sized firms can benefit substantially from training programs offering technical assistance and support of their efforts to achieve greater compliance with state and federal health and safety regulations. The generalizability of these findings to larger companies (i.e., those with more than 500 employees), however, was not ascertained in this study since most of the participating firms employed fewer than 100 workers.

Overall, this research suggests a number of directions for future study. First, the efficacy of worksite safety and health legislation and training programs designed to enhance corporate compliance with specific regulations warrant further investigation. Program evaluations that directly compare the needs and experiences of small-, medium-size, and large organizations are especially needed (Chenoweth, 1995; Erfurt & Holtyn, 1994; Wilson et al., 1999). Second, the cost-effectiveness of worksite safety and health training programs such as REACH OUT should be examined prospectively for their impacts on both organizational health costs and individual employees' health outcomes (O'Donnell & Harris, 1994; Warner, Wickizer, Wolfe, Schildroth, & Samuelson 1988). Third, the sustainability of safety and health training programs implemented in particular companies needs to be examined in future research (cf. Altman, 1995).

4.1. Implications of the findings for industry

The findings from this study suggest that train-the-trainer programs can contribute to improved levels of corporate compliance with worksite safety

and health regulations. At the same time, certain situational factors such as the lack of time, resources, and upper management support can reduce levels of corporate regulatory compliance within particular firms. It is important that these potential constraints to regulatory compliance be identified and removed to enhance the efficacy of occupational safety and health programs. Moreover, the cross-training of multiple health and safety coordinators at participating firms should be undertaken in future training programs to ensure the continuity of organizational efforts to enhance regulatory compliance and employee health outcomes. Finally, greater efforts should be made in future programs to broaden employees' opportunities for direct participation in the design and implementation of corporate health programs and policies intended to enhance organizational compliance with worksite safety and health regulations (Heaney et al., 1993).

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