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Authors
Wells, M
Stokols, D
McMahan, S
et al.

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Evaluation of a Worksite Injury and Illness Prevention Program: Do the Effects of the REACH OUT Training Program Reach the Employees?

Meredith Wells, Daniel Stokols, Shari McMahan, and Chip Clitheroe
University of California, Irvine

In this article the authors report the findings of a 2-year study evaluating the effectiveness of REACH OUT, a train-the-trainer program developed to assist small businesses comply with California legislation, Senate Bill 198 (1989), requiring employers to implement a worksite Injury and Illness Prevention Program. Data from a case study sample of 8 companies, drawn from 151 Southern California small businesses participating in the larger study, are reported. Diagnostic walk-throughs were performed, and employee surveys collected at the case study companies approximately 2 months before the treatment group received the intervention and again 1 year later. Results indicate that greater corporate compliance led to employees' perceptions of increased health and safety meetings and training sessions, which led to greater employee health and safety knowledge and improved employee health outcomes.

In 1989, the state of California passed Senate Bill 198, the most comprehensive health and safety legislation since the passage of the federal Occupational Safety and Health Act of 1970. Senate Bill 198 requires businesses not only to report and evaluate accidents but also to promote actively health and disease prevention. The legislation specifically requires California employers to establish, implement, and maintain a worksite Injury and Illness Prevention Program (IIPP). An effective IIPP includes several key elements: (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.

Unfortunately, Senate Bill 198 (1989) has not been widely implemented by California small businesses (California Senate Committee on Industrial Relations, 1992). Cal-OSHA's records indicate that during the first year of the legislation, there were approximately 6,000 Senate Bill 198-related violations. The California Senate Committee on Industrial Relations found several problems with Senate Bill 198's implementation. Their report criticized the legislation as being unclear, Cal-OSHA's (1991) *Guide to Developing Your Workplace Injury and Illness Prevention Program* as being too general, and Cal-OSHA as inadequately assisting small businesses in developing their IIPPs.

National surveys have shown that small businesses offer fewer health promotion and disease prevention programs than large companies (Fielding & Piserchia, 1989; U.S. Department of Health and Human Services, 1993). This variation is attributable to small businesses' lack of staff, time, facilities, and financial resources (Chenoweth, 1995; Stokols, Pelletier, & Fielding, 1995). Consistent with these national trends, earlier reported data from the present study indicated that larger corporate size was associated with a greater number of health and safety programs, more time spent implementing Senate Bill 198 (1989), higher levels of the respondents' knowledge, and greater baseline (preintervention) levels of corporate regulatory compliance (Stokols, McMahan, Clitheroe, Wells, & Ituarte, 1995).

Meredith Wells, Daniel Stokols, Shari McMahan, and Chip Clitheroe, School of Social Ecology, University of California, Irvine.

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Correspondence concerning this article should be addressed to Meredith Wells, School of Social Ecology, University of California, Irvine, California 92697. Electronic mail may be sent via Internet to mwells@uci.edu.

The REACH OUT Training Program

The REACH OUT Training Program was designed to assist small businesses develop and implement IIPPs. REACH OUT is a train-the-trainer program presented to individuals responsible for implementing the IIPP in their organizations, usually worksite health and safety coordinators. REACH OUT is based on an acronym incorporating the eight basic implementation steps of an IIPP, as outlined in the Appendix.

The REACH OUT Program was developed from a multidisciplinary perspective linking theories from the fields of social ecology, risk communication, occupational health and safety, and worksite health promotion. The social–ecological approach emphasizes the integration of behavioral and environmental modification strategies to enhance individual and organizational health. The ecological perspective suggests that interventions that incorporate both behavioral (active) and environmental (passive) components will be more effective in promoting health than interventions of narrower scope (Stokols, 1992; Stokols, Allen, & Bellingham, 1996; Williams, 1982). Active strategies of health promotion consist of lifestyle and behavior change programs that require individual voluntary effort, such as use of personal protective devices and proper lifting techniques. Passive strategies consist of organizational policies and environmental changes that require little or no individual effort, such as ergonomically designed workstations and policies requiring employees to take regular work breaks. The REACH OUT Program emphasizes both active and passive strategies of health promotion.

The social–ecological approach also highlights the importance of high-impact "leverage points" in health promotion (Stokols, 1996). These leverage points are key to maximizing the impact and effectiveness of a health promotion or disease prevention program. In the REACH OUT Training Program, the coordinator is the primary high-impact leverage point. The program must go through the coordinator to reach the organization and thus be effective. Therefore, personal attributes of the coordinator, such as his or her level of knowledge about worksite health and safety and commitment to comply with the IIPP legislation, are important factors that influence the outcomes of the Program.

The REACH OUT Training Program also incorporates principles from the field of risk communication. As noted earlier, REACH OUT is an eight-letter acronym. Acronyms are popular mnemonic devices that have been found to be effective tools for enhancing learning and improving recall (Nelson & Archer, 1972; Perewizynik & Blick, 1978). In addition to mnemonics, REACH OUT uses multiple training techniques such as oral presentation, videotape, slides, and hand-outs and provides participants with a detailed notebook that they can take back to their workplaces for future reference and review. The REACH OUT Program also facilitates learning by encouraging active participant involvement and group interaction during the training.

The worksite injury and illness prevention study was designed to test the effectiveness of the REACH OUT Training Program. A model of the proposed effects was developed on the basis of a social ecological approach to worksite health promotion. See Figure 1 for the complete model. The model suggests that participation in the REACH OUT Training Program increases the coordinator's knowledge of Senate Bill 198 (1989), thereby leading to greater organizational compliance, which, in turn, leads to the employees' perception of increased health and safety meetings and training sessions, greater employee health and safety knowledge, and improved employee health outcomes. Previously reported results from the larger study (Stokols et al., 1995) indicated that participation in the REACH OUT Training Program increased coordinator knowledge of Senate Bill 198 that led to greater corporate compliance with the legislation, thus supporting the first two hypothesized links of the model. In this article we report the three links of the model pertaining to the case study companies and their employees (the shaded portion of Figure 1).

Hypotheses

The proposed model suggests three employee-related hypotheses. First, it was predicted that greater corporate compliance with the legislation would be associated with employees' perceptions of increased health and safety meetings and training sessions. Second, employees' perceptions of increased health and safety meetings and training sessions were predicted to be associated with greater employee health and safety knowledge. Third, greater health and safety knowledge was predicted to be associated with improved employee health outcomes, such as reduced injuries, illnesses, and stress.

In addition, it was hypothesized that these effects would be moderated by organizational factors at each worksite (e.g., company size) and mediated by the personal characteristics of the coordinators who attended the REACH OUT Program (e.g., their prior

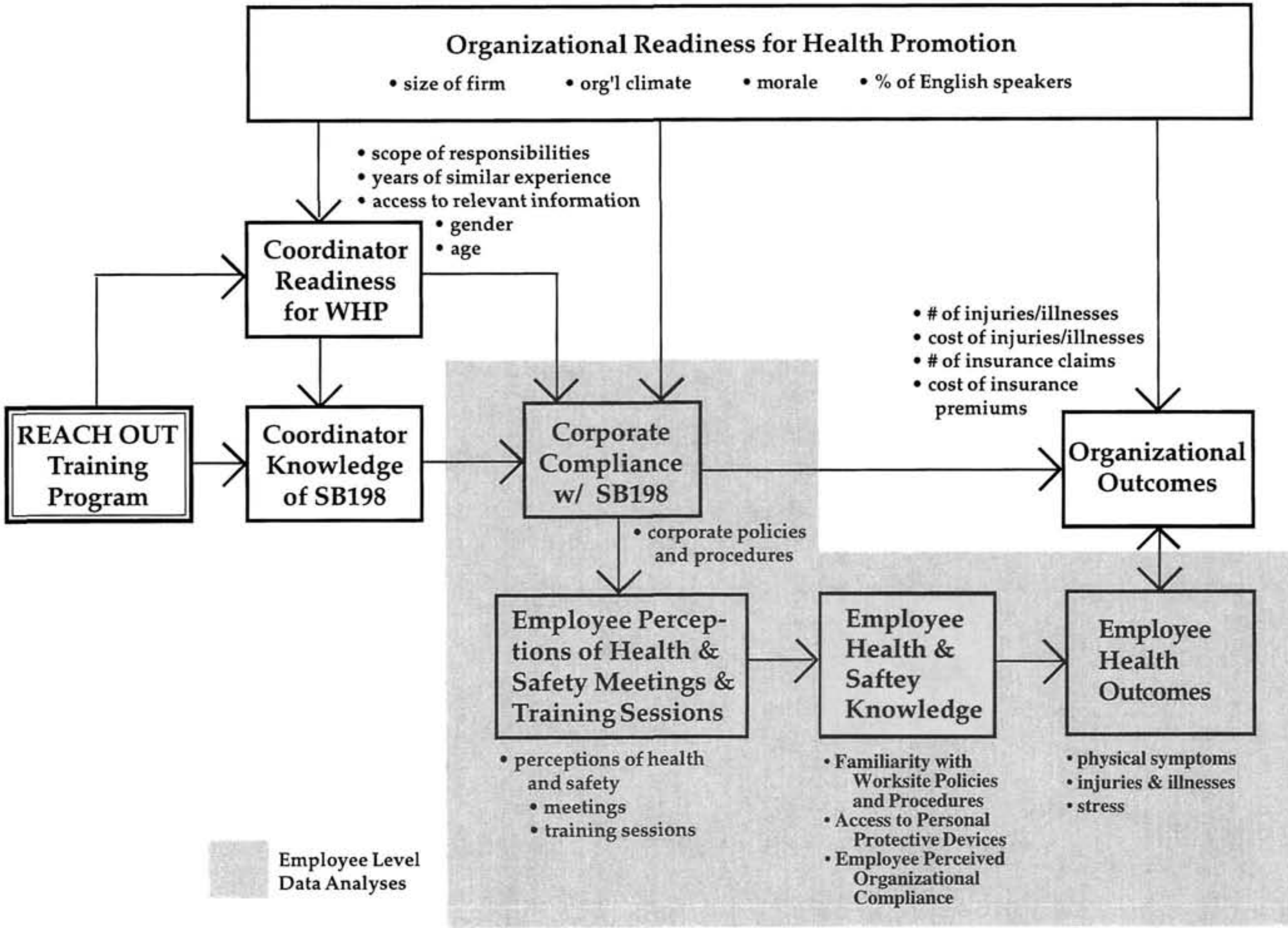

Figure 1. Proposed model of the REACH OUT Training Program effects. SB198 = Senate Bill 198 (1989); org'l = organizational.

levels of knowledge about Senate Bill 198 (1989) and scope of their Senate Bill 198-related responsibilities). On the basis of previous studies (e.g., Steckler, Goodman, McLeroy, Davis, & Koch, 1992), employee-level outcomes also were expected to be influenced by social climate (as measured, for example, in terms of perceived social support and morale among employees): Companies with higher levels of social climate were expected to report better employee health outcomes.

Method

Participants

A sample of 151 Southern California small businesses was compiled by two methods: random and nonrandom sampling. First, to acquire a random sample of companies in Los Angeles County and Orange County, a randomly drawn list of 700 businesses was obtained from a survey mailing service. The list included companies having diverse Standard Industrial Classification codes, numbers of employees (ranging from 2 to 500), and geographic locations (including Los Angeles and Orange Counties). Information about the study was sent to all 700 companies on the list. Of those 700, 110 (or 16%) companies 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 a response rate of 83% (among businesses that initially expressed an interest in participating in the study) for the randomly drawn sample.

To augment the number of companies participating in the study, the research team also obtained lists of businesses from two local chambers of commerce and sent participant interest forms and background questionnaires to companies on these lists. This procedure yielded an additional 25 background questionnaires. Also, public service announcements were presented by means of radio and newspapers, yielding 35 more questionnaires for a final sample size of 151.

Case Study Companies

Of the companies that participated in the worksite injury and illness prevention study, several volunteered on their participant interest forms to serve as case study companies. These companies agreed to have two on-site visits by members of the research team during the course of the study and to have their employees complete questionnaires on these two occasions. Twenty companies were selected from the 91 randomly sampled companies rather than from the nonrandomly sampled companies. These 20 companies were chosen because they had a "match"—another company that produced similar goods and services. The 10 pairs of companies represented (a) ophthalmic device manufacturers, (b) steel manufacturers, (c) plastics manufacturers, (d) clothing manufacturers, (e) paper–lumber manufacturers, (f) printing companies, (g) furniture retailers, (h) automobile dealerships, (i) human services, and (j) recreational services.

Once the 10 pairs were selected, the companies were sorted into two groups, each having one company from each pair and being roughly equivalent in terms of number of employees, location, industry type, and baseline compliance levels with Senate Bill 198 (1989). Once the two groups were formed, a coin was tossed to determine which group would be designated the treatment group and which group would be the control group.

Procedure

Each case study company was visited twice by the research team: once approximately 2 months before the training session and again approximately 1 year after the initial visit. During these visits, the research team conducted a diagnostic walk-through of the facility by using a checklist of proper safety signage, personal protection devices, the general work environment, fire safety, electrical–mechanical safety, hazardous substances, ergonomics, employee training, and the company's injury and illness prevention plan. To record examples of regulatory compliance and noncompliance, the team took photographs during the walk-through. Also, each company's Cal-OSHA Log 200 and worker's compensation annual summaries were collected to ascertain the number, type, and cost of employee injuries. Records of company safety meetings were also gathered. Additionally, each company was given approximately 50 employee surveys to be distributed to and completed by the employees. In companies with fewer than 50 employees, the contact person was asked to give each employee a survey. In companies with greater than 50 employees, the contact person was asked to give the 50 surveys to a representative sample of employees (including those occupying managerial, professional, and nonprofessional roles).

After the baseline data collection, all treatment companies were invited to attend one of three REACH OUT Training sessions held at hotels in Orange County and Long Beach in January 1994. Approximately 1 year after the first visit and approximately 10 months after the treatment group received the training program, the 20 case study companies were visited again by members of the research team. As before, a walk-through was performed, Cal-OSHA logs and workers compensation summaries were collected, and employee surveys were distributed. After all follow-up visits had been completed, the control group companies were invited to attend the REACH OUT Training sessions during January 1995.

Of the 20 original case study companies, only 8 case study companies were used in the analyses. Two control companies elected to withdraw from the study citing insufficient time. Two treatment companies and one control company did participate in the study but did not have their employees complete the employee surveys. Three treatment companies were unable to attend the REACH OUT Training Program.[1] Coordinator turnover also was a problem: One

[1] It should be noted that the first day of the training session was January 18, the day after the Northridge earthquake. Several companies reported that the earthquake prevented them from attending the training program. A makeup session was held, but many were not able to attend because of earthquake damage.

treatment company and three control companies were eliminated from analysis because of the attrition of coordinators over the course of the study.[2] Consequently, the final number of case study companies to be analyzed was four treatment and four control. The four treatment companies were a label manufacturer, a plastics manufacturer, an ophthalmic device manufacturer, and a human services organization. The four control companies were a printing company, a plastics manufacturer, a clothing manufacturer, and an automobile dealership.

A total of 547 employees completed either the first or second employee survey, and 167 employees (31%) completed both surveys. The research team decided that only employees who completed the surveys at both times would be included in the analyses so that statistical controls for preintervention levels of the outcome measures could be incorporated. Further, surveys of 73 employees were not analyzed because of discontinuity of coordinators, as noted above. These restrictions yielded 94 employee surveys to be analyzed at the conclusion of the study.

Survey Instrument

The employee surveys consisted of eight instruments. The first instrument was used to assess employees' perceptions of safety meetings and training sessions. This instrument consisted of two open-ended questions asking employees to report the approximate amount of time per month they had spent in health and safety meetings and health and safety training sessions during the past year.

The second, third, and fourth instruments were used to assess employee health and safety knowledge. The familiarity with worksite policies and procedures scale is a nine-item survey of employees' familiarity with worksite safety features. Participants were asked to assess their familiarity with safety features such as company safety regulations, emergency procedures, and procedures for operating machinery and handling hazardous substances. The rating scale for the items was a 7-point Likert scale with responses ranging from 7 (*highly familiar*) to 1 (*not at all familiar*). Cronbach's alpha for this scale was .91.

The third instrument, titled "access to personal protective devices," consists of 11 items used to assess employees' perceptions of the availability of personal protective devices and work practices. These protective devices and work practices are first aid kits, eye wash facilities, protective goggles–face shields, ear plugs, gloves–aprons, written procedures for using respirators, proper lifting procedures, hair nets, hard hats, rules against wearing jewelry when working with machinery, and lunch areas away from toxic materials.

The fourth instrument was the employee perceived organizational compliance scale, which assesses employees' perceptions of the company's compliance with Senate Bill 198 (1989). This instrument consists of 13 items from the walk-through survey, such as "Employees know who is responsible for the IIPP at our company," "Someone from our company does regular safety inspections," and "When accidents occur, someone from our company investigates immediately.[3]" Cronbach's alpha for this scale was .56.

The fifth, sixth, and seventh instruments were designed to assess employee health outcomes. The fifth instrument was the Checklist of Work-Related Experiences (CWRE; Stokols & Scharf, 1990). This instrument asked respondents to indicate how frequently 35 different work-related experiences occur for them on a series of 5-point Likert scales with responses ranging from 5 (*always*) to 1 (*never*). Specifically, two scales from the CWRE were used, the Physical Health Symptoms scale (Stokols, Churchman, Scharf, & Wright, 1990) and the Social Climate scale (Stokols et al., 1990). The Physical Health Symptoms scale consists of 10 items from the CWRE such as headaches, eye strain, soreness in neck–shoulders, lower back, or arms–hands, and difficulty sleeping due to worries about work. Cronbach's alpha for this scale was .81. The Social Climate scale (Stokols et al., 1990) consists of nine items from the CWRE such as opportunities for open exchanges of ideas with supervisor, supportive interactions with coworkers, high levels of employee morale, and opportunities to participate in decisions about work projects. Cronbach's alpha for this scale was .79.

The sixth instrument, titled about your health, assesses workers' injuries and illnesses throughout the past year. Respondents were asked 19 open-ended questions, such as "How many times were you injured at work in the past year?", "How many full days of work did you miss due to these injuries?", and "For how many of these injuries did you make a workers' compensation claim?"

The seventh instrument was the Global Stress Scale (Cohen, Kamarck, & Mermelstein, 1983), which assesses respondents' stress symptoms. Respondents were asked to rate the frequency of nine stressful feelings or experiences on 5-point Likert scales with responses ranging from 1 (*never*) to 5 (*very often*). Examples of the items are "satisfied with life," "nervous and stressed," and "unable to control the important things in your life." Cronbach's alpha was .79 for this scale.

The eighth instrument consisted of demographic information to assess employees' age, gender, ethnicity, education, salary, job title, shift, length of time with the company, and length of time in the present position.

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[2] The research team decided that if the contact persons who attended the training program left their companies during the study, the new contact persons would not be included in the analyses because they had not received the REACH OUT training information.

[3] The 13 items in the employee compliance scale are "the Cal/OSHA poster Safety and Health on the Job is displayed where employees can see it," "Employees know who is responsible for the Injury and Illness Prevention Program at our company," "Employees have been trained on emergency escape procedures," "Someone from your company does regular safety inspections," "Exit doors are openable from the direction of exit travel without the use of a key or any special knowledge," "Employees have been instructed on proper lifting procedures," "When accidents occur, someone from our company investigates immediately," "Exits are marked with exit signs and illuminated by a reliable light source," "Your company disciplines employees who fail to comply with safety rules," "Fire extinguishers are mounted in readily accessible locations," "Employees can openly communicate with coworkers and employers about safety matters," "Employees have been trained on how to perform their jobs," and "Equipment can be positioned so that tasks can be performed comfortably."

Data Analyses

As noted earlier, previously reported results of the larger study indicated that the REACH OUT intervention promoted greater coordinator knowledge of Senate Bill 198 (1989) and increased corporate compliance with the legislation. The researchers predicted that this increased legislative compliance would promote employees' perceptions of increased health and safety meetings and training sessions that would, in turn, improve employees' health and safety knowledge, thereby leading to improved employee health outcomes.

Analyses of variance (ANOVAs) were performed to test the proposed model. An initial series of ANOVAs was performed to evaluate the effects of increased corporate legislative compliance on employees' perceptions of safety meetings and training sessions at Time 2. Because levels of corporate compliance were measured at the organizational level (as assessed by the worksite health and safety coordinator participating in the study), and workers' perceptions of meetings and training sessions were employee-level data, the employees' scores were averaged for each company so that the data sets could be used together. Each company's legislative compliance score was used to predict the average employee score for perceived frequency of health and safety meetings and training sessions. In these analyses, company size, the scope of the coordinator's Senate Bill 198-related responsibilities and Time 1 assessments of meetings and training sessions were controlled for.

To determine the effects of employees' perceptions of increased health and safety meetings and training sessions on employee health and safety knowledge, we performed a second series of ANOVAs. Employees' perceptions of health and safety meetings and training sessions were used to predict employee health and safety knowledge by using all three measures of health and safety knowledge: the familiarity with worksite policies and procedures scale, access to personal protective devices, and the employee perceived organizational compliance scale. Time 1 assessments of each measure of health and safety knowledge were controlled for.

A third series of ANOVAs was performed to determine the effects of employee health and safety knowledge on employee health outcomes. Employee health outcomes, as measured by the Physical Health Symptoms scale (Stokols et al., 1990), the about your health instrument, and the Global Stress Scale (Cohen et al., 1983), was analyzed by the three measures of employee health and safety knowledge, controlling for the Time 1 measures of employee health outcomes.

A fourth series of ANOVAs was performed to determine whether there were any direct effects of the REACH OUT Training Program on the employees. Employees' perceptions of health and safety meetings and training sessions, employee health and safety knowledge, and employee health outcomes were examined by participation in the REACH OUT Training Program, controlling for the Time 1 scores.

A fifth series of ANOVAs examined all employee outcome variables at Time 2 × Intervention and Company Size, controlling for the Time 1 outcome scores. To test the hypothesis that more favorable social climate is associated with improved employee health outcomes, we performed a sixth series of ANOVAs to examine all employee outcome variables at Time 2 × Intervention and Social Climate, controlling for the Time 1 outcome scores.

Results

The first series of ANOVAs examining the effects of corporate legislative compliance (as assessed by worksite health and safety coordinators) on employees' perceptions of health and safety meetings and training sessions revealed that employees in companies with greater corporate compliance perceived an increase in the number of meetings, $F(1, 7) = 9.50, p < .04$, and training sessions, $F(1, 7) = 8.17, p < .05$, when Time 1 measures, and scope of the coordinators' Senate Bill 198-related responsibilities were controlled for (see Table 1). When company size was also controlled for, employees in companies with greater corporate compliance still perceived increased training sessions, $F(1, 7) = 15.12, p < .03$, but not increased meetings.

The second series of ANOVAs revealed that as

Table 1

Effects of Corporate Legislative Compliance on Employees' Perceptions of Health and Safety Meetings and Training Sessions

Perceptions of corporate compliance	*n*	Perceptions of meetings[a] *M*	Perceptions of meetings[a] *SD*	Perceptions of training[b] *M*	Perceptions of training[b] *SD*
Low	5	130.40	22.22	85.20	40.05
High	3	189.67	37.04	192.00	66.75

Note. Controlling for Time 1 measures of perceptions and scope of the coordinators' Senate Bill 198-related responsibilities. Median splits were performed on employees' perceptions of compliance. Perceptions of meetings and training sessions measured as hours per month spent in meetings and training sessions by 100. The unit of analysis is the company rather than the individual employees. Accordingly, mean scores reflect the average scores for all employees at each company. These results replicate the significant effects found when the unit of analysis is the individual employee rather than the company.

[a]$F(1, 7) = 9.50, p < .04$. [b]$F(1, 7) = 8.17, p < .05$.

Table 2
Effects of Employees' Perceptions of Health and Safety Meetings on Employees' Perceptions of Access to Earplugs, Access to Proper Lifting Instructions, and Corporate Legislative Compliance

Perceptions of meetings	n	Access to earplugs[a]		Access to lifting instructions[b]		Assessments of compliance[c]	
		M	SD	M	SD	M	SD
Low	32	.71	.18	.93	.05	9.47	0.85
High	61	.97	.08	1.00	.03	10.77	0.45

Note. Median splits were performed on employees' perceptions of meetings. Access to ear plugs and proper lifting instructions were measured on a scale with responses ranging from 0 (*no access*) to 1 (*access*). Compliance assessments were measured on a scale with responses ranging from 0 (*low compliance*) to 13 (*high compliance*). Variations in the degrees of freedom for each F test reflect the fact that certain items (i.e., access to earplugs and access to proper lifting instructions) were not relevant to the employees at all companies (e.g., those working in offices rather than in factories). Nonresponses on these items were counted as missing data.
[a] $F(1, 46) = 7.54, p < .01$. [b] $F(1, 79) = 4.13, p < .05$. [c] $F(1, 92) = 7.96, p < .01$.

employees' perceptions of health and safety meetings and training sessions increased, employee health and safety knowledge increased (see Table 2). Specifically, as perceptions of meetings increased, so did perceptions of access to ear plugs, $F(1, 46) = 7.54$, $p < .01$, perceptions of access to proper lifting instructions, $F(1, 79) = 4.13, p < .05$, and employee assessments of corporate legislative compliance, $F(1, 92) = 7.96, p < .01$. Also, as perceptions of training sessions increased, employee assessments of corporate legislative compliance increased, $F(1, 92) = 13.95$, $p < .001$, and physical health symptoms decreased, $F(1, 93) = 5.58, p < .02$.

The third series of ANOVAs examining employee health outcomes by employee health and safety knowledge revealed that stress was positively associated with greater perceptions of access to goggles–face shields, $F(1, 63) = 5.11, p < .03$, and ear plugs, $F(1, 45) = 5.54$, $p < .02$ (see Table 3). Reduced injuries was predicted by perceived access to a lunch area away from toxins, $F(1, 70) = 5.63, p < .02$.

The fourth series of ANOVAs examining all of the employee variables (employees' perceptions of safety meetings and training sessions, employee health and safety knowledge, and employee health) by intervention revealed that employees in the training group had fewer illnesses, $F(1, 89) = 5.75, p < .02$, and greater perceptions of access to protective devices such as hard hats, $F(1, 18) = 22.73, p < .001$, and hair nets, $F(1, 22) = 17.35$, $p < .001$, than employees in the nontraining group (see Table 4).

The fifth series of ANOVAs examining the interactive effects of the intervention and company size on employee-level outcomes again indicated that the training group had fewer illnesses, $F(1, 89) = 7.39$, $p < .01$, and greater perceptions of access to hard hats, $F(1, 18) = 27.78, p < .001$, and hair nets, $F(1, 43) = 10.71$, $p < .001$, than the nontraining

Table 3
Effects of Employees' Perceptions of Health and Safety Training Sessions on Employees' Assessments of Corporate Compliance and Their Reports of Physical Health Symptoms

Perceptions of training	n	Assessments of compliance[a]		Physical health symptoms[b]	
		M	SD	M	SD
Low	43	9.47	0.86	23.54	0.72
High	50	11.06	0.74	22.31	0.51

Note. Median splits were performed on employees' perceptions of training sessions. Assessments of compliance were measured on a scale with responses ranging from 0 (*low compliance*) to 13 (*high compliance*). Physical symptoms measured on the Physical Health Symptoms scale ranged from 10 (*no symptoms*) to 50 (*many symptoms*).
[a] $F(1, 92) = 13.95, p < .001$. [b] $F(1, 93) = 5.58, p < .02$.

Table 4
Effects of the REACH OUT Training Program on Employees' Reports of Illnesses and Their Perceptions of Access to Safety Devices

REACH OUT participation	n	No. of illnesses[a] M	No. of illnesses[a] SD	Access to hard hats[b] M	Access to hard hats[b] SD	Access to hair nets[c] M	Access to hair nets[c] SD
Treatment	51	1.86	0.49	.92	.24	1.00	.09
Control	39	3.00	0.64	.17	.52	.50	.41

Note. Number of illnesses were measured by number of illnesses per employee in past year. Access to hard hats and hair nets was measured on a scale with responses ranging from 0 (*no access*) to 1 (*access*). Variations in the degrees of freedom for each F test reflect the fact that certain items (i.e., access to hard hats, access to hair nets) were not relevant to the employees at all companies (e.g., those working in offices rather than in factories). Nonresponses on these items were counted as missing data.
[a]$F(1, 89) = 5.75, p < .02$. [b]$F(1, 18) = 22.73, p < .001$. [c]$F(1, 22) = 17.35, p < .001$.

group. In addition, there was an interaction: In the nontraining group, illnesses increased as company size increased, but in the training group, illnesses decreased as company size increased, $F(1, 89) = 3.99, p < .05$.

A sixth series of ANOVAs examining the effects of the intervention and social climate on employee outcomes indicated that employees in the training group not only had fewer illnesses, $F(1, 89) = 5.25$, $p < .02$, and greater perceptions of access to hard hats, $F(1, 18) = 22.71, p < .001$, and hair nets, $F(1, 22) = 15.64, p < .001$, than those in the nontraining group, but they also experienced less stress, $F(1, 38) = 4.60$, $p < .04$, when social climate and Time 1 measures of stress were entered as covariates.

Discussion

The findings of this study support the hypothesized linkages outlined in the proposed model (see Figure 1). The results indicate that employees of companies in greater compliance with Senate Bill 198 (1989) perceived more health and safety meetings and training sessions. Moreover, increased health and safety meetings and training sessions were associated with improved employee health and safety knowledge as well as improved employee health outcomes.

The results also indicate direct linkages between coordinator participation in the REACH OUT Training Program and employee outcomes. Employees whose company had participated in the Program reported fewer illnesses, greater perceptions of access to personal protective devices, and lower levels of stress than nonparticipants, after controlling for preintervention levels of these variables. These findings are important because they reveal direct linkages between corporate participation in the REACH OUT Training Program and employee-level health outcomes.

Another interesting finding was the interaction between intervention and company size on number of reported illnesses. In the control group, as company size increased, illnesses increased. This supports earlier data from this study indicating that the number of injuries and illnesses is a function of company size (Stokols et al., 1995). However, in the treatment group, as company size increased, illnesses decreased. This finding may indicate that once companies have the knowledge to implement an effective IIPP, larger companies will be more capable than smaller companies, because of differences in resources, of implementing an IIPP and, perhaps, reducing illnesses.

The findings also revealed that stress was positively associated with perceptions of access to goggles–face shields and ear plugs. These findings suggest that occupations that are hazardous and require use of these protective devices may be especially stressful.

Although the findings of this study are significant, they should be interpreted cautiously in light of certain methodological limitations. The response rate was lower than expected, and the sample was not completely random because we used a combination of random and nonrandom sampling strategies to identify our final list of participating companies. Moreover, the research team could not ascertain that those who chose to participate in the study were not significantly different from those who did not. The participating companies may have been more aware of and, perhaps, in greater compliance with Senate Bill 198 than those who did not participate. Also, except for the researchers' on-site observations of corporate compliance, there was a lack of nonsubjective indicators of the intervention effects. Although the research team attempted to collect Cal-OSHA logs, injury reports, and workers' compensation data, many companies were unable to provide this information, and the data that were provided were often difficult to use because of variations in reporting formats. Future research should take steps to collect and to examine more objective employee data. A final limitation of the study is the lack of a fine-grained causal model that explicitly accounts for the relationships between all of the variables considered.

It should also be noted that these findings are of limited generalizability to larger companies. Most companies that participated in this study employed between 50 and 100 employees. In fact, companies of this size were targeted for the study because of their general lack of regulatory compliance. As national survey data have shown, large and small companies have very different levels of resources and, therefore, very different capabilities in terms of providing organizational and employee services. In view of these differences, it must be reiterated that in this study we examined the effects of the REACH OUT Training Program on small companies, and the results cannot fully be generalized to larger companies.

At the same time, however, the above-noted limitations were partly offset by certain strengths of this research, including (a) the selection of the case study companies from the sampling frame provided by a survey research firm (rather than from among those businesses identified through nonrandom sampling strategies), (b) the matching of comparable treatment and control companies within the case study sample, (c) the use of pre- and posttests and analyses controlling for preintervention levels of the major outcome variables. These methods may compensate for some of the study's limitations.

The results of this study suggest several directions for future research on worksite injury and illness prevention programs. As noted earlier, two companies withdrew from the study because of insufficient time. Several companies withdrew from the larger study also citing insufficient time. This is consistent with previous research indicating that small businesses are hindered by a lack of resources such as staff, time, and funding. For IIPP programs to assist small businesses, they must be streamlined so that employers will consider them more feasible and effective. Future studies also should examine IIPPs in the context of comprehensive worksite wellness programs. Comprehensive programs are being developed to incorporate occupational health and safety, facilities management, health risk appraisal, clinical preventive services, organizational health, as well as organizational regulatory compliance. Future research should examine the effectiveness of IIPP programs within the context of these comprehensive programs.

The present study offers evidence for the effectiveness of the REACH OUT Training Program and suggests the value of a social–ecological approach to worksite health promotion. This multidisciplinary approach—integrating social ecology, risk communication, occupational health and safety, and worksite health promotion—combines both active and passive strategies of health promotion and emphasizes high-impact organizational leverage points for health promotion. A comprehensive, ecological perspective should be applied consistently in the future to develop more effective health promotion programs in the workplace and in the larger community.

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Appendix

The REACH OUT Acronym for Requirements of Senate Bill 198 (1989)

Responsibility assignment
Evaluation procedure
Accident investigation
Corrective action
Hazard prevention training
Obeying the law
Understanding through communication
Tracking and record keeping

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