

Research Needed on Behavior Skills Training to Teach Young Workers Workplace Safety Skills

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Young workers find themselves at an increased risk for accidents, injuries, and death on the job but there have been few studies of methods for improving on-the-job safety in young workers. A substantial body of literature shows increased *in vivo* safety behaviors in children, adolescents, and adults following behavior-based safety training programs. This paper describes recommended applied research on a behavior skills training (BST) program for young workers to determine whether BST with *in vivo* training is superior to a standard organizational safety training program.

Problem Statement and Setting

A local temporary employment agency runs a Summer Youth Employment Program (SYEP) for local organizations that hire young (16–19 year-old) people to work on a variety of seasonal projects including lawn maintenance, planting, painting, roofing, minor construction and building repair, and window washing. Data collected by the organizations and temporary agency show that this group of workers is more likely to suffer work-related injuries than are other employees working in similar capacities.

According to estimates by the Bureau of Labor Statistics (BLS) (2002), occupational accidents in the United States cost organizations 250,000 productive years of employee life and service every year. Young workers present the highest rate of risk for occupational injury. Workers between the ages of 16 and 19 suffered 38,230 nonfatal workplace injuries (BLS, 2004a) and 128 workplace fatalities (BLS, 2004b) during 2004. Workers in this age group are often newer or temporary employees such as students hired for summer work. These employees, especially those with less than one year of experience on the job, are overrepresented in their share of workplace injuries (about 34%) when compared to their share of the workforce (about 25%) (BLS, 2004a).

As a source of substantial direct and indirect costs, safety is a major concern for organizations. Based on industry reports from 1997, The National Institute for Occupational Safety and Health (NIOSH, 1999) concluded that U.S. corporations provide nearly 2 billion hours of

training to approximately 60 million employees at a cost of \$55 to \$60 billion. In addition, many organizations view safety as an important variable in organizational culture that may impact trust, teamwork, and a sense of belonging (Geller, 2002). Safety has also become an important issue for organizational researchers as they attempt to discover which organizational and individual variables impact safety and develop programs to improve safety behavior while reducing workplace injuries and accidents. However, many publications describing organizational safety training methods do not provide evidence of effectiveness (Cohen & Colligan, 1998) and it seems likely that many organizational development strategies go untested.

From a management perspective, Dubin, Mezack, and Neidig (1974) suggest that, with regard to employee development programs, the most basic question to ask is, "Have changes occurred as a result of this program?" Thus, when organizations adopt new and expensive training programs, they should expect evidence of efficacy, and organizational developmental specialists should be prepared to demonstrate a program's efficacy.

There is little research into programs designed specifically to train young workers in on-the-job safety skills even though there is evidence that they are especially likely to be injured on the job. Furthermore, the training programs used generally in organizations are largely untested. Therefore, this recommended research is designed to test one training method, behavior skills training (BST), for young, temporary (SYEP) workers to determine its effect on scores from knowledge-based safety assessments, on-the-job safety, and workplace injuries.

Review of Related Literature

There is a substantial body of literature supporting the efficacy of behaviorally based interventions to improve the safety behavior of children, adolescents, and adults (Geller, 2005; Gras, Cunhill, Planes, Sullman, & Oliveras, 2003; Heck, Collins, & Peterson, 2001; Miller, Austin, & Rohn, 2004; Roll, 2005). Several studies have used BST or very similar procedures to improve safety behavior. For example, Himle, Miltenberger, Flessner, and Gathridge (2004) and Miltenberger, Flessner, Gathridge, Johnson, Satterlund, and Egemo (2004) used a BST program to teach gun safety (do not touch, leave the area, tell an adult) to young children (4-5 year-olds and 6-7 year-olds respectively). The behavior skills programs included trainers modeling correct safety behaviors, practice of safety behaviors by the children, praise for correct responses and corrective feedback for incorrect responses, *in situ* training (training in an actual "found gun" situation), realistic training materials in multiple training situations to promote an active learning approach, positive reinforcement for correct responses, and generalization of skills. Himle, Miltenberger, Gathridge, and Flessner (2004)

and Gatheridge, Miltenberger, Huneke, Satterlund, Mattern, Mattern, Johnson, and Flessner (2004) compared behavior skills training to the Eddie Eagle GunSafe Program (National Rifle Association, 2005) and found that both programs were effective in teaching children to verbally reproduce the gun safety message ("Stop, Don't Touch, Leave the Area, Tell an Adult") but only BST was effective in teaching the children to perform the safety behaviors during supervised role play.

Johnson, Miltenberger, Egemo-Helm, Jostad, Flessner, and Gathridge (2005) used BST with *in situ* training to teach 4- and 5-year-olds abduction prevention skills which were maintained at two-week and one-month follow-ups.

Heck, Collins, and Peterson (2001) demonstrated that structured, interactive training and small individual rewards (certificates, ribbons, stickers, and posters) based on overall group performance decreased risk taking behaviors in Kindergarten through third graders. (Risk taking behaviors have been shown to increase the likelihood of playground injuries; see Ward, 1987, as cited in Heck, Collins, & Peterson, 2001.)

Miller, Austin, and Rohn (2004) compared the effects of a national pedestrian safety awareness program with behavioral intervention strategies including training, feedback, and reinforcement. They found significant improvement when the two strategies were combined but no improvement when the safety awareness program was used by itself.

A common safety training method is to instruct employees to read safety literature including safety brochures, product manuals, and MSDS (material safety data sheets) books (Eckerman, Lundeen, Steele, Fercho, Ammerman, & Anger, 2002). Eckerman, et al., (2002) found, however, that participants who received an interactive instructional method that followed consensus behavioral education principles scored significantly better on test questions about the training material than did participants who simply read the material. However, the study was limited because no test of on-the-job safety behavior was completed.

There is a growing body of literature showing that organizational safety climate affects individual employee safety behavior and on-the-job accidents (e.g., Neil & Griffin, 2006). However, temporary or summer employees may not work at an organization long enough to experience safety climate improvements and the lagged effect that Neil and Griffin (2006) found between safety climate, safety motivation, and safety behavior.

Research Hypotheses

Null Hypothesis. BST with *in situ* training is no more effective at teaching safety-skill knowledge, improving on-the-job safety, and reducing workplace injuries in SYEP workers than is the standard safety training procedure.

Working Hypothesis. BST with *in situ* training is significantly more effective than the standard safety training procedure at increasing safety-skill knowledge, improving on-the-job safety behavior, and reducing workplace injuries in SYEP workers.

Definition of Research Variables

Independent Variable. The independent variable for this study is the safety training used to teach safety skills to SYEP workers. Two conditions comprise levels of the independent variable:

✦ Standard safety training program as currently used by the temporary employment agency for SYEP training.

✦ Safety training protocol using BST with *in situ* training.

Dependent Variables: In this study four dependent variables will be measured:

✦ Test scores from a test of basic safety knowledge. (This test has been used by the temporary employment agency for several years. Trainees must obtain a score of 80% to start work.) Validity and reliability have not been established. However, the test designers believe it has good face validity. Data compiled for the current study could facilitate validity testing of the current measurement instrument.

✦ Safe and unsafe behavior on the job.

✦ Accidents and injuries amongst SYEP workers during the study period (one summer).

✦ A qualitative analysis conducted to assess the feeling and perceptions of SYEP workers about the two training procedures and the organizational safety cultures of the three organizations.

Data Collection

Data for this study will come from four sources:

✦ A test of basic safety knowledge will be given to each participant at the end of the safety training programs. Scores will be compared between the two groups and with scores generated in the previous two years. Statistical comparisons will be made using independent group *t*-tests.

✦ Safety-behavior skill observation sheets (see Geller, 2002) will be completed by trained observers (direct supervisors and researchers) at least once weekly for each research participant. Independent group *t*-tests will be used to look for statistical differences between groups. Approximately 20% of observations will be conducted by two observers to provide reliability data. Reliability calculations will be made using percentage agreement between the two observers (see Leedy & Ormrod, 2005).

✦ Accident and injury reports will be maintained by the temporary employment agency (a standard practice). These data will also be compared to accident and injury data collected during the previous two summers. Independent group *t*-tests will be used to compare group scores.

✦ At the completion of each safety training session, groups of participants will be asked to express their feelings and perceptions about the training they received (see O'Brien, 2000 and Peterson, 2001, as cited in Geller, 2005). These discussions will be unscripted and informal. At the end of each participant's employment with the SYEP, the participant will be asked to complete an exit interview, which includes a scripted one-on-one interview with the temporary agency's human resource director, and a perception survey. The perception survey has been used for several years and includes questions about organizational safety culture.

Research Participants

Participants will be drawn from the SYEP workers employed over one summer. On average, 40 people are hired each year for this program. All people hired for the program will be informed that the temporary employment agency, and the supporting organizations, are participating in a research project designed to study workplace safety. All will be asked to volunteer to participate. Those who volunteer will be asked to sign a statement of informed consent to acknowledge that they (a) have been informed about the research study and (b) have consented to participate in the proposed research.

SYEP employees who volunteer for this Safety Training Research Project will be randomly assigned to one of two safety training conditions: (1) standard safety training, or (2) BST with *in situ* training. A "no-treatment" (no safety training) control group will not be used because each of the organizations is required by regulation to provide safety training to new employees and it would be unethical to fail to provide safety training.

All participants who complete their safety training will be given \$25. In addition, all participants who continue in the research project will receive an additional \$25 upon completing their exit interviews and surveys.

Method

Standard safety training program. Currently, all prospective new employees (including SYEP workers) receive the same basic pre-employment safety training which is entirely classroom based, and consists of reading assignments and lectures supported by audio-visual aides such as video tapes and power point presentations. This training is conducted on two successive eight-hour days. At the end of the training, prospective employees are required to complete a 100-question written test that covers the safety topics included in the safety training. Trainees must score a minimum of 80% to be hired. Trainees who fail are permitted to retake the course one week later. Trainees who successfully complete the course

by scoring 80% or more on the written test, and accept employment, are given \$25 (though they are not yet employed by one of the organizations and are not otherwise paid). The only other measures of on-the-job safety are accident and injury reports filed by supervisors when they become aware of on-the-job accidents or injuries. These practices will continue as they have with the exception that safe and unsafe workplace behaviors will be recorded during planned observations which will be conducted at least once weekly for 30 minutes for each SYEP worker. Each participant hired into the SYEP will be required to perform each of the trained safety skills during his or her first day on the job. Safe and unsafe on-the-job behaviors will be observed and recorded but no praise, corrective feedback, or retraining will occur. Subsequent safety behavior observations will likewise result in no praise or corrective feedback.

BST with *in situ* training. Following typical practices for BST with *in situ* training (Himle, Miltenberger, Gathridge, & Flessner, 2004) and behavior-based safety and occupational risk management (Geller, 2002; 2005), prospective SYEP workers assigned to the BST with *in situ* training condition will receive safety training designed to cover all the topics covered in the standard safety training program but following a plan of instruction, modeling, rehearsal, and praise for correct behavior/corrective feedback for incorrect behavior. Trainees will not move on to subsequent lessons until they have successfully completed a required safety procedure rehearsal three consecutive times. Once trainees have completed all behavior skill training modules, they will be required to take and pass the 100 question safety test. Each participant hired into the SYEP will be required to perform each of the trained safety skills during his or her first day on the job. Safe and unsafe on-the-job behaviors will be observed and recorded. Safe behaviors will be praised. Unsafe behaviors will result in corrective feedback and retraining (*in situ* training). Subsequent safety behavior observations will result in no praise or corrective feedback.

Discussion

This recommended research proposes an applied research project with the goal of determining whether a behavior-based safety skills training program will increase on-the-job safety behaviors and reduce accidents and injuries in young (16-19 year-old) workers as compared to the instruction-based training program now in use. Rejecting the null hypothesis based on data obtained from this study would extend the research base demonstrating the efficacy of behavior-based training programs in improving safety behaviors. In addition, it would extend the re-

search base demonstrating efficacious organizational training methods.

The proposed research has broader implications as well. Findings may be relevant to even younger workers, for example, young teenagers are often employed as farm and agriculture workers, and young people may work in family businesses. Research using BST and *in situ* training to teach safety skills to young children (Himle, Miltenberger, Flessner, & Gathridge, 2004; Miltenberger, et al., 2004) make this extension more plausible, but more research should be done with specific job-related safety skills in differently aged populations. Findings may also be relevant for adult workers, especially newer workers who have been shown to be more prone to accidents and injuries due to lack of experience (BLS, 2004a).

The proposed research has several clear limitations. Owing to ethical and legal concerns, no “no treatment” control group can be used. The sample sizes may be too small to yield meaningful results owing to a likely population size of about 40. However, since all SYEP workers are required to take safety training and the only additional requirement for participating in the proposed research would be to permit behavioral observations (with participants completing the project earning an additional \$25) it is expected that most SYEP candidates will volunteer.

Two methodological concerns limit the proposed research. *In vivo* behavioral observations may affect safety behaviors in the observed participants thereby artificially improving safety behavior in both groups (the “Hawthorne effect,” Leedy & Ormrod, 2005). However, it is expected that any potential effect should apply to both groups equally. More problematic, however, is the fact that cross-contamination may occur both during *in situ* training sessions where standard training group participants may witness additional training being provided to BST group participants, and conversations and “safety instruction” may occur between participants from both groups (Leedy & Ormrod, 2005). However, comparisons between accident and injury data from research participants and SYEP workers from previous years may help determine the size of this effect, even though it is also possible that there have been substantial differences in the SYEP populations from year to year. However, current data show a relatively consistent accident and injury rate from year to year, possibly mitigating this concern.

This recommended research uses both quantitative and qualitative measures to capture a broad range of data about safety performance following standard and behavior-based trainings, and SYEP workers’ feelings and perceptions of the training programs and organizational safety cultures. These data are expected to provide a useful guide to the administrations of the temporary employment agency and three organizations involved in the safety training and hiring of SYEP workers. The data are

expected to be important also to the broader community of organizational behavior managers, organizational development specialists, and safety engineers as they attempt to decide which safety training programs improve on-the-job safety behavior and reduce workplace accidents and injuries.✻

Endnotes

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