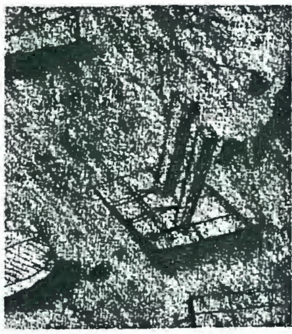

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Observed Versus Reported Behaviors and a Theoretically-Based Eye Injury Intervention for Carpenters

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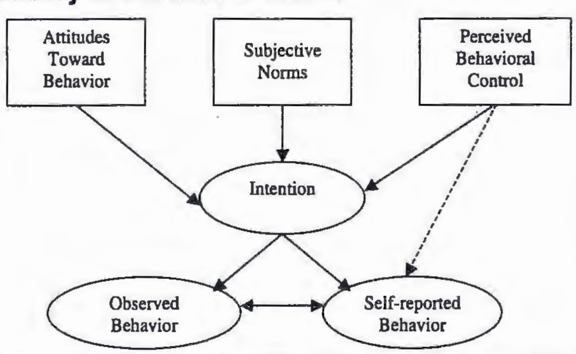
This article describes a National Institute for Occupational Safety and Health (NIOSH) Health Communications Research Branch study designed to improve eye-protection behavior in construction workers. We applied the social psychology theory, the Theory of Planned Behavior (TPB), to the occupational issue of eye protection (EP) usage. We created interventions to specifically give the carpenters control over their safety behavior, an important part of TPB. This article is a preliminary report only on the portion of the study that examines the self-reported and observed behaviors both before and after specific interventions to prevent work-related eye injuries.

Figure 1. Ajzen's (Modified and Abbreviated) Theory of Planned Behavior



In 2000, about 54,000 work-related eye injuries or illnesses involving days away from work were reported across all private industries. Of these injuries, 15% occurred in construction. Though it is believed that most eye injuries can be prevented with safety eyewear use, protective eyewear is still not worn by many workers. A recent study found that construction workers received a disproportionately high number of eye injuries, accounting for 16% of all occupational eye injuries treated in emergency rooms. The percentage of workers not wearing safety eye-protection at the time of injury has ranged from 85% to 97% leading NIOSH researchers to believe that increased safety eyewear usage would reduce occupational eye injuries.

Carpentry is a subset of the construction industry that has a high incidence of eye injuries. The eye has been identified as the third most common body part injured. A recent study that included onsite observations found that only 51% of union carpenters were wearing safety eyewear appropriately.

The provision of personal protective equipment, specifically protective eyewear, by employers to employees is a simple and practical solution to reducing eye injuries in carpentry. However, compliance does not always occur even though using EP is a relatively effortless process. We found that carpenters' behavior related to using EP was a more complex issue than previously thought by researchers. This study examined the attitudes toward wearing EP, influences of others on EP use, and the facilitators or barriers to its usage.

Focus groups of carpenters provided information on the advantages and disadvantages of performing the behavior and the factors that would affect EP use. This focus group information was used to develop the intervention. Disseminating information, reminders, and alternative eyewear products were found to be the best means of intervention to make wearing EP a preferred practice by these carpenters. The intervention involved providing information in two forms: one that was worker focused and one that was both employer and worker focused. The worker intervention consisted of giving the carpenters reminders and control over the choice and comfort of EP. Reminders came in the form of hard-hat stickers and messages on neck straps. Control over choice was provided by letting workers choose a pair of comfortable and well-fitting glasses from a group of worker-preferred glasses. The employer-plus-worker intervention was the same as the worker's intervention but it

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included additional information, a tool box talk, posters and incentives for the employer to disseminate.

The Theory of Planned Behavior played a significant role in the questionnaire, intervention, and analysis. The TPB model suggests that the performance of a behavior, such as EP use, is the direct result of the person's intention to perform the behavior. According to this theory, intention is comprised of an individual's attitude toward the behavior, his or her perception of whether significant others would approve of the behavior, and whether the individual perceives he or she has some control over their behavior (see figure on previous page).

One-hundred fifty-six union carpenters at several commercial construction sites participated in this study. Participants were enrolled early in the work day, observed for three hours, given a pre-intervention survey, given the intervention, observed again after two weeks, and given a post-intervention survey four weeks later. In other words, observational and self-report baseline data were collected before the intervention and outcome observational and self-report data were collected at two and four week intervals after the intervention, respectively.

We obtained information from three groups participating in the study: (a) 53 carpenters in the workers only intervention (W), (b) 50 carpenters in the employer-plus-worker intervention (W+), and (c) 53 in the control group, a comparison group receiving no intervention (W-).

Self-reported behavior was measured retrospectively. Workers were asked to recall and rate the percent of time they wore EP in the past month. Observed EP was defined as the percentage of times a carpenter wore EP during the three hour observation period.

Carpenters were observed using power tools such as chop saws, hand drills and nail guns; hand tool tasks such as hammering, sawing, and filing; and non-tool tasks such as measuring and marking, tool maintenance, and other housekeeping tasks. Intentions were measured similarly to self-reported behavior, but in a prospective manner, i.e., for the next three months.

Table 1. Means and Standard Deviations for Self-Reported and Observed Behaviors by Intervention Group

	Self-reported Behavior		Observed Behavior	
Intervention Groups	Pre	Post	Pre	Post
W	57.9	62.6	16.9	26.0
	(31.5)*	(29.4)	(32.5)	(39.0)
W+	55.4	61.6	25.1	24.6
	(31.3)	(27.0)	(35.1)	(36.8)
W-	71.5	62.3	29.9	12.5
	(28.1)	(29.7)	(39.8)	(30.7)

*Standard Deviations are in parentheses

Attitude toward behavior was measured directly as a feeling toward EP behavior. The five attitudes considered were importance, goodness, desirableness, pleasantness, and comfort. An attitude score was created by averaging these five attitude items.

Subjective norms were considered a social factor. Information was gathered on worker's concern over what other people think about their EP behavior. For example, study participants were asked if people important to them approved of their wearing EP.

Perceived behavioral control is the degree of control one perceives they have over a behavior. For the purposes of this study, we gathered information about perceived ease or difficulty of wearing EP to represent this factor. Carpenters were asked if the behavior was easy, if they were confident that they could wear EP, and if they felt they could control their behavior. These three items were also averaged.

Table 1 displays the pre-intervention and post-intervention means and standard deviations of self-reported and observed behaviors. These means show a change in pre and post-behavior in each intervention group. But, this change was not as great as we had expected. In the self-report condition, behavior was reported to have increased slightly for the worker and employer-plus-worker groups. The control groups average self-reported behavior declined. Though we saw an increase in the observed behavior for the worker condition, there was a decline in the average observed behavior in both the employer-plus-worker and control groups. T-tests comparing changes in pre and

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Table 2. Correlations Among Variables in the Theory of Planned Behavior

Variables	Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Self-reported EP Behavior
Attitude	—				
Subjective Norm	.26**	—			
Perceived Behavioral Control	.62**	.31**	—		
Intention to Wear EP	.54**	.34**	.43**	—	
Self-Reported EP Behavior	.55**	.29**	.54**	.55**	
Observed EP Behavior	.25**	.21**	.14	.30**	.41**

** Significant at the .01 Level.

National Safety Council Convenes a Graduated Driver Licensing Research Symposium

Leading researchers who study Graduated Driver Licensing (GDL) programs in the U.S. and abroad convened in Chatham, Massachusetts, to document the GDL experience, verify the science, synthesize the most compelling rationale for adopting and strengthening effective GDL legislation and programs, and outline an agenda for future research.

Graduated Driver Licensing programs are designed to address the high incidence of crashes and injuries among young drivers. It allows beginning drivers to get their initial driving experience under supervised, less risky conditions and gradually exposes them to more complex driving situations. Thirty-six states and the District of Columbia have instituted at least some basic elements of GDL, and it is likely that most of the remaining states will follow in the near future. A few leading states have several years of experience, but most are just now graduating the first generation of fully licensed drivers.

The National Safety Council organized the symposium with generous support from General Motors, the National Highway Traffic Safety Administration, and Nationwide. The proceedings from the symposium will be published in Volume 34, Number 1 (January 2003) issue of the *Journal of Safety Research*.

Contents of the Winter 2002 issue of the *Journal of Safety Research*

For more information on any of these articles, please contact Katie Porretta, Managing Editor, at porrettk@nsc.org.

Aggressive behaviour while driving as a predictor of self-reported car crashes. Chliaoutakis, Demakakos, Tzamalouka, Bakou, Koumaki, & Darviri.

Fatality risk assessment and modeling of drivers responsibility for causing traffic accidents in Dubai. Abdalla.

An evaluation of the implementation of ignition interlock in California. DeYoung.

A model of fishing vessel accident probability. Jin, Kite-Powell, Thunberg, Solow, & Talley.

Changes in logging injury rates associated with use of feller-bunchers in West Virginia. Bell.

An analysis of motorcycle injury and vehicle damage severity using ordered probit models. Quddus, Noland, & Chin.

Occupational safety and health in Spain. SeSe, Palmer, Cajal, Montano, Jimenez, & Llorens.

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post-behaviors for each condition separately were significant for the employer-plus-worker and control groups in the self-reported behavior and for the control and workers group in the observed behaviors.

Table 2 (see page 2) displays the correlations among variables contained in the TPB before and after the interventions. It can be seen that intention to wear EP correlated significantly with attitude, subjective norm, and perceived behavioral control. One can see from Table 2 that attitude and perceived behavioral control are more highly correlated with intention to wear EP and with self-reported EP behavior over the 4-week period. The best correlation of observed EP behavior was self-reported behavior followed by intention. Though attitude and subjective norm were somewhat significant they had lower correlations. Perceived behavioral control was the least significant of the TPB variables. The idea that success at wearing EP requires both intention and some control over the comfort and availability of eyewear implies an interaction between intention and perceived behavioral control. This was much stronger in the self-reported behavior than in the observed behavior.

Overall, the TPB was quite successful in the analysis of intentions to wear EP and moderately successful in its analysis of observed EP behavior.

Observing behavior before distributing the pre- intervention survey had the advantage of helping to avoid bias in the self-reported behavior. Observing behavior after two weeks avoided bias in the observed behavior. Responses were not geared to what researchers wanted to hear. Also, because observers were discrete, the research did not needlessly influence the respondent's need to be consistent in their self-report questionnaires. The short time period of two weeks between the pre-intervention survey and the post-intervention observations better enabled us to capture the influence of the intervention and maybe even the survey on the behavior. Everything was newly reinforced, i.e. "fresh," in the carpenters' mind. Data showed an increased use of EP.

This study demonstrates, to a certain degree, that theory can guide practitioners in developing safety eyewear interventions. Instead of just focusing on the individual, we found it beneficial to focus on individuals in their work environment. It was shown that workers would wear their glasses under certain conditions such as doing specific tasks and when given reminders and incentives. The observed behavior after the intervention and the correlation of the self-reported and observed behaviors in the post surveys support this. This intervention appears to help workers gain control over their safety eyewear via selection (comfort and availability were reinforced) and reminders. This study showed an increased usage in EP, especially for the worker intervention condition. It may be that the additional information was not disseminated and/or reinforced in the employer-plus-worker intervention condition. This needs to be explored further. The intervention was most effective when workers were given what they wanted and needed to perform the behavior.

Inman C, Blanciforti L [2002]. Observed versus reported behaviors and a theoretically-based eye injury intervention for carpenters. In: Injury insights - December 2002/January 2003. Itasca, IL: National Safety Council Research and Statistical Services, pp 1-2, 7.