EFFECTS OF AN AVERSIVE VICARIOUS EXPERIENCE AND MODELLING ON PERCEIVED RISK AND SELF-PROTECTIVE BEHAVIOR

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A 2 x 3 between-subjects design was used to determine the effects of modelling and aversiveness of a vicarious experience on perceived risk and self-protective behavior. Modelling and aversiveness of experience were manipulated using an instructional videotape. Unprotected model and protected model conditions were compared. Benign, slightly aversive, and highly aversive conditions were compared. The dependent variables were self-protective behavior and perceptions regarding the hazardousness of the product, severity of injury, likelihood of injury, likelihood of an accident, and familiarity with the product.

More subjects in the protected model group exhibited self-protective behavior compared to the control group. There was no difference in levels of perceived risk between the two groups. Aversiveness had an effect on self-protective behavior. The slightly aversive group showed an incidence of self-protective behavior significantly greater than that of the control group and the highly aversive group. Examination of the nature of manipulation used in the slightly aversive condition suggests that an ambiguous portrayal of the consequences of a hazard while implying its potential to inflict harm causes people to behave cautiously. The incidence of self-protective behavior in the highly aversive group did not differ significantly from that of the control group despite a significant difference in perceived levels of hazardousness. This is explained as a manifestation of the so-called "self-protective attribution of responsibility." Perceived hazardousness was found to be the primary predictor of self-protective behavior. Perceived severity and likelihood of injury were found to be the primary predictors of perceived hazardousness. A strong association was found between self-protective behavior and perceived personal susceptibility to injury.

Introduction

A number of studies have shown that people tend to base their decisions to protect themselves upon the degree of perceived risk. Wogalter et al. (1987) reported that perceived hazardousness correlated highly with the degree of precaution reported by subjects when using a product. It is generally believed that safe behaviors become more likely to the extent that the product is perceived as being dangerous, or conversely, become less likely if a product is perceived as being safe.

Perceptions of risk seem to be determined by perceived severity and probability of accidents associated with an activity (Slovic et al., 1980). Perceived severity of injury has been found to be the best single predictor of perceived risk so far. Probability of injury provided a small but significant increment in the prediction of perceived risk (Wogalter et al.,1987).

Perceived risk may be influenced by a benign or an aversive experience. Based on research in the field of people's responses to natural disasters, Dorris and Purswell concluded that the extent to which a product is perceived to be hazardous is influenced by past experience with the product (1977). If a warning is presented without an incident taking place, the likelihood of responding to subsequent warnings is lessened. Meltsner (1978) supports this contention by proposing that one's exposure to a specific dangerous condition reinforces indifference toward that condition, unless serious personal damage is incurred. Prior personal experience with an injury may increase the likelihood of warning compliance. It appears that the extent to which a hazard-specific experience is benign may be negatively related to the degree of perceived risk.

There is some evidence that the effect of a benign or aversive experience on people's responses to warnings involving natural disasters also holds true for people's responses to product warnings. A study by Karnes, Leonard, and Rachwal (1986) on perceived risk as a function of experience with all-terrain vehicles and types of warnings reported no significant difference in risk perceived between those who had not been in accidents and those who had been in non-injury accidents. They reported higher levels of perceived risk among those who experienced injury accidents compared to those who experienced non-injury accidents.

The behavior of other people has also been found to have a very strong influence on warning compliance. A study conducted by Wogalter et al. (1988) reported 100% compliance by subjects when a confederate complied with a warning. Whether or not the high degree of compliance was mediated by increased risk perceptions due to other people's safe behavior is unknown. Given that the level of aversiveness of an experience affects risk perception and warning compliance, what the nature of this relationship would be in the presence of a model who does or does not exhibit protective behavior warrants investigation.

Most of the above findings were based on observations, hypothetical responses and expressed intentions, thereby allowing only the determination of correlations and associations rather than causal relationships. The present study was designed to fill that gap by employing direct manipulation of variables relevant to risk perception and observation of actual self-protective behavior. The first objective of the study was to empirically determine the effects of an aversive vicarious experience and modelling of a protective behavior on perceptions of product hazardousness and actual self-protective behavior. The second objective was to empirically determine the factors that best predict overall risk perceived and actual self-protective behavior.

Method

Two independent variables were tested: (1) aversiveness of a vicarious experience, and (2) modelled behavior. Aversiveness of experience had three levels: (1) benign (no accident), (2) slightly aversive (non-injury accident), and (3) highly aversive (injury accident). Modelled behavior had two levels: (1) a model not using protective gloves, and (b) two models, one not using protective gloves and the other using protective gloves.

The independent variables were introduced using 6-minute instructional videotapes for tiling floors with a model showing the process step-by-step. All six versions of the videotape were identical, with the exception of a segment showing an incident involving the use of an adhesive remover. Each incident depicted one of six possible combinations of levels of the independent variables. A benign experience was depicted by the correct and successful application of the adhesive remover. The slightly aversive experience was depicted by the model spilling the adhesive remover and verbally expressing pain. The highly aversive experience was depicted by the model spilling the adhesive remover followed by a shot of a severely burned hand. As the incidents were shown, a statement was narrated cautioning the viewer to have a bucket of water and first-aid kit handy in the event of an accident. The intent was to portray the incident as part of the instructional scheme.

The dependent variables were: 1) perceived hazardousness of the product, (2) perceived severity of injury, (3) perceived likelihood of an injury, (4) perceived likelihood of an accident, (5) familiarity with the product, and (6) self-protective behavior. The first five dependent variables were measured on a seven-point scale. Self-protective behavior was measured based on whether or not the subjects wore protective gloves while performing the experimental task.

Each condition had ten subjects. The control group had sixteen subjects. Students from the California State University at Northridge participated in the experiment and received credits to satisfy partial requirements of an introductory psychology class.

The experimental manipulation was embedded by presenting the study as a marketing survey. Subjects answered a questionnaire pertaining to three consumer products (adhesive remover, drain opener, and mildew remover). Embedded in the survey were pre-test measures pertaining to familiarity, frequency and recency of use, perceived hazardousness, perceived probability of accidents, perceived probability and severity of injury, and types of injury associated with the product. The videotape was then shown. Subjects answered a questionnaire to test their understanding of the content of the videotape, a task designed to further embed the purpose of the experiment.

Subjects were then given a mini-tiling project. They were asked to first remove the hardened adhesive from mock old flooring using an adhesive remover and scraper. A pair of gloves was provided among a set of materials normally used in tiling projects. No sharp objects or tools were provided. The adhesive remover had a warning which was 3/4" x 3" in size and was located in the middle section of the back label. It contained the text "DANGER: Contains highly active chemicals. To avoid severe burns, put on protective gloves before opening." and a pictograph of a hand coming in contact with liquid matter. No instructions were given to instigate the subjects to read the back label.

When subjects began to pour the adhesive remover or dip the brush into the container, the experiment was stopped. Subjects' risk perceptions were again measured using a questionnaire. Probe questions were asked, followed by a debriefing session.

Results

Table 1 shows the percentages of self-protective behavior based on marginal frequencies. A three-way frequency analysis showed a significant association between self-protective behavior and modelled behavior, partial $\chi 2(1, N = 76) = 7.59$, $p < .01$. Self-protective

Table 1
Percentages of Self-Protective Behavior Based on Marginal Frequencies

INDEPENDENT VARIABLES	DEPENDENT VARIABLE: SELF-PROTECTIVE BEHAVIOR		
MODELLED BEHAVIOR	GLOVES	NO GLOVES	TOTAL
UNPROTECTED	57%	43%	100%
PROTECTED	87%	13%	100%
AVERSIVENESS	GLOVES	NO GLOVES	TOTAL
BENIGN	65%	35%	100%
SLIGHT	90%	10%	100%
HIGH	60%	40%	100%
CONTROL	50%	50%	100%

behavior and aversiveness of experience were significantly associated, partial $\chi^2(2, N = 76) = 6.38$, $p < .05$. No significant three-way interaction was found between self-protective behavior, aversiveness and modelled behavior. *A priori* contrasts showed significant differences in the incidence of protective behavior between the control and slightly aversive groups, $z=2.41$, $p<.05$, between the slightly aversive and the highly aversive groups, $z=2.00$, $p<.05$, and between the control and protected model groups, $z=2.52$, $p<.05$. The percentage of subjects who wore gloves increased significantly from 50% in the control group to 90% in the slightly aversive condition. This dropped significantly to 60% in the highly aversive condition. The percentage of subjects who wore gloves increased significantly from 50% in the control group to 87% in the protected model group.

Table 2 shows the mean ratings for the five continuous dependent variables. A 2 x 3 multivariate analysis of covariance revealed no interaction between modelled behavior and aversiveness on the combined dependent variables, after adjusting for the pre-test measures. Results of a one-way MANCOVA (including the control group), univariate, and stepdown analyses showed that aversiveness had an effect on perceived hazardousness of the product, stepdown $F(3, 65) = 7.06$, $p<.001$, and on perceived likelihood of injury, stepdown $F(3, 63) = 3.79$, $p<.05$. *A priori* contrasts showed a significant difference in perceived hazardousness of the product between the control and benign groups, $t(65) = -3.70$, $p < .001$, and between the control and slightly aversive groups, $t(65) = -3.62$, $p<.001$. Perceived hazardousness in the highly aversive group was found to be significantly higher than the control group in a post-hoc comparison, $t(65) = 4.58$, $p<.001$. Levels of aversiveness did not differ from each other in terms of perceived hazardousness. *A priori* contrasts of perceived likelihood of injury revealed that the highly aversive group perceived a greater likelihood of injury compared to the slightly aversive group, $t(63) = -2.89$, $p<.01$. The same series of statistical tests were employed to determine the effect of modelled behavior on the combined dependent variables and revealed no significant effects.

Using a hierarchical multiple regression analysis, perceived hazardousness was found to be the primary predictor of subjects' protective behavior, $F(1, 74) = 10.00$, $p<.01$, accounting for 12% of the variance. Those who wore gloves rated the product more hazardous ($M = 4.29$) than those who did not wear gloves ($M = 3.16$). A hierarchical multiple regression also revealed perceived severity of injury to be the best predictor of perceived hazardousness, $F(1, 74) = 47.11$, $p<.001$, accounting for 39% of the variance. Perceived likelihood of injury added to the prediction of perceived hazardousness by perceived severity of injury, $F(2, 73) = 25.54$, $p<.001$, accounting for 16% of the variance.

Responses to the post-experimental questionnaire were examined. It was observed that 80% of the subjects who wore the gloves reported feeling personally susceptible to injury (i.e., responded "Yes" to the question "Did you feel any threat of being injured while doing the task?"), such as skin irritations or burns. Ninety-six per cent of the subjects who did not wear the gloves reported not feeling any personal threat of being injured. Table 3 shows the incidence of self-protective behavior and perceived personal susceptibility to injury. A frequency analysis showed a highly significant two-way association between perceived personal susceptibility to injury and self-protective behavior, partial $\chi^2(1, N = 76) = 25.15$, $p < .001$. A z-value of 4.52 was obtained which is significant at $p<.001$, indicating a very strong association between perceived personal susceptibility to injury and self-protective behavior. Perceived personal susceptibility to injury accounted for 48% of the variance in self-protective behavior. Perceived personal susceptibility to injury was not significantly associated with aversiveness nor with modelled behavior.

Discussion

Presenting a model of safe behavior increased the subjects' self-protective behavior. This is consistent with the strong effect of social influence on

Table 2
Mean Ratings for Dependent Variables

INDEPENDENT VARIABLES	DEPENDENT VARIABLES				
MODELLED BEHAVIOR	FAMILIARITY	HAZARD	LIKEACC	LIKEINJ	SEVINJ
UNPROTECTED	2.37	4.17	3.53	3.37	4.40
PROTECTED	2.70	4.30	3.93	3.90	4.03
AVERSIVENESS	FAMILIARITY	HAZARD	LIKEACC	LIKEINJ	SEVINJ
BENIGN	2.95	4.10	3.60	3.55	4.25
SLIGHT	2.55	4.15	3.20	3.05	3.90
HIGH	2.10	4.45	4.40	4.30	4.50
CONTROL	2.38	3.06	3.06	2.81	3.81

Table 3
Incidence of Perceived Personal Susceptibility to Injury and Self-Protective Behavior

	GLOVES	NO GLOVES	TOTAL
PERCEIVED PERSONAL SUSCEPTIBILITY TO INJURY	53%	1%	54%
PERCEIVED NO PERSONAL SUSCEPTIBILITY TO INJURY	14%	32%	46%
TOTAL	67%	33%	100%

warning compliance found in past research (Wogalter et al., 1988). This result has some interesting practical implications. For example, in a hazardous workplace where no hazard-prevention practices are in place, merely seeing other people's protective behavior, even without the benefit of a warning advising the desirability of this behavior, may provide enough motivation for other people to protect themselves. Thus, modelling a safe action is helpful in getting people to act safely, even without the benefit of hazard information (for example, warnings). This can only be generalized to situations where the observer does the same kind of work as the model, as was the case in the experiment. The protective device must also be accessible for imitation of protective behavior to take place. Many subjects indicated that they would go ahead and do the task without the gloves if these were not available.

Viewing a model who exhibited non-protective behavior did not decrease the subjects' self-protective behavior, possibly because no behavioral standards to ensure appropriate task performance and avoidance of harm were set for the subjects. Subjects did not perceive that "not" wearing gloves was "non-protective" because they didn't see gloves being worn as a standard to compare with.

Modelling protective and non-protective behaviors did not affect perceived risk. It seems that the modelled behavior was simply used as a guide for appropriate action in subsequent task performance.

All levels of aversiveness produced higher degrees of perceived hazardousness than shown by the control group. The videotape seems to have given the subjects, who initially were only slightly familiar with the product, a better awareness of the nature of the product, and hence, ideas of what the hazards might be. There were, however, no significant differences in degrees of perceived hazardousness between levels of aversiveness. It seems that this is due to failure of the accident scenarios to create varying levels of perceived severity of injury, a measure that accounts for 39% of the variance in perceived hazardousness. Interestingly, despite the absence of differences in perceived hazardousness, a difference in self-protective behavior was found between the slightly aversive group and the highly aversive group. The slightly aversive group, which was shown a non-injury accident, showed a very high incidence of self-protective behavior, a level that is much higher than predicted compared to the control group, and contrary to prediction, significantly higher than that of the highly aversive group, which was shown an injury accident. The highly aversive group, which was expected to show the highest degree of self-protective behavior, did not differ significantly from the control group in this regard. This led to the possibility that some other factor was at play that caused the difference in incidence of self-protective behavior between the three levels.

The fact that the incidence of self-protective behavior in the slightly aversive group was much higher than predicted compared to the control group could be attributed to the ambiguity of the accident scenario portrayed in this condition. The scenario was such that an accident was shown and a slight injury was implied verbally, but not visually. What seems to have occurred was that the ambiguously hazardous situation led to a feeling of uncertainty about the product's potential to inflict harm, and caused an increase in perceived hazardousness and self-protective behavior. This "uncertainty" seems to be characterized by a lack of knowledge of the nature of the hazard that befell the model, and, perhaps, a lack of knowledge of the probability of it occurring, and the severity of its consequences. This suggests that if people see a seemingly injurious accident and have a vague notion of what type of harm had befallen a person, if at all, then they may tend to be more careful and protective of themselves, when put in the same situation as the other person.

In order to identify possible reasons for the unexpectedly low incidence of self-protective behavior in the highly aversive group, the incidence of feeling personally susceptible to injury, a factor which showed the strongest association with self-protective behavior, was examined. There was no significant difference in the number of people who perceived personal susceptibility to injury between the slightly and highly aversive groups. However, in the slightly aversive group, 67% of those who did not perceive personal susceptibility to injury wore the gloves for various reasons. On the contrary, in the highly aversive group, none of those who perceived personal susceptibility to injury wore the gloves. This difference may be explained by "self-protective attribution of responsibility" proposed by Shaver in 1970. According to Shaw and McMartin (1977), "self-protective attribution of responsibility" is such that when the outcome of an accident is inconsequential, an observer may attribute the victim's plight to chance. However, the observer is likely to hold the victim of an accident responsible if he or she finds the outcome of the accident considerably serious and if there is a similarity between the victim's and his or her situation. The observer allocates the blame to the other person, and thinks that he or she is unlike the victim and, by doing so, dissociates himself or herself from a possible, similar tragedy. Since the injury shown in the highly aversive group was more serious, subjects may have allocated the blame on the model and manifested this perceived personal insusceptibility by not wearing the protective device provided. This is evidenced by comments such as "It can't happen to

me," "I am careful enough," and "The actor was careless." Hence, while an aversive vicarious experience may cause an increase in people's perception of a product's hazardousness, it will not necessarily elicit self-protective behavior but may instead instigate non-protective behavior.

It has been suggested that the consequences must be explicitly conveyed when potential hazards are severe to increase cautious intent, particularly because people's perceptions of severity do not correlate with actual accident frequencies (Laughery, et al., 1991). In this experiment, the explicit portrayal of the consequence did not cause an increase in actual self-protective behavior. People's intentions will not necessarily translate into the intended behavior. There may be other factors we ought to explore that determine the user's final actions. One of them may be the phenomenon called "self-protective attribution of responsibility."

The present study also pointed out that the commonly measured "perceived likelihood of injury" may refer to a large extent to perceived likelihood of injury to others, rather than to likelihood of injury to self. While the slightly aversive group perceived the likelihood of injury to be significantly lower compared to the highly aversive group, the number of subjects who personally felt that they could get injured while doing the task did not differ significantly. Based on the strong association between perceived personal susceptibility to injury and self-protective behavior, it is recommended that future research measure this factor instead of "perceived likelihood of injury" which has little value in the prediction of perceived hazardousness.

Conclusions

The results of this experiment suggest that showing a model who exhibits protective behavior can effectively increase people's self-protective behavior even without the perception of a written warning. This increase in self-protective behavior is not associated with an increase in perceived level of risk. The results also suggest that people, when placed in a situation where the potential for a hazard is perceived but the hazard itself is not known, would tend to behave in a more self-protective manner. On the other hand, viewing a model experiencing severe injury while using a product will not necessarily increase self-protective behavior, perhaps because subjects may blame the model for the injury and perceive themselves as being unlike the model. The results also point to the relevance of perceived personal susceptibility to injury in predicting actual self-protective behavior.

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