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Abstract
The authors attempt to clarify some of the variables that influence whether people act appropriately when a Risk is substantial and subject to individual control. They do so by reporting results of a pilot study of seat belt use. Also, the authors believe their approach to be generalizable to problems such as encouraging people to test for radon, to use condoms to prevent AIDS or to quit smoking.

Keywords
radon, seat belts, individual Risk, public awareness, questionnaire, survey, study, social pressure

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Introduction

In a recent issue of RISK, Professor William R. Freudenburg argued that the proper role for social science should not be limited to risk management or communication but should also include risk assessment.¹ Why stop there? Social science, and specifically psychology, can make major contributions to all aspects of risk analysis. These contributions might take two general forms. First, social science can add to knowledge about risk through basic research into how individuals and groups perceive and think about risk; appropriate topics would be perception, cognition, social influence, etc. The second area of contribution is on the applied side, specifically with regard to individual and group responses to risk. For example, it seems to be a fairly common problem that people do not make appropriate protective responses even in situations where risk is well documented and the appropriate action is known, specific and inexpensive.

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Two prime examples are responses to risk of geological radon in homes and the use of automobile seat belts. In the case of geological radon, it has been well documented that: 1) risk is substantial in specific geographical areas (increased lung cancer risk of 1% to 3%), 2) remediation is relatively simple, and 3) remediation is inexpensive ($2,000 or less to reduce radon to acceptable levels). Nonetheless, using data from a high risk area, Sandman et al. reported that only 6.6% of the sample had a radon test completed or in progress and only 10.8% expressed an intention to monitor radon levels. People failed to take the appropriate protective action.

Similarly, with regard to the use of vehicular seat belts, Stasson and Fishbein note that, in spite of attempts to link perceived risk to behavior, by 1986 only 41% of a sample of 1,500 adults reported consistent use of seat belts, while 21% said they used seat belts never or hardly ever. In 1991, in New Hampshire alone, the percentage of belted drivers was 49%. Again, the risk is substantial, remediation is simple and inexpensive, but people do not take appropriate action.

Such evidence poses the question of whether assessment of risk can have an impact where individual protective or remedial action is required. The social sciences, and, in particular, psychology, are well equipped to examine the circumstances under which risk assessment can be linked with effective response on the part of the individuals at risk. Professor Freudenburg has called to our attention the fact that people may respond to risk from technological developments with irrationality and dread even when expert assessment suggests that the probability of negative consequences is minute. It may be that a more exigent

3 Id.
6 P. Slovic, Perception of Risk, 236 SCIENCE 280 (1987) as discussed in Freudenburg, supra note 1, at 2.
problem is influencing people to react with appropriate protective action when the risk is substantial and subject to individual control.

This paper is an attempt to consider and clarify some of the variables which are operative in the situation described. As a model, we have chosen the problem of use of seat belts in cars. An analysis of the variables in this example should be generalizable to other analogous problems from testing for radon or using condoms to prevent AIDS to smoking. In order to analyze the seat belt problem, we have conducted a pilot study, the results of which are explained below. Basically, we have found that the multitude of previous attempts to persuade people to deal with collision risk by using protective restraints have failed for predictable reasons. The earlier literature has, however, suggested one possible approach which, at least in this pilot study, has indicated a potentially successful technique. The pilot study manipulated normative social pressure in such a way that individuals' expressed intentions with regard to seat belt use were significantly increased.

Risk

For people aged 5 to 34, traffic accidents are the leading cause of death.\(^7\) For the first six months of 1991, nationwide there were 12,704 traffic fatalities; of these 8,365 were unrestrained, 2,846 restrained and 1,493 unknown.\(^8\) Figures from the state of New Hampshire indicate that, in 1990, 158 deaths and 131 injuries resulted from 140 fatal traffic accidents. Eighty-seven percent of vehicle occupants killed were not known to be wearing safety equipment; however, no children in child safety seats were killed and there was only one child aged 12 or under who died while wearing a seat belt.\(^9\)


An often quoted figure estimates that 50% of traffic deaths and serious injuries could be avoided by the use of seat belts.\textsuperscript{10} According to the National Highway Traffic Safety Administration (NHTSA), the economic cost is estimated at 74 billion dollars annually.\textsuperscript{11} Looking again at figures for the state of New Hampshire, in 1990, in cars with restraints installed, 83 people died and 56 were injured when the restraints were not used compared to 13 deaths and 32 injuries when restraints were used.\textsuperscript{12} The benefits of using seat belts are clear in light of these figures. Nonetheless, seat belt use is not the majority norm in the U.S.; an average of 46\% of American motorists were using seat belts as of January 1990.\textsuperscript{13} It is also interesting to note from this data that the increase in seat belt use seemed to be at a plateau at about 40 to 46\% from 1986 through the beginning of 1990. This is clearly a case of well-known, high expense risk for which preventive or remedial action is inexpensively available but not adopted.

**Review of Literature**

A significant amount of research has been directed toward discovering why seat belts are not used. Fhaner and Hane\textsuperscript{14} surveyed the previous literature and conducted subsequent research designed to identify and respond to reasons for non-use of seat belts.\textsuperscript{15} Fhaner and


\textsuperscript{11} Economic Cost, supra note 10.

\textsuperscript{12} Supra note 9 at 41.

\textsuperscript{13} Buckle-Up, supra note 10.

\textsuperscript{14} G. Fhaner & M. Hane, Seat Belts: Factors Influencing Their Use, 5 ACCIDENT ANAL & PREV. 27 (1973).

\textsuperscript{15} G. Fhaner & M. Hane, Seat Belts: Relations Between Beliefs, Attitude, and Use, 59 J. APPLIED PSYCH. 472 (1974), hereafter Seat Belts; G. Fhaner & M. Hane, Seat Belts: Changing Usage by Changing Beliefs, 60 J. APPLIED PSYCH. 589 (1975); G. Fhaner & M. Hane, Seat Belts: Opinion Affects of Law Induced Use, 64
Hane asked drivers why they did not wear seat belts; reasons given varied from difficulty to unlock or fasten and feeling of discomfort or restraint to harming the driver's image and providing a sense of insecurity. Some respondents felt that wearing a seat belt might cause accidents because the driver might feel "too secure" and drive less carefully.

Studies of reasons for not using seat belts did not lead to successful intervention strategies. More recent research has focused on attempting to identify successful intervention strategies with less concern about specific "reasons" given by respondents. One group of attempted interventions involved the use of vehicle reminder systems. Manufacturers installed in cars such devices as a buzzer that stopped only when belts were buckled and an ignition interlock system requiring front belts to be buckled in order to start the vehicle. The primary problem with such systems is that drivers can disconnect the buzzer or sit on the seat belt to avoid the restraint. In most vehicles today, only a panel light or chime signals the driver to buckle up when the car is started; the signal usually lasts 4 to 8 seconds. One advantage of this type of system is that it is impossible to avoid the chime or light, as supported by 1,492 field observations.

Another approach to safety belt use promotion is mandatory seat belt laws. Through legislation, aversive techniques (fines) are used to encourage compliance. Laws may involve primary enforcement, focusing on seat belt use alone, or secondary enforcement in which primary focus is on enforcing speed limits or other traffic laws. In Canada, enactment of seat belt laws has been followed by increased


16 Seat Belts, supra note 15.


3 RISK – Issues in Health & Safety 199 [Summer 1992]
reported use of seat belts, but the effect was found to be related to other variables at least as much as to the legislation.\textsuperscript{19} A number of states have enacted various pieces of legislation aimed at seat belt use, but, as reported earlier, the percentage of the population actually using seat belts remains low.

Several intervention programs based upon more psychological sorts of variables have been attempted. For a number of years, Geller and his associates have employed a behavior analysis model to create intervention programs which have had varying degrees of success. This body of research is extensively described elsewhere.\textsuperscript{20} Many of Geller's strategies include the use of incentives (prizes, etc.) as positive reinforcement for seat belt use. One program used buckle-up reminder stickers to be applied to vehicle dashboards or windows. In one study, a sticker with the message "Safety Belt Use Required in This Vehicle" was placed in the cars of 24 graduate students; students were asked to keep a record of belt use by passengers before putting the sticker in the vehicle, while the sticker was there, and after removing the sticker.\textsuperscript{21} Before the stickers were applied, the mean belt use of 476 occupants was 34%; after the sticker was implemented, belt use rose to 70%. Removal of the stickers dropped belt use to 41%. Return of stickers boosted belt use to 78% of 392 passengers.


Another approach designed by Geller used the “Flash for Life” reminder flash card which was shown to passengers in cars. The card read, “Please Buckle-Up — I Care.” If, after viewing the flash card, occupants put on their seat belts, the card was reversed to flash the message, “Thank You for Buckling-Up.” The first use of this technique involved 1,087 observations; the person flashing the card was seated in the front seat of a car adjacent to the subject’s car. Of 82% who looked at the card, 22% actually buckled-up. The technique was used again in a study which asked college students to observe safety belt use of the occupants of vehicles entering and exiting the campus. Mean belt use by the drivers of 269 vehicles increased from 19.5% during the one week baseline period to 45.5% of 635 vehicles during the week of “flashing.” During the third week, when the use of the card was discontinued, mean belt use fell to 28.5% of 634 observations. Finally, the flash card was again used during the fourth week, and the percentage of belt use increased to 51.5% of 625 observations. Reminder stickers and flash cards are two examples of the various programs developed by Geller; typically, results of these programs show increased belt use during intervention and a drop toward base line levels when the intervention stops.

Currently, the NHTSA is promoting a campaign in which communities or groups who can demonstrate a 70% participation in buckling-up receive the award of being listed on the 70% Honor Roll and receiving a plaque. Obviously, the strategy is to provide positive reinforcement for compliance.

Other intervention strategies have involved modeling, education and goal setting. For example, when television characters wear seat belts, viewers may model the behavior by learning to buckle-up or being reminded to do so. Educational strategies have been extensively

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24 Buckle-Up, supra note 10.
employed; public campaigns using signs, billboards, television, advertising, radio, films, school programs, slide shows and pamphlets are examples of educational strategies.\textsuperscript{26} Educational strategies are generally designed to promote appropriate behavior by increasing or clarifying perceived risk; ample research evidences that perception of risk is not related to seat belt use.\textsuperscript{27} Goal-setting techniques such as establishing written or verbal commitments have been tried; one program used a buckle-up promise card with some success.\textsuperscript{28}

No intervention has proved to be a panacea. In spite of all efforts, the percentage of people using seat belts remains low. Programs which attempt to change behavior directly simply have not proved sufficiently effective. It is necessary to look elsewhere for ideas for dealing with this kind of risk. Analysis of the behavioral change strategies indicates that while they are effective in the short-term, behavior reverts toward original levels in the long-term, after the intervention has ceased. This suggests that the temporary behavior change is occurring at a very superficial level; thus, for example, programs offering incentives or positive reinforcement for compliance are effective while the reinforcement is available, but the behavior extinguishes when reinforcement ceases.\textsuperscript{29} An effective long-term strategy should be aimed at change at some deeper, internal level of the individual.\textsuperscript{30}

There is research which examines the effects upon seat belt use of interventions directed at attitudes, values, norms, beliefs and opinions. Several studies have drawn theoretical support from Fishbein's Theory of Reasoned Action.\textsuperscript{31} Described in detail elsewhere,\textsuperscript{32} basically, the

\begin{itemize}
\item \textsuperscript{25} Preventing Injuries, \textit{supra} note 20.
\item \textsuperscript{26} \textit{Id.}; Seat Belts, \textit{supra} note 15; G. Fhaner & M. Hane, \textit{supra} note 14.
\item \textsuperscript{27} M. Stasson & M. Fishbein, \textit{supra} note 4.
\item \textsuperscript{28} E.S. Geller & G.R. Lehman, \textit{The Buckle-up Promise Card: A Versatile Intervention for Large Scale Behavior Change}, 24 J. APPLIED BEHAVIOR ANAL 91 (1991).
\item \textsuperscript{29} Preventing Injuries, \textit{supra} note 20.
\item \textsuperscript{30} C.K. Knapper et al., \textit{Attitudinal Factors in the Non-use of Seat Belts}, 8 ACCIDENT ANAL. & PREVENTION 241 (1976).
\item \textsuperscript{31} B.A. Jonah & N.E. Dawson, \textit{Predicting Reported Seat Belt Use From}
theory argues that behavior results from behavioral intentions which, in turn, are the product of attitude toward the act and the subjective norm concerning the behavior. Attitudes are measured by summing beliefs about consequences of the act; beliefs are weighted by the values of the consequences. Measuring the subjective norm involves summing the beliefs about what others expect the individual to do; these elements are weighted by the person's motivation to comply. Thus, Fishbein presents the notion that attitudes and subjective norms are pivotal in establishing behavioral intentions which, in turn, are antecedents of actual behavior. Perceived risk, as in the case of seat belts, would influence behavior indirectly by altering the attitude or subjective norm components. Stasson and Fishbein have discussed health risks and specifically use of seat belts in this context and have concluded that the risk is not related to seat belt use but that intentions, attitudes and subjective norms are. They say:

Thus, in general, a variety of risks (likelihood of accident, likelihood of self or child being injured, likelihood of being charged with not wearing a seat belt) do not appear to be directly related to seat belt usage.

In summary, a major theory of behavioral prediction and previous empirical results indicate that in any given situation (or in general) appropriate measures of intention to wear a seat belt and/or attitude toward wearing a seat belt and subjective norms regarding seat belt use can account for seat belt usage....


32 J. Wittenbraker et al., supra note 31; M. Fishbein, Attitude and the Prediction of Behavior, in READINGS IN ATTITUDE THEORY AND MEASUREMENT 447 (M. Fishbein, ed. 1967); M. FISHBEIN & I. AJZEN, BELIEF, ATTITUDE, INTENTION, AND BEHAVIOR: AN INTRODUCTION TO THEORY AND RESEARCH (1975); I. AJZEN & M. FISHBEIN, UNDERSTANDING ATTITUDES AND PREDICTING SOCIAL BEHAVIOR (1980).

33 M. Stasson & M. Fishbein, supra note 4, at 1534.

3 RISK – Issues in Health & Safety 199 [Summer 1992]
The empirical results which are referred to in the quotation are from descriptive research and deal mostly with the attitude component. For example, Jonah and Dawson used data from telephone interviews in which subjects responded on a seven point Likert scale to eleven belief statements and 1 normative statement ("My family and friends believe that I should always wear a seat belt when I am driving.") and to other measures regarding legislation. As a second normative factor, respondents were asked to estimate how many drivers in their community use seat belts. The criterion variable was reported seat belt use which has been shown to be highly correlated (r=.70) with actual use. Results indicated that "self-reported seat belt use was significantly (p < 0.05) predicted by attitudes toward seat belt use, favorability to the seat belt legislation, social pressure from family and friends, and perceived belt usage by other drivers in the community such that as each of these factors increased, so did seat belt use." (p. 308). The correlation between belt use and attitude was r=.59 (p < 0.05) and between belt use and and social pressure, r=.43 (p < 0.05). Jonah and Dawson concluded that targeting public education in such a way as to increase social pressure would increase use of seat belts. These results were replicated and extended by subsequent research.

Wittenbraker et al. asked subjects to respond to a questionnaire designed to measure behavior, habits, intentions, outcome, evaluations, normative beliefs (whether important others thought subjects should engage in given behaviors), motivation to comply and social desirability. Again, the results supported Fishbein's model. "Attitudes and subjective norms predicted intentions, and intentions predicted behaviors." Habits were also predictive, and Wittenbraker et al. proposed adding habit to the model.

Having reviewed the literature, the authors of the current study concluded that it would be instructive to conduct empirical research in which the role of the subjective norms could be examined as the

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35 B.A. Jonah, supra note 19.
36 Wittenbraker et al., supra note 31.
independent variable. The literature supports the importance of the subjective norm component, but has not studied that component specifically or attempted to develop techniques to manipulate the subjective norm as a technique to encourage appropriate behavior in response to risk.

**Method**

**Independent Variable: Normative Social Pressure**

Norms are defined in social psychology as "widely accepted ideas or rules indicating how people should behave in certain situations." Groups enforce the rules through social influence that takes several interrelated forms. Compliance is acceding to requests. Conformity is changing one’s behavior to fit social norms; conformity for the purpose of gaining approval and acceptance is called normative social influence. Obedience refers to changing behavior in response to a direct order. Modeling is changing behavior to match behavior observed in others.

Attempts to encourage seat belt use have failed because they request (campaigns, programs) or demand (laws) conformity to a norm which does not exist in at least 50% of the population (in fact, the actual norm in some cases is “don’t wear your seat belt”) or they attempt to create a new norm (education, legislation). There is no internalized general societal norm that says wearing seat belts is appropriate behavior. Asking for compliance or conformity with a non-existent norm fails. Likewise, attempts at creating a new norm fail; for example, incentives provide external motivation, but when the incentive ceases, behavior is extinguished because it was dependent on the reinforcement and was not supported by an internalized norm. It may, however, be possible to associate seat belt use with other internalized norms such as the desire to please others and the desire to take care of one’s self. The normative social pressure used in the present study attempts to make these norms salient in the seat belt situation and to associate wearing seat belts with positive feelings related to conforming with these norms.

In line with this analysis, we developed a technique to apply normative social pressure by associating seat belt use with the accepted

norms of taking care of one's self and pleasing others (normative social influence); the technique involved presenting subjects with short scenarios or stories to induce feelings usually associated with these norms. Using stories to induce emotional responses is a technique used in other research and generally referred to as "induction."³⁸

**Dependent Variable: Intention to Wear Seat Belts**

For practical reasons, it was not possible to measure actual seat belt use after introduction of the independent variable. However, the literature relating to Fishbein's model, as discussed above,³⁹ has established the essential link between intention and actual behavior. Thus, the dependent variable was intention to wear seat belts. As a baseline for comparison, the first question asked of all subjects was whether they wear seat belts; again, reported use of seat belts has been shown to be related to actual use.⁴⁰

**Subjects**

Subjects were 206 students at Plymouth State College in Plymouth, New Hampshire. Seventy were male and 136 female; most were in the 18 to 23 age range; 198 were single; only 6 had children; most had at least 5 years of driving experience. The variables of sex, age, marital status, children and driving experience were recorded because of possible correlations with seat belt use. With the exception of sex, however, the distributions were truncated and/or skewed by the use of college students exclusively, and analysis of those variables must await further testing of a broader spectrum of subjects.

**Materials and Procedures**

Questionnaires containing the stimulus materials were administered to subjects in four conditions. Condition 1, the control group, received a questionnaire asking for the base line response, demographics and the

³⁹ B.A. Jonah & N.E. Dawson, supra note 31; M. Stasson & M. Fishbein, supra note 4.
⁴⁰ B.A. Jonah, supra note 19.
measure of the dependent variable. Condition 2 received the demographic questionnaire along with 11 questions developed from previous research literature which purported to measure the subjective norm or normative social pressure. For example, one of the questions included was:

Most people important to me think I should wear a seat belt: Agree 1 2 3 4 5 6 7 Disagree.

Subjects in Condition 3 responded to the same materials as those in Conditions 1 and 2 with the addition of three fictitious scenarios or stories designed to induce normative social pressure. Following each story were seven questions assessing responses to the stories. The measure of the dependent variable followed the entire presentation of stories and questions. For Condition 4, subjects were presented the same material as those in Condition 3 with the addition of a relatively low-key single sentence reminder in each story of possible consequences of failure to use seat belts.

Responses to all questions (with the exception of the base line and demographic questions) were recorded on a Likert-type seven point scale. Questionaires were administered to subjects in classes (with permission of the college human subjects committee and the class instructor as well as informed consent forms signed by each subject). All questionaires were administered within 1 week. One week after the first administration, experimenters returned to the classrooms and re-administered the Condition 1 questionaire to all groups (as a check on delayed reactions) and debriefed all subjects.

**Results**

With regard to risk, the bottom line is whether subjects change behavior in the appropriate direction. Table 1 describes the before and after measures and the change. Although these results are presented simply in terms of percentages, examination of the percentages clearly indicates that change did occur, and it occurred to the greatest extent in the treatment groups. Intention to wear seat belts was 75% in Conditions 3 and 4 after treatment, while, by comparison, it was 59% in

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the control group (Condition 1) and 54% in Condition 2 (previous literature). Actually, all groups showed increases in the percentage of subjects expressing intentions to wear seat belts; it may be that calling attention to the topic in any way produces some change (which would be predicted to be temporary, perhaps even momentary). Yet, the fact that the largest percentage of people expressing intentions to wear seat belts occurred after the presentation of the Condition 3 and 4 normative social pressure stimulus materials encourages belief that these materials were effective.

It also seems that most of the change represents subjects moving out of the "sometimes" or neutral category into the more extreme "always" and "never," or "will" or "won't" categories. Movement in either direction may be interpreted as a response to the independent variable because normative social pressure may result in conformity (positive change, in this case) or reactance, which is defensive reaction to social pressure which would result in rejection of the norm and movement in a negative direction. In general, more people respond to normative social pressure with conformity than with reactance.

It may appear that responses of subjects, particularly of college students in a classroom setting, might be biased by social desirability, i.e. attempts to provide socially acceptable responses. It is unlikely, however, that the observed changes can be so explained for two reasons. First, anonymity was assured. Second, social desirability has been specifically measured in a similar study, and no evidence of bias was found.42

42 J. Wittenbraker et al., supra note 31.
Table 1
Number and Percentage of Subjects Reporting Seat Belt Use (Before) and Intention to Wear Seat Belts (After) as a Function of the Normative Social Pressure Conditions

<table>
<thead>
<tr>
<th>Condition [Σ N]</th>
<th>Frequency of Use</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Always</td>
<td>Sometimes</td>
<td>Never</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>1 [22]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before</td>
<td>9</td>
<td>41</td>
<td>11</td>
</tr>
<tr>
<td>After†</td>
<td>13</td>
<td>59</td>
<td>4</td>
</tr>
<tr>
<td>2 [67]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before</td>
<td>20</td>
<td>30</td>
<td>43</td>
</tr>
<tr>
<td>After†</td>
<td>36</td>
<td>54</td>
<td>18</td>
</tr>
<tr>
<td>3 [65]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before</td>
<td>33</td>
<td>51</td>
<td>23</td>
</tr>
<tr>
<td>After†</td>
<td>49</td>
<td>75</td>
<td>4</td>
</tr>
<tr>
<td>4 [52]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before</td>
<td>18</td>
<td>35</td>
<td>28</td>
</tr>
<tr>
<td>After†</td>
<td>39</td>
<td>75</td>
<td>7</td>
</tr>
<tr>
<td>Total, Indep. Var. [184]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before</td>
<td>71</td>
<td>39</td>
<td>94</td>
</tr>
<tr>
<td>After†</td>
<td>124</td>
<td>67</td>
<td>29</td>
</tr>
</tbody>
</table>

† After: For this measure, the Likert scale measuring intention was collapsed into three categories (Always 1-3, Sometimes 4, Never 5-7)

The group with the greatest change (in terms of percentage) toward using seat belts was Condition 4; 35% originally reported wearing seat belts, but, after the treatment, 75% expressed the intention to wear seat belts in the future. By comparing the control group (Condition 1) with all other conditions, it is possible to determine that the reported seat belt use before treatment was fairly equal for control and experimental subjects (41% and 39%, respectively). However, the "after" percentages (59% and 67%, respectively) indicate considerable change.
Change for all treatment conditions (2, 3 and 4) would be greater if only the data for Condition 3 and 4 were were examined; these, it will be recalled, were the story or scenario treatment conditions. Condition 2 simply involved questions derived from previous research.

Table 2 presents this comparison; the increase in the control group (Condition 1) was 18 percentage points while the story groups (Conditions 3 and 4) showed a 31 percentage point increase. Conditions 2 and 3 represented the same levels of increase (24 percentage points), probably because Condition 3 had an unusually high level of reported belt usage to begin; nonetheless, the 75% expressed intention in Condition 3 is well above the national rate of seat belt use and does suggest a positive influence of the independent variable.

<table>
<thead>
<tr>
<th>Condition [Σ N]</th>
<th>Frequency of Use</th>
<th>Always</th>
<th>%</th>
<th>Sometimes</th>
<th>%</th>
<th>Never</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td></td>
<td>9</td>
<td>41</td>
<td>11</td>
<td>50</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>After†</td>
<td></td>
<td>13</td>
<td>59</td>
<td>4</td>
<td>18</td>
<td>5</td>
<td>23</td>
</tr>
<tr>
<td>Scenario Condition (3 and 4) [117]</td>
<td></td>
<td>51</td>
<td>44</td>
<td>51</td>
<td>44</td>
<td>15</td>
<td>13</td>
</tr>
<tr>
<td>After†</td>
<td></td>
<td>88</td>
<td>75</td>
<td>11</td>
<td>9</td>
<td>18</td>
<td>15</td>
</tr>
</tbody>
</table>

† After: For this measure, the Likert scale measuring intention was collapsed into three categories (Always 1-3, Sometimes 4, Never 5-7)

In order to establish whether the observed changes are statistically significant, it is necessary to analyze the data using something other than percentages. Accordingly, a Chi Square analysis is reported in Table 3.43 Basically, this compared the base line response (before) to the

43 See, e.g., A.A. Siegel, Statistics and Data Analysis (1988).
expressed intention (after) in terms of whether the respondent said “yes” or “no” to seat belt use. Chi Square was computed for each condition of the independent variable separately (four 2X2’s) and for all conditions together (2X8). As Table 3 shows, all of the Chi Square computations were found to be statistically significant at the p < .01 level except for Condition 1, which was the control group. In other words, significant changes occurred in all of the treatment groups. At the p < .05 level of significance, all Chi Square computations were found to be statistically significant, even the control group. This may be interpreted as suggesting that anything which calls seat belt use to people’s attention may increase their intentions to wear seat belts, at least momentarily. However, the higher level of significance found in the treatment groups suggests that the treatment increases the effect.

Table 3
Chi Square Analysis of Change Toward Wearing Seat Belts as a Function of Experimental Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>X² Model</th>
<th>X² Value</th>
<th>Significance (p &lt; .01)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2X2</td>
<td>6.0</td>
<td>no</td>
</tr>
<tr>
<td>2</td>
<td>2X2</td>
<td>34</td>
<td>yes</td>
</tr>
<tr>
<td>3</td>
<td>2X2</td>
<td>14</td>
<td>yes</td>
</tr>
<tr>
<td>4</td>
<td>2X2</td>
<td>32</td>
<td>yes</td>
</tr>
<tr>
<td>Σ</td>
<td>2X8</td>
<td>88</td>
<td>yes</td>
</tr>
</tbody>
</table>

The only demographic variable analyzed was sex. Table 4 describes the results as a function of sex. The total number of females was twice the number of males; this may follow from the fact that most of the classes tested were social science classes. The number of males in the control group (Condition 1) was small. Nonetheless, examination of the percentage indicates that more women reported using seat belts to begin with, and more women than men expressed the intention to wear seat belts at a level higher than the baseline level (note the 87% and 84% intentions expressed in Conditions 3 and 4, respectively). This suggests that women were more easily persuaded by the normative social pressure as might be predicted by the use of induction. Induction is designed to produce certain feelings, and women, because of their
socialization, may be more easily influenced by the technique. In order to test these apparent effects, we calculated Chi Square analyses for each condition for each sex.

### Table 4
Number and Percentage of Subjects Reporting Seat Belt Use (Before) and Intention to Wear Seat Belts (After) as a Function of Control Group Versus Scenario Groups

<table>
<thead>
<tr>
<th>Condition [( \Sigma N, \Sigma Male, \Sigma Female )]</th>
<th>Sex Frequency of Seat Belt Use</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Always</strong></td>
<td><strong>Sometimes</strong></td>
<td><strong>Never</strong></td>
</tr>
<tr>
<td><strong>N %</strong></td>
<td><strong>N %</strong></td>
<td><strong>N %</strong></td>
<td><strong>N %</strong></td>
</tr>
<tr>
<td>1 [22, 5, 17]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before</td>
<td>1 20</td>
<td>2 40</td>
<td>2 40</td>
</tr>
<tr>
<td>After(^\d)</td>
<td>3 60</td>
<td>0 0</td>
<td>4 40</td>
</tr>
<tr>
<td>2 [67, 19, 48]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before</td>
<td>3 16</td>
<td>13 68</td>
<td>3 26</td>
</tr>
<tr>
<td>After(^\d)</td>
<td>5 26</td>
<td>7 37</td>
<td>7 37</td>
</tr>
<tr>
<td>3 [65, 26, 39]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before</td>
<td>11 42</td>
<td>8 31</td>
<td>7 27</td>
</tr>
<tr>
<td>After(^\d)</td>
<td>15 58</td>
<td>3 12</td>
<td>8 31</td>
</tr>
<tr>
<td>4 [52, 20, 32]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before</td>
<td>4 20</td>
<td>12 60</td>
<td>4 20</td>
</tr>
<tr>
<td>After(^\d)</td>
<td>12 60</td>
<td>3 15</td>
<td>5 25</td>
</tr>
<tr>
<td><strong>Total IV</strong> [184, 65, 119]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before</td>
<td>18 28</td>
<td>33 51</td>
<td>14 21</td>
</tr>
<tr>
<td>After(^\d)</td>
<td>32 49</td>
<td>12 20</td>
<td>20 31</td>
</tr>
<tr>
<td><strong>Total Subjects</strong> [206, 70, 136]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before</td>
<td>19 27</td>
<td>35 50</td>
<td>16 23</td>
</tr>
<tr>
<td>After(^\d)</td>
<td>35 50</td>
<td>13 19</td>
<td>22 31</td>
</tr>
</tbody>
</table>

\(^\d\) After: For this measure, the Likert scale measuring intention was collapsed into three categories (Always 1-3, Sometimes 4, Never 5-7)
As Table 5 demonstrates, the Chi square analyses support the conclusions drawn from observation of the percentage data. Results for men were non-significant except in Condition 4 which had the highest level of normative social pressure. For women, the results were significant in all treatment conditions, supporting the notion that women were more influenced by normative social pressure than were men.

**Table 5**
Chi Square Analysis of Change Toward Wearing Seat Belts as a Function of Experimental Conditions and Sex of Subjects

<table>
<thead>
<tr>
<th>Condition</th>
<th>Sex</th>
<th>$\chi^2$ Model</th>
<th>$\chi^2$ Value</th>
<th>Significance ($p &lt; .01$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
<td>2X2</td>
<td>1.7</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>2X2</td>
<td>0.47</td>
<td>no</td>
</tr>
<tr>
<td>2</td>
<td>Male</td>
<td>2X2</td>
<td>0.63</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>2X2</td>
<td>8.2</td>
<td>yes</td>
</tr>
<tr>
<td>3</td>
<td>Male</td>
<td>2X2</td>
<td>1.2</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>2X2</td>
<td>9.1</td>
<td>yes</td>
</tr>
<tr>
<td>4</td>
<td>Male</td>
<td>2X2</td>
<td>6.7</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>2X2</td>
<td>8.2</td>
<td>yes</td>
</tr>
</tbody>
</table>

**Discussion**

This pilot study has supported the findings of previous literature that normative social pressure can be used to increase the protective behavior of individuals faced with risk of death or injury in cars. It is also apparent that we have identified a technique which can be used to manipulate normative social pressure. We are encouraged to proceed with the refinement of the stimulus materials and testing procedures. In addition, a number of questions have presented themselves during the course of the investigation and should be pursued. The study should be expanded to include subjects of various ages and subjects with children. Time should be a variable; intention to wear seat belts should be measured at various times after the treatment to discover whether the
effects are permanent. Actual seat belt use should be observed and related to intention. Responses to the questions should and will be subjected to factor analysis in an effort to determine the social norms and influence involved and, in general, to learn more about the effects of normative social pressure.

From the standpoint of dealing with risk, the most important group of additional studies are those in which normative social pressure may be used in an attempt to encourage people to protect themselves from risks other than automobile accidents. It is necessary to test this procedure with a variety of risks such as smoking, radon, AIDS, cholesterol, speeding, failure to use protective gear in sports, failure to use helmets when riding motorcycles, failure to follow safety procedures in the workplace, etc.

Perhaps the main contributions of the pilot study to risk analysis are to demonstrate how the social sciences can be applied to solving risk problems and to exemplify how such applications may result in actual attempts at behavioral change rather than merely descriptions. The ability to analyze and predict risk accurately will be of little value if people cannot be persuaded to engage in appropriate protective behavior.