A UNIVERSITY-BASED INCENTIVE PROGRAM TO INCREASE SAFETY BELT USE: TOWARD COST-EFFECTIVE INSTITUTIONALIZATION

JAMES R. RUDD AND E. SCOTT GELLER

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

A cost-effective incentive program to increase safety belt use was implemented by the campus police of a large university. For each of the 3-week intervention periods during three consecutive academic quarters, the 22 campus police officers recorded the license plate numbers of vehicles with drivers wearing a shoulder belt. From these numbers, 10 raffle winners were drawn who received gift certificates donated by community merchants. Faculty and staff increased their belt usage markedly as a result of the "Seatbelt Sweepstakes," whereas students increased their belt use only slightly. A cost-effectiveness analysis indicated that the sweepstakes cost an average of \$0.98 per each newly buckled driver. During each sweepstakes intervention, officers' belt usage increased significantly, but diminished to initial baseline levels after the final withdrawal of the program. Surveys of officers' opinions indicated that the police would accept the program demands as a regular task requirement. This result and the fact that program promotion and coordination were eventually taken over by two student organizations suggest that institutionalization of the "Seatbelt Sweepstakes" is feasible.

DESCRIPTORS: behavioral community intervention, transportation behavior, seat belts, police-delivered rewards, incentives, driver safety, cost-effectiveness

One of the most critical problems facing society today is the tremendous risk on the nation's highways. More than 45,000 deaths and 500,000 injuries occur each year to occupants of motor vehicles (Bigelow, 1982), and vehicle accidents are the leading cause of fatalities to U.S. children and young adults ("Accident Facts," 1981). This is certainly one of the greatest tragedies of our society; but even more tragic is the fact that only about

15% of the vehicle occupants in the U.S. wear a safety belt, which could reduce the chance of death and serious injury from a vehicle accident by 55% or more (*Federal Register*, 1984). On the Virginia Tech campus (the site of our study), over 250 accidents occurred during academic year 1983-1984, with 41 resulting in injuries serious enough to warrant emergency medical care (*Virginia Tech Police Department Records*, 1984).

This research served as partial fulfillment for the first author's Master of Science degree from Virginia Polytechnic Institute and State University. The second author chaired the committee, with other members being David A. Bownas, Lee W. Frederiksen, and Richard A. Winett. Preparation of this document was supported in part by Contract DTRS57683-C-0050 from the U.S. Department of Transportation and Contract DE84-5-58005 from the Virginia Division of Motor Vehicles.

We gratefully acknowledge the assistance of Cheryl Bruff, Steven Clarke, Fifi Emami, Sandra Forrest, Phillip Maddox, Sharon McGourty, James Nimmer, Agustin Reyna, Fritz Streff, Ann Talton, and the Virginia Tech Police Department. Helpful support and advice were provided by Dr. Doug Gurin of the National Highway Traffic Safety Administration and Police Chief Ray Lewis of Virginia Tech.

Requests for reprints, copies and results of the student telephone survey and police questionnaire, and *daily* percentages of shoulder belt use for all drivers should be sent to E. Scott Geller, Department of Psychology, Virginia Tech, Blacksburg, Virginia 24061.

In 1981, the U.S. National Highway Traffic Safety Administration (NHTSA) launched a nationwide effort to increase safety belt usage, and this campaign has been enhanced considerably with large-scale applications of incentive strategies (Bigelow, 1982). Several research projects have documented the beneficial impact of safety belt incentives in a variety of environmental settings, including industries (Campbell, Hunter, Stewart, & Stutts, 1982; Geller, 1982; Geller & Hahn, 1984), shopping malls (Elman & Killebrew, 1978), high schools (Campbell et al., 1982), and banks (Geller, Johnson, & Pelton, 1982; Johnson & Geller, 1984).

The results of these studies prompted NHTSA to promote the implementation of communitywide incentive programs for safety belt promotion. For

example, NHTSA sponsored communitywide incentive programs in six localities: Dover, New Jersey; Fresno, California; Kalamazoo, Michigan; Natchitoches, Louisiana; San Antonio, Texas; and Suffolk County, New York. Vehicles were approached at intersections and occupants wearing safety belts were offered rewards donated by community merchants (Geller, 1984). Similar community incentive programs have been implemented in Chapel Hill, North Carolina (Campbell, Hunter, Gemming, & Stewart, 1984), Helena, Montana (A. Goke, personal communication, November, 1983), and Jacksonville, Mississippi (Long, 1983).

These attempts to motivate safety belt use in the community have largely been implemented by research groups and funded by federal and state grants. Such demonstration projects have shown substantial communitywide increases in safety belt use, but the interventions have been short-term and costly. For example, the program in Chapel Hill cost well over \$30,000 for the incentives during a 6-month intervention, and the federal government spent \$82,000 in Natchitoches to hire people to stand at the town's 23 traffic lights and pass out prizes (U.S. is Trying Safety 'Bribes,' 1983). Given only transient impact of most short-term incentive programs for safety belt promotion (e.g., see review by Geller, 1984), community-based safety belt programs should attempt to obtain institutionalization of incentive schemes by encouraging the indigenous businesses, institutions, and social groups of a community to initiate and continue program efforts. This was a prime consideration in the study reported here.

The police department is one service agency that may reap immediate payoffs for implementing a community safety belt program. Tactics to improve community relations between police officers and citizens are sorely needed and improved community relations have long been a goal of law enforcement agencies nationwide (Harris, 1982). By designating police officers as the delivery agents of an incentive-based safety belt campaign, it was hypothesized that not only would safety belt usage

increase, but citizens would perceive the incentive strategy as a genuine show of community concern by police officers. In this study, we investigated the efficacy of a university-based safety belt program that was implemented and maintained by an organization indigenous to the community (i.e., the campus police department) and evaluated independently by a research staff.

For all of the community-based programs implemented so far, those who observed drivers' shoulder belt usage for evaluation purposes were also the individuals who delivered the rewards (Geller, 1984). Thus, these observer/reward administrators could have served as discriminative stimuli for some motorists to buckle up, and this was in fact observed by some researchers (e.g., Campbell et al., 1984). As reviewed by Geller (1984), several studies of belt wearing at industrial sites have shown this "observer bias" to increase safety belt wearing. In this research, we addressed this evaluation problem by using observers who were unobtrusive and independent of those delivering rewards for safety belt use.

METHOD

Participants and Setting

The study was conducted on the campus of Virginia Polytechnic Institute and State University (Virginia Tech) during the fall, winter, and spring academic quarters of 1983–1984. During the project period, Virginia Tech, located in Blacksburg, Virginia (population, 30,000), had an enrollment of 21,357 students, employed 2,033 faculty, and 3,267 staff, and issued vehicle parking stickers to approximately 5,200 faculty/staff drivers and 18,300 students. Although the study was aimed primarily at the Virginia Tech community, any vehicle driver who traversed the campus was a potential participant.

Eighteen different locations (six per quarter) around the campus were selected as observation sites to provide a sample of vehicles representative of the entire Virginia Tech community. Vehicles were observed 6 days a week, Monday through

TECH POLICE SAY
'Get Caught Buckled Up'
to enter

SEATBELT SWEEPSTAKES 1

■ **Who?**

Anyone Driving on Campus

■ **When?**

November 1st until November 18th

■ **How?**

The Tech Police will record License No. of cars driven by belt wearers.

Get noticed by giving the "Seat Belt Salute."

■ **Why?**

\$20 to \$500 in prizes awarded to 10 raffle winners per week.

The more you are caught . . . the greater your chances to win.

Get in the habit of Buckling Up. If not for yourself, for someone you love . . .

Figure 1. A poster describing the specifics of the Seatbelt Sweepstakes 1. Large posters (11" × 15") were placed on bulletin boards throughout the university, and smaller versions (8" × 11") were located in classrooms and lecture halls.

Saturday. On each of these days a different observation site was chosen as the data collection point, and sites were rotated according to a Latin Square arrangement (i.e., each site fell on a different day

of the week for each 6-week period). Observation sessions occurred daily from 8:00 a.m. to 9:00 a.m., 4:00 p.m. to 5:00 p.m., and 8:00 p.m. to 9:00 p.m.

General Observation Procedure

As vehicles passed an observation site, two observers independently spoke into a hand held microphone the vehicle license plate number, shoulder belt availability, and whether the driver was wearing a shoulder belt. If the vehicle had a Virginia Tech parking sticker, the color of the sticker was also noted. Police cars were noted separately. There was no attempt to observe every vehicle that passed an observation site. After completing the data recording of a particular vehicle, the observer looked up and targeted the next available vehicle. Occasionally, communication occurred between the two observers, to ensure that at least one-third of the vehicles were being observed by both observers. The two observers stood on the sidewalk of the observation site and, as inconspicuously as possible, recorded vehicle and occupant data. Although the observers were visible to vehicle occupants, at no time during the study was it made public that the observers were collecting data on safety belt usage. When observers were asked what they were doing, they replied that they were taking an "automobile survey for a research grant." If the pedestrian or driver questioned further, he or she was given the office address of the second author.

Experimental Conditions

Fall baseline. Field observations occurred for 31 consecutive weekdays and nights (i.e., excluding Sundays). During the last 3 days of fall baseline, promotional tickets were placed under the windshield wipers of parked automobiles to announce the upcoming intervention phase.

Fall intervention. Through a variety of promotional activities (e.g., news releases, fliers, posters) implemented by research assistants and the Virginia Tech police, the faculty, students, and staff of Virginia Tech and residents of Blacksburg and the surrounding area were made aware of the "Virginia Tech Police Department's Seatbelt Sweepstakes 1." (Details of the promotional aspects for the entire program are available from the second author on request.) Specifically, it was announced that beginning November 1 (the first day

of the intervention), Virginia Tech police would record the license plate numbers of drivers they saw wearing their shoulder belts. Figure 1 is a reduction of the 9" × 14" (23 cm × 36 cm) poster used to promote Seatbelt Sweepstakes 1. The posters for subsequent sweepstakes included logos of student organizations that assisted in the promotion and coordination of the program.

For three 1-week periods, the 22 campus police officers across three work shifts recorded license plate numbers of drivers wearing shoulder belts. At the end of each intervention week, the week's license plate numbers were entered into a raffle conducted by the police chief and a prominent university official (e.g., university president, college dean, student body president, editor of the school newspaper). Ten winners were picked weekly and each chose prizes valued from \$20 to \$450 that had been donated by local merchants. The Virginia Tech police, using a Virginia Division of Motor Vehicles computer linkup, matched winning license plate numbers with names. Officers who submitted the winning license numbers were offered dinners-for-two donated by local restaurants (these incentives were faded out during the course of the study and were not offered during the third intervention period). Data were collected for 17 consecutive weekdays (excluding Sundays).

Fall withdrawal. The withdrawal period began the Monday following the last intervention week. Most of the promotional material used in the intervention phase had announced the date for the discontinuation of Seatbelt Sweepstakes 1. Observers recorded vehicle and occupant data in the same manner as described above for 18 consecutive weekdays (excluding Sundays).

Winter baseline. Baseline data collection for the winter quarter began 27 days after the discontinuation of the withdrawal period of the fall term, and occurred for 17 consecutive weekdays. Four days before the end of the baseline condition, promotional efforts similar to those used in the fall were initiated to announce the start of the next intervention phase.

Winter intervention. The three drawings were

identical to those described for Sweepstakes 1, with 10 winners choosing prizes ranging in value from \$20 to \$120 and donated by local merchants and the Virginia Tech police. During winter quarter, the distribution of promotional materials and solicitation of area merchants for prizes was handled by a volunteer student service organization (i.e., Circle-K, the student affiliate of the Kiwanis Club) with the occasional assistance of research students.

The observation procedures were the same as those followed during winter baseline with one alteration in the data collection schedule. Each day, data were collected either for the morning and afternoon sessions or for the evening session. This alternate sampling began on the 9th day of Sweepstakes 2 and continued throughout the remainder of the study. This change, which was made to contain research costs, had no effect on the Latin Square design, in that observation sites continued to be rotated every day and shoulder belt usage continued to be computed on a daily basis. Observers recorded vehicle and occupant data for 16 consecutive weekdays (excluding Sundays).

Winter withdrawal. The withdrawal period began the Monday following the discontinuation of Sweepstakes 2 and ran for 20 consecutive weekdays. Observers continued to record vehicle and occupant data.

Spring baseline. Baseline data collection for the spring quarter began 18 days after winter withdrawal and continued for 23 consecutive weekdays. Three days before the end of this condition, promotional efforts were initiated to announce the start of the next intervention phase.

Spring intervention. The implementation and promotion of "Seatbelt Sweepstakes 3" occurred in the same fashion as the other sweepstakes, with 10 winners per each of 3 weeks choosing prizes valued from \$20 to \$180. The observation procedures were the same as those described previously and continued for 19 consecutive weekdays (excluding Sundays). Poster distribution and merchant solicitation were handled entirely by two student service organizations (Circle-K and the campus Consumer Interest Organization).

Spring withdrawal. This withdrawal period began the weekday following the termination of Sweepstakes 3 and ran for 12 consecutive days (excluding Sundays).

Cost-Effectiveness

A cost-effectiveness analysis was conducted to identify all *direct* costs incurred during program promotion and implementation. This analysis focused on two aspects: (a) the computation of program expenses, and (b) the estimated average program cost per newly buckled driver over the entire academic year (i.e., from fall baseline to spring withdrawal).

Telephone Surveys

To assess students' awareness of the sweepstakes and their attitudes toward the Virginia Tech police, a telephone survey was developed and randomly administered. Telephoning occurred during the second week of each experimental condition. During the same time periods, these telephone interviews were administered to students at a nearby college (i.e., Radford University; enrollment, 6,285). Using Likert-type, 7-point scales, students were asked their opinions regarding the value and competence of the police. Beginning in November (during Sweepstakes 1) and during all subsequent interviews, students were also asked if they had heard of the Seatbelt Sweepstakes and if so, how they had heard of it.

Police Questionnaire

At the end of each quarter (i.e., during each withdrawal period), questionnaires with Likert-type, 7-point scales were administered to all regular police officers to assess their perceived involvement and satisfaction with the Seatbelt Sweepstakes. In addition, officers were asked to rate the feasibility of the program and to offer suggestions for improvements.

Additional Measures

The daily numbers of parking and moving violation citations issued prior to, during, and after

Figure 2. Mean weekly shoulder belt use for all drivers. BL1 = fall baseline; SS1 = Seatbelt Sweepstakes 1; WD1 = fall withdrawal; BL2 = winter baseline; SS2 = Seatbelt Sweepstakes 2; WD2 = winter withdrawal; BL3 = spring baseline 3; SS3 = Seatbelt Sweepstakes 3; WD3 = spring withdrawal.

each of the sweepstakes were compared. Also, the frequency of license plate numbers entered in each raffle was recorded as a measure of officer involvement in each sweepstakes.

RESULTS

Interobserver Reliability

Independent data recordings were made for 26,763 (35.0%) of the 76,504 vehicles observed. Rater agreement percentages were determined separately for occurrences and nonoccurrences of the target behavior and were calculated by dividing the total number of observations agreed on for a particular data category by the total number of agreements and disagreements and multiplying by 100. The percentage of agreement for shoulder belt availability was 96.1% for occurrences and

63.3% for nonoccurrences; agreement for shoulder belt use was 82.6% for occurrences and 95.1% for nonoccurrences.

Shoulder Belt Usage

Figure 2 shows the weekly percentages of shoulder belt use for all drivers observed during the fall, winter, and spring quarters. Each data point in Figure 2 represents a weekly mean of 2,550 observations (range = 1,534 to 3,345), with the 30 data points representing a total of 76,504 observations. Only 9.3% of 84,348 total vehicles observed were not equipped with shoulder belts; these vehicles were not included in the analyses. As can be seen in Figure 2, shoulder belt usage increased over the academic year, from a fall baseline mean of 16.6% to a spring withdrawal mean of 24.3%.

Each incentive intervention was associated with an increase in shoulder belt usage, and shoulder

Figure 3. Mean weekly shoulder belt use for faculty/staff, students, and noncampus drivers. BL1 = fall baseline; SS1 = Seatbelt Sweepstakes 1; WD1 = fall withdrawal; BL2 = winter baseline; SS2 = Seatbelt Sweepstakes 2; WD2 = winter withdrawal; BL3 = spring baseline 3; SS3 = Seatbelt Sweepstakes 3; WD3 = spring withdrawal. Due to a computer failure, a plot of spring baseline data according to type of driver was not possible.

belt usage remained higher than initial baseline after withdrawal of incentives. Given 23,454 registered drivers on campus and an increase of 7.7 percentage points from fall baseline 1983 to spring withdrawal 1984, the program influenced an estimated 1,800 individuals to begin buckling up while driving on the Virginia Tech campus.

Figure 3 represents a breakdown of mean shoulder belt use according to: (a) faculty/staff drivers, (b) student drivers, and (c) noncampus drivers. Due to a computer failure, an analysis of spring baseline data according to type of driver was not possible. From fall baseline to spring withdrawal, shoulder belt usage increased 64.2%, 30.5%, and 40.4%, respectively, for faculty/staff, students, and noncampus drivers.

Table 1 summarizes the shoulder belt usage data, showing mean usage percentages by experimental condition as well as by type of driver. In addition, mean shoulder belt usage percentages are shown for the Virginia Tech police. The numbers in parentheses represent the frequencies of observations per cell.

The baseline period for the police data included belt wearing percentages before and after the presentation of a 40-min awareness workshop session we conducted to introduce them to the program and describe its potential value. Prior to this education intervention, officer usage was 52.4% ($n = 96$); afterwards, officer belt wearing increased to 91.2% ($n = 100$). It is noteworthy that a departmental policy requiring officer shoulder belt use

Table 1
Mean Shoulder Belt Use During Baseline, Sweepstakes, and Withdrawal Periods

	Faculty	Students	Noncampus	Police	Overall
Baseline	19.3% (<i>n</i> = 3,284)	15.4% (<i>n</i> = 4,159)	15.6% (<i>n</i> = 3,750)	71.8% (<i>n</i> = 196)	16.6% (<i>n</i> = 11,389)
Sweepstakes 1	33.2% (<i>n</i> = 2,195)	23.9% (<i>n</i> = 2,867)	19.3% (<i>n</i> = 2,242)	87.2% (<i>n</i> = 109)	25.8% (<i>n</i> = 7,413)
Withdrawal	27.9% (<i>n</i> = 2,403)	18.7% (<i>n</i> = 3,088)	15.9% (<i>n</i> = 2,752)	79.5% (<i>n</i> = 112)	20.4% (<i>n</i> = 8,355)
Baseline	25.3% (<i>n</i> = 2,796)	16.5% (<i>n</i> = 3,515)	16.8% (<i>n</i> = 4,359)	72.8% (<i>n</i> = 112)	18.9% (<i>n</i> = 10,782)
Sweepstakes 2	31.7% (<i>n</i> = 1,872)	19.6% (<i>n</i> = 2,330)	20.8% (<i>n</i> = 2,809)	83.0% (<i>n</i> = 62)	23.4% (<i>n</i> = 7,073)
Withdrawal	29.9% (<i>n</i> = 963)	20.6% (<i>n</i> = 1,432)	19.2% (<i>n</i> = 1,762)	84.0% (<i>n</i> = 39)	22.3% (<i>n</i> = 4,196)
Baseline	•	•	•	•	22.3% (<i>n</i> = 10,351)
Sweepstakes 3	33.5% (<i>n</i> = 2,815)	21.4% (<i>n</i> = 2,893)	23.5% (<i>n</i> = 3,235)	78.5% (<i>n</i> = 42)	26.0% (<i>n</i> = 8,985)
Withdrawal	31.7% (<i>n</i> = 1,230)	20.1% (<i>n</i> = 1,112)	21.9% (<i>n</i> = 1,841)	72.7% (<i>n</i> = 22)	24.3% (<i>n</i> = 4,205)

Note. Only those vehicle observations that included a notation of the availability of a parking sticker are included.
• During the spring phase, baseline data were not available for this categorization due to a computer failure.

had been put into effect immediately prior to fall baseline. Thus, prior to the awareness workshop session, 47.6% of the officers ignored this safety belt mandate. Officers' shoulder belt usage increased substantially with the implementation of each sweepstakes even though the officers were not eligible to win prizes. However, after the third withdrawal of the incentives, officer belt usage dropped to preprogram levels (i.e., 71.8% vs. 72.7% for fall baseline and spring withdrawal, respectively), indicating that the increase in officer safety belt wearing beyond that obtained with a mandate and education was transient, i.e., only apparent during program implementation.

Cost-Effectiveness

The cost-effectiveness analysis included computation of the costs of promoting the program, the costs incurred in soliciting prizes from merchants, the monies expended in distributing promotional materials, and the value of the prizes for Sweepstakes 1, 2, and 3.

The number of drivers newly buckled as a result of the Seatbelt Sweepstakes was estimated by calculating the percent increase in shoulder belt usage from fall baseline to spring withdrawal and multiplying this outcome by 235 (235 is 1% of the total number of drivers registered at Virginia Tech). The costs for each newly buckled driver were calculated by dividing the net total program costs (i.e., the total cost of the program minus the value of the incentives) by the number of newly buckled drivers.

The cost-effectiveness analysis indicated that it cost an average of \$0.98 per newly buckled driver from fall baseline to spring withdrawal, with total program costs amounting to \$1,783. Of course, these costs would have been higher had the program not received support from the two Virginia Tech student organizations and the Blacksburg merchants. Had the two student organizations not volunteered their time and the merchants not donated prizes, the average projected costs for the entire program would have been \$3.19 per

newly buckled driver (with total projected costs of \$5,769). None of these estimates include research costs (i.e., program development and evaluation).

Telephone Surveys

Of the 2,300 surveys planned, 1,622 (70%) were administered. Other questionnaires were not administered because the interviewer was unable to reach the student for an interview or the student reported no opinion of the police department. A $2 \times 2 \times 8$, School (Virginia Tech vs. Radford University) $\times$ (driver vs. nondriver) $\times$ (month of interview), multivariate analysis of variance (MANOVA; Tatsuoka, 1971) was conducted on each of the three criterion measures (general opinion, value, and competency). The analysis, using weighted means for unequal cell sizes, used Wilk's lambda as the test for significance. In general, the MANOVA showed no statistically significant improvement in student attitudes toward Tech police as a function of the Seatbelt Sweepstakes. It is noteworthy, however, that opinions toward the police were quite favorable during each measurement session (e.g., a mean composite score of 5.7 on a 7-point scale, with 7 representing the maximum positive opinion), and thus, an absence of significant findings may have been due to restriction of range.

By asking students at the end of the interview whether they had heard of the Seatbelt Sweepstakes, a measure of the students' awareness of the program was obtained. In general, students quickly became informed of the program, with 78.4% of those interviewed during November indicating they knew of the program. By the end of Sweepstakes 3, over 90% had heard of the sweepstakes and knew the specifics of its implementation.

Police Questionnaire

In general, the officers reported that (a) their delivery of the sweepstakes was a positive experience, (b) administering the incentive intervention was not especially difficult, and (c) the Virginia Tech students were reacting in a more positive fashion toward the police, specifically as a result of the Seatbelt Sweepstakes.

Parking and Moving Citations

A $3 \times 3 \times 3$ (work shift $\times$ quarter $\times$ experimental phase) ANOVA for daily frequency of parking and moving citations indicated only a main effect for work shift, $F(2, 683) = 84.45$, $p < .0001$, with officers issuing an average of 50.7 tickets per day during the 7:00 a.m.–3:00 p.m. work shift, 15.5 tickets per day during the 3:00 p.m.–11:00 p.m. work shift, and an average of 7.1 tickets per day during the 11:00 p.m.–7:00 a.m. work shift. The absence of any other effect suggests that the officers' daily issuance of speeding and parking tickets was not hindered by the delivery of the sweepstakes.

Raffle Entries

In general, officers recorded a surprisingly large number of license plate numbers for each of the sweepstakes. Specifically, the officers recorded 3,443 entries during Sweepstakes 1; 1,625 raffle entries during Sweepstakes 2; and 1,791 raffle entries during Sweepstakes 3. Because officers' raffle entries stabilized and remained high over the course of Sweepstakes 2 and 3 (despite the withdrawal of officer rewards during Sweepstakes 3 for collecting winning license plate numbers), it appears that the officers accepted the implementation of the sweepstakes as a part of their regular ongoing duties.

DISCUSSION

The implementation of the Seatbelt Sweepstakes on the Virginia Tech campus increased shoulder belt usage for university-affiliated drivers as well as drivers not affiliated with Virginia Tech, and some belt usage was maintained after the withdrawal of the incentive programs. Although the mean gain in usage from fall baseline to spring withdrawal represented a 46% increase, the gains in belt wearing as a result of the incentive conditions were not as large as those reported in other community-based attempts to motivate safety belt use. One possible explanation for this difference is that the data collectors in this study were not the delivery agents (as in all other community-based safety belt programs); therefore, the observers in

this study did not serve as discriminative stimuli to buckle up. Also, other communitywide incentive programs to promote safety belt use delivered more frequent and more valuable rewards than this one (see review by Geller, 1984). Furthermore, this difference may also be partially due to the relatively long-term nature of this study. Indeed, the data collected during the fall quarter, which represents a duration comparable to most prior incentive programs for safety belt promotion (corporate or community-based), showed an impact equivalent to that of the more successful community incentive programs reported previously (cf. Geller, 1984). Thus, the more rigorous design of the study reported here may have mitigated the influence that previously uncontrolled variables (i.e., obtrusive observers, static data collection schedule) might have had on the change in the level of shoulder belt usage.

The evaluation of the successive sweepstakes showed a stepwise increase in shoulder belt usage over successive withdrawal periods. Analogous results were found in Canada with a response cost approach to safety belt promotion. Jonah, Dawson, and Smith (1982) showed successively greater compliance to a safety belt mandate as a function of periodic introductions of a "selective traffic enforcement program" (STEP), whereby the Canadian seat belt law received a publicity and enforcement blitz.

Faculty and staff were more likely to buckle up as a function of the campus incentive intervention than were either students or off-campus drivers. Although it is not surprising that noncampus drivers were less likely to buckle up, the substantially lower program impact on students as compared to faculty and staff was unexpected and disappointing. There are a number of possible explanations. For instance, drivers aged 16 to 24 are not as likely to buckle up as the rest of the driving population in general (Bragg & Finn, 1981); therefore, a student population may be more resistant to attempts to motivate safety belt use. The irregular driving schedule of university students may also have contributed to the lower intervention impact of this group. Because classes are offered Monday,

Wednesday, and Friday, or on Tuesday and Thursday, or sometimes on only 1 day a week, many students did not drive to school everyday, perhaps making it more difficult for them to establish a buckle-up habit.

During fall baseline, the campus police officers were observed buckled up almost five times more often than the rest of the campus. This high rate of belt usage was no doubt due to the preprogram implementation of a departmental mandate and educational program for safety belt use. During each sweepstakes, however, officer usage increased noticeably. Apparently, implementing a safety belt incentive program (with prior education and accompanying publicity) increased the likelihood of officers behaving in a manner consistent with the goals of the program.

In general, the increases in shoulder belt usage were disappointing. The results of this study indicate that although incentives can increase the rate of shoulder belt usage, larger increases in usage are not only desirable but necessary to make a significant social impact on the rate of traffic injuries and fatalities.

Follow-up studies should assess the impact of a package approach, with the use of incentives as one of a number of behavior change components. For example, incentives could be combined with a safety belt mandate. Indeed, the use of an incentive approach could possibly make a safety belt mandate more palatable not only to citizens but also to the officers tasked with enforcing the mandate.

Incentives could also be combined with the public posting of usage feedback. Horne and Terry (1983) reported that a combination of incentives and feedback resulted in the doubling of safety belt wearing (from 36% to 70%) at the General Motors Technical Center in Warren, Michigan. Increases in shoulder belt use in our study may have been larger had students, faculty, and staff been exposed to feedback signs in conjunction with the incentive program. Perhaps rewards could have been delivered contingent on campus drivers reaching a certain level of shoulder belt usage. Although Nau and Van Houten (1981–1982) found public posting to be only marginally effective in increasing

shoulder belt use, larger effects of public posting were found in a Canadian province where a safety belt law was in effect (Grant, Jonah, Wilde, & Ackersville-Monte, 1983). Perhaps optimal increases in shoulder belt usage may be realized with a combination of a mandate, public feedback, and incentives.

A major consideration in the design of the police-administered program reported here was the development of a cost-effective plan feasible for long-term application in various settings (e.g., other college and university campuses or the community at large). The cost-effectiveness analysis indicated that on a per capita basis, the program cost approximately \$1.00 for every newly buckled driver. It is noteworthy that the analysis used a measure of residual rather than full impact in computing program effectiveness (i.e., the cost-effectiveness analysis was based on usage during withdrawal rather than during the sweepstakes), and therefore, this measure was a conservative estimate of the program's impact. In addition, the \$1,783 expended for the incentive intervention represents a very small investment for a program that can provide invaluable returns (i.e., the reduction of serious accident injuries or the saving of a life). Indeed, one graduate student credited the Seatbelt Sweepstakes with saving her husband's life, and a coed who recently was uninjured because she was buckled up when her pick-up truck rolled over three times claimed that she had been wearing her safety belt because of the campus program.

The most significant finding of the police survey was that not only did officers indicate that students were responding more favorably toward them after the safety belt program was in place, but that this improvement was attributed specifically to the Seatbelt Sweepstakes. This suggests that implementing a safety belt incentive program can improve officers' perceptions of increased goodwill between the police department and the citizenry. A critical empirical question is whether this is also the case when police officers enforce safety belt mandates.

There have not been any previous investigations of possible side effects when implementing a safety

belt program. A statistical analysis of the parking and speeding violation data indicated no differences in ticket issuances across the baseline, sweepstakes, and withdrawal phases of the study. This permanent product data provided a reliability check for the officers' verbal reports that the sweepstakes did not interfere with their regular ongoing duties, and this information also supported the long-term feasibility of a police-administered safety belt program. Commendable officer involvement in the safety belt program was also shown by the fact that the 22 full-time regular police collected nearly 7,000 raffle entries during the course of the study and raffle entries did not drop off during Sweepstakes 3, when officers were no longer offered incentives for collecting license plate numbers.

Perhaps the most positive outcome of the study was the fact that by the time of Sweepstakes 3, the program was almost entirely managed, promoted, and administered by the Virginia Tech police and two student organizations. Indeed, plans are under way for a continuation of the program into the 1984-1985 academic year, with the campus police again delivering the program and the two student organizations handling promotion and coordination. In addition, the security officers of Wytheville Community College in Wytheville, Virginia, and the police departments in Sante Fe, New Mexico, and Roanoke, Virginia, have developed safety belt promotion programs that are modeled directly after the police-delivered Seatbelt Sweepstakes at Virginia Tech. Perhaps the enforcement of a state mandate to buckle up (as passed recently in New York, New Jersey, Illinois, and Michigan) could be made more palatable to police and the public (with increased beneficial impact) if a police-administered incentive program for safety belt wearers were combined with monetary fines for nonuse of safety belts.

REFERENCES

- Accident Facts.* (1981). National Safety Council, Chicago, IL.
- Bigelow, B. E. (1982, June). The NHTSA program of safety belt research. *SAE Technical Paper Series* (No. 820797), 400 Commonwealth Drive, Warrendale, PA.

- Bragg, B. W. E., & Finn, P. (1981). *Young driver risk-taking research: Experimental plan*. Cambridge, MA: Abt Associates.
- Campbell, B. J., Hunter, W., Gemming, M., & Stewart, J. (1984). *Seat belts pay off: The use of economic incentives and public information to increase seat belt use in a community*. Chapel Hill, NC: University of North Carolina Highway Safety Research Center.
- Campbell, B. J., Hunter, W. W., Stewart, J. R., & Stutts, J. C. (1982, October). *Increasing safety belt use through an incentive program*. Final report for Innovative Grant Project 4-A22 from the U.S. Department of Transportation, University of North Carolina, Highway Safety Research Center, Chapel Hill, NC.
- Elman, D., & Killebrew, T. J. (1978). Incentives and seatbelts: Changing a resistant behavior through extrinsic motivation. *Journal of Applied Social Psychology*, 8, 72-83.
- Federal Register. (1984, July). *Federal motor vehicle safety standards: Occupant crash protection. Final rule*. Vol. 48, No. 138, Washington, DC: U.S. Department of Transportation.
- Geller, E. S. (1982, October). *Corporate incentives for promoting safety belt use: Rationale, guidelines, and examples*. Final report for Contract DTNH22-82-P-05552 from the U.S. Department of Transportation, Washington, DC.
- Geller, E. S. (1984). Motivating safety belt use with incentives: A critical review of the past and a look to the future. In *Advances in belt restraint systems: Design, performance, and usage* (No. 141), Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.
- Geller, E. S., & Hahn, H. A. (1984). Promoting safety belt use at industrial sites: An effective program for blue-collar employees. *Professional Psychology: Research and Practice*, 15, 553-564.
- Geller, E. S., Johnson, R. P., & Pelton, S. L. (1982). Community-based interventions for encouraging safety belt use. *American Journal of Community Psychology*, 10, 183-195.
- Grant, B. A., Jonah, B. A., Wilde, G. J. S., & Ackersville-Monte, M. (1983, June). The use of feedback to encourage seat belt wearing. Technical Memorandum TMRU 8301, Road Users Division, Transport Canada, Ontario.
- Harris, I. (1982). New approaches to community relations programs. *Police Chief*, 24-26.
- Horne, T. D., & Terry, T. (1983). *Seat belt sweepstakes—An incentive program*. SAE Technical Paper Series (No. 830474). Warrendale, PA: Society of Automotive Engineers.
- Johnson, R. P., & Geller, E. S. (1984). Contingent versus noncontingent rewards for promoting seat belt usage. *Journal of Community Psychology*, 12, 113-122.
- Jonah, B. A., Dawson, N. E., & Smith, G. A. (1982). Effects of a selective traffic enforcement program on seat belt use. *Journal of Applied Psychology*, 67, 84-96.
- Long, N. D. (1983, November). *Promoting safety belt use in Jacksonville, Mississippi with the use of incentives*. Presentation at the Governor's 1983 Conference on Highway Safety, Charleston, SC.
- Nau, P. A., & Van Houten, R. (1981-1982). The effects of prompts, feedback and an advertising campaign on the use of safety belts by automobile drivers in Nova Scotia. *Journal of Environmental Systems*, 11, 351-361.
- Tatsuoka, M. M. (1971). *Multivariate analysis*. New York: John Wiley.
- U.S. is trying safety 'bribes.' (1983, November 6). *The New York Times*.
- Virginia Tech Police Department Records. (1984). Virginia Polytechnic Institute and State University, Blacksburg, VA.

Received October 10, 1984

Final acceptance March 28, 1985