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A Commitment/Incentive Program to Increase Safety Belt Use on a University Campus

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16. Abstract

Safety belt use on a university campus was substantially increased by offering faculty/staff and students who signed and returned "buckle up" pledge cards the opportunity to win prizes donated by community merchants. The 28,000 pledge cards, committing signers to buckle up for an academic quarter, were distributed during the Spring and Fall of 1985. One portion of the card was designed to be hung from a vehicle's rearview mirror as a reminder of the pledge to buckle up. The other portion served as a sweepstakes ticket and was deposited in boxes located throughout the campus community. Each quarter, winners were drawn from the returned pledge cards during three consecutive weeks. Although a relatively small proportion of the pledge cards were signed and turned in (i.e., 14.3% during Spring and 9.4% during Fall), those who signed and returned a pledge card (n = 3117) increased their safety belt use significantly. Across both quarters, faculty/staff pledgers went from a high pre-pledge belt use level of 56.4% to a post-pledge level of 75.9%, and students who signed pledges increased their belt use from a pre-pledge use of 49.3% to a post-pledge level of 69.8%.

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Preface

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Executive Summary

Incentive and commitment strategies were integrated in an attempt to increase the use of vehicle safety belts among the students, faculty, and staff at a major state university with 23,500 vehicles registered with the campus police. Before, during, and after two intervention periods, the use of shoulder belts by front seat occupants was observed each weekday from 8:00 a.m. to 9:00 a.m. or from 4:00 p.m. to 5:00 p.m. at five different locations on the university campus. The two intervention procedures consisted of distributing buckle-up pledge cards and raffle boxes throughout the campus community including the premises of contributing merchants. Subsequently, three weekly public raffles were held during each intervention period whereby 10 winning pledge cards were randomly drawn. Winners selected from a list of prizes ranging from $20 to $800 in value that were donated by community merchants. Participants could also win prizes by hanging a designated portion of the pledge card from the rearview mirror of their vehicle, because each week during the intervention period the campus police officers placed five prize coupons under the windshield wipers of parked vehicles that displayed the buckle-up reminder. Faculty, students, and staff were informed of the "Pledge Card Sweepstakes" through a variety of promotional strategies, including news releases, flyers and posters. Also, the pledge cards, containing sweepstakes instructions, were placed under the windshield wipers of vehicles parked in campus parking lots (approximately 9,000 per intervention period).

Of the total 10,000 pledge cards distributed during the first intervention period (Spring 1985), 14.3% were signed and entered in the sweepstakes. During the second intervention period (Fall 1986), 18,000 pledge cards were distributed and of these, 9.4% were entered in the lotteries. Since participants included their vehicle license plate number on their entries and since vehicle license plate numbers were recorded in the field (along with safety belt use), it was possible to track the safety belt use of pledge card signers before and after they signed and returned a buckle-up pledge. During baseline observations, those who signed pledge cards were more apt to use their safety belt than nonsigners (i.e., 48.8% mean belt use for 927 signers observed during baseline vs. 27.6% mean belt use for 10,110 nonsigners observed during baseline). Most importantly, the act of signing and returning a pledge card increased safety bel use signficantly. Specifically, faculty and staff pledgers increased their belt use from a baseline (pre-pledge) use of 56.4% (n = 170) to a post-pledge level of 75.9% (n = 208), and students who signed pledge cards increased their safety belt use from a pre-pledge use of 49.3% (n = 203) to a post-pledge level of 69.8% (n = 334). It is noteworthy that during follow-up observation (i.e., after the three-week intervention periods), the safety belt use of the pledge card signers did decrease significantly, but remained above the pre-pledge belt use levels.

Gender data (collected only during the second half of the study) showed females to be buckled up significantly more often than males (i.e., 53.4% mean belt use for 2,380 females vs. 47.5% mean belt use for 2,955 males). Also, strong modeling effects were found in the comparison of safety belt use by drivers vs. front-seat passengers. More specifically, 95.1% of the passengers with unbuckled drivers were also unbuckled, and 68.0% of the passengers with buckled drivers were likewise buckled up. Thus, the individual responses of front seat passengers with regard to safety belt use were significantly more likely to be the same than different.

The cost-effectiveness of the "Pledge Card Sweepstakes" was comparable to that of an earlier campus incentive program that involved a more direct rewarding of actual safety belt use. The pledge-card approach was less labor intensive than the direct reward program, and in various settings it is a more feasible approach to promoting safety belt use. The theoretical foundation of this commitment intervention is discussed, as well as its special social marketing advantages.

Introduction

Some estimate the traffic accident to be the most significant public health problem in the U.S., given that it is the leading cause of death among people age 5 to 34, and results in more than 2 million disabling injuries per year (Sleet, 1984). Since the consistent use of a vehicle safety belt would likely reduce fatalities and injuries from vehicle crashes by at least 50% (Federal Register, 1983), the large-scale promotion of safety belt use is an urgent and critical target for primary prevention in public health.

Previous Interventions to Increase Safety Belt Use

Over the past several years, a variety of interventions have been designed and implemented to increase safety belt use in the U.S. from a low nationwide level of 15% (Tarrants, 1984). These intervention strategies can be categorized as: (a) engineering approaches such as buzzer/light reminders and ignition interlock systems (Geller, Casali, & Johnson, 1980; Robertson, 1975), (b) legal mandates that require belt use at industries, institutions, or throughout entire states (Insurance Institute for Highway Safety, 1985); (c) mass media campaigns that promote safety belt use on T.V. and radio (Robertson, Kelley, O'Neill, Wixon, Eisworth, & Haddon, 1974); (d) education and awareness sessions at industrial sites, schools and civic organizations (Campbell, Hunter, Stewart, & Stutts, 1982; Geller & Hahn, 1984); (e) community-based reminders such as highway signs, flash cards, and bumper and dashboard stickers (Geller, Bruff, & Nimmer, 1985; Thyer & Geller, in press); and (f) incentive/reward programs implemented at specific corporate, business, and government locations (e.g., Geller, 1983; Geller & Bigelow, 1984) and throughout entire communities (Campbell, Hunter, Gemming, & Stewart, 1984; Geller, 1984).

The Benefit of Incentives

Incentive strategies have been particularly promising as a method of increasing safety belt use because they are relatively simple to implement, readily accepted by drivers, and produce immediate and prominent increases in safety belt wearing (e.g., see reviews by Geller 1984; Geller, Lehman, Rudd, Kalsher, & Streff, 1986). The beneficial impact of safety belt incentives has been demonstrated in a variety of environmental settings, including several industries (Campbell et al., 1982; Geller & Hahn, 1984), banks (Geller, Johnson, & Pelton, 1982; Johnson & Geller, 1984), a shopping mall (Elman & Killebrew, 1978), a high school (Campbell et al., 1982), a hospital (Nimmer & Geller, in press), and a large university campus (Geller & Rudd, 1985; Rudd & Geller, 1985).

Previous Use of Incentives on a University Campus

The university incentive program, called "Seatbelt Sweepstakes," evaluated by Rudd & Geller (1985) was particularly noteworthy because it was implemented by indigenous personnel (the university police and local student organizations), and

therefore had the potential of becoming institutionalized. Specifically, for each three-week intervention period during three academic quarters, campus police officers recorded license plate numbers of vehicles with drivers wearing a shoulder belt. Each week, ten winners, drawn from these numbers, received gift certificates donated by community merchants. This large-scale, police-administered incentive program resulted in a significant long-term increase in shoulder belt use (i.e., from an overall baseline belt use mean of 16.6% to a withdrawal mean of 24.3%).

A possible disadvantage of the incentive program developed by Rudd & Geller (1985) was that the increase in shoulder belt use was more attributable to behavior change among faculty/staff than students, who are more likely to be involved in a vehicle accident. Interviews with students and anecdotal evidence suggested that the program's promotion strategies may have reached proportionately more faculty/staff than students. On the other hand, it is just as reasonable to attribute the lower program impact among students to the overall greater risk taking and lower safety belt use among drivers aged 16 to 24 (Bragg & Finn, 1981).

The Commitment/Incentive Program

A university-based safety belt program, called "Pledge Card Sweepstakes," was implemented and evaluated in the current study. It included a promotional component with greater dissemination potential and a reward contingency that was easier to administer than the 1984-85 Seatbelt Sweepstakes developed and evaluated by Rudd and Geller (1985). Also, this pledge card intervention included a commitment component which had the potential of eliciting intrinsic (or internal) motivation for facilitating response maintenance, after program withdrawal (Deci, 1975; Deci & Ryan, 1980).

Method

Participants and Setting

The study was conducted on the campus of Virginia Polytechnic Institute and State University (Virginia Tech). Data were collected during two academic years, 1984-85 and 1985-86. During the project period, Virginia Tech, located in Blacksburg, VA (pop. = 40,000) had an enrollment of approximately 22,000 students, and employed 2,100 faculty and 3,300 staff. The campus police department issued vehicle registration stickers to approximately 5,200 faculty/staff drivers and 18,300 students.

General Observation Procedure

Vehicles were observed Monday through Friday from 8:00 a.m. to 9:00 a.m. or from 4:00 p.m. to 5:00 p.m. at five different locations around the Virginia Tech campus. Each day, the time periods and observation sites were rotated according to a prearranged schedule in an attempt to obtain a representative sample of the Virginia Tech driving population.

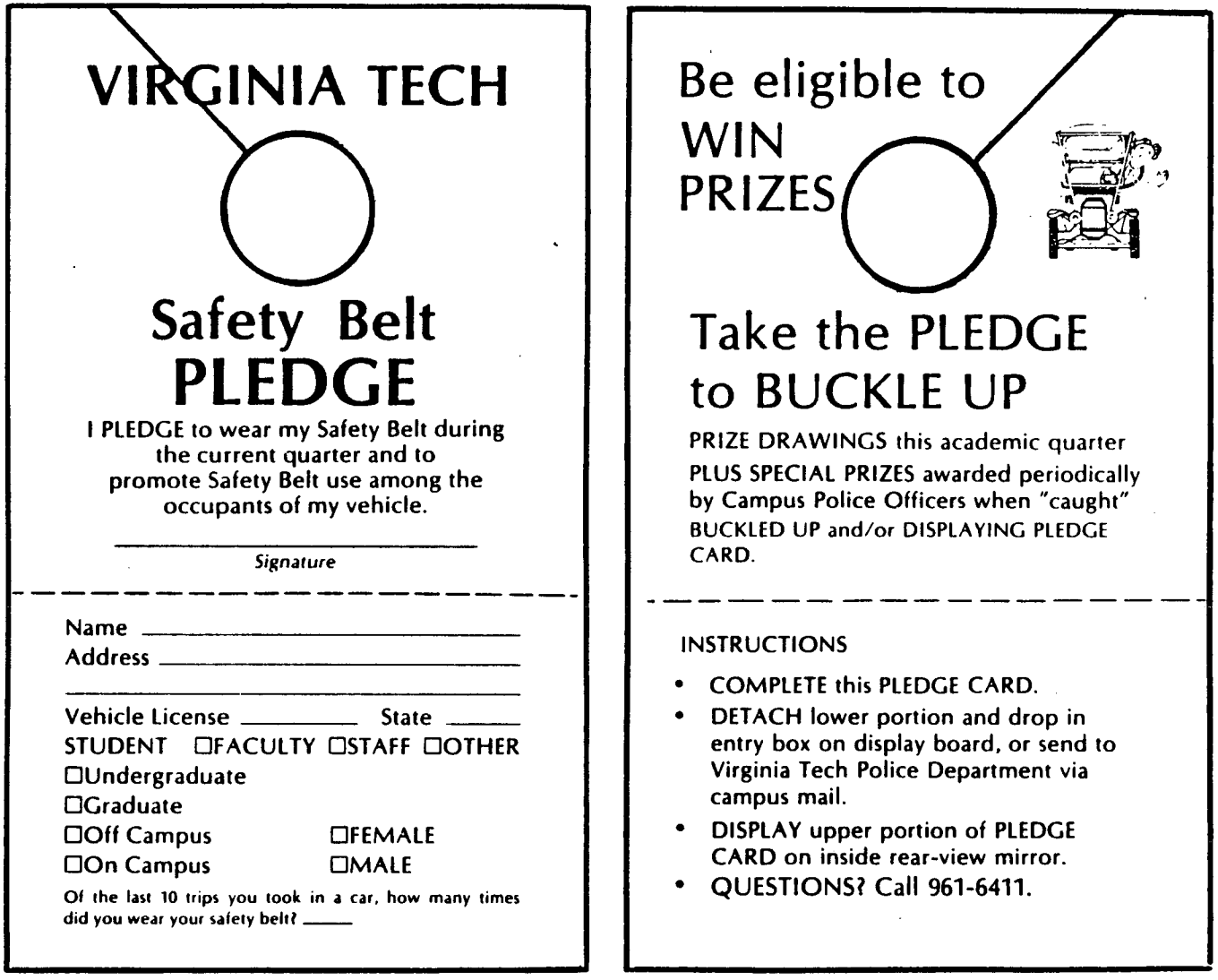
As vehicles passed the observation site, two observers independently verbalized relevant vehicle information into hand-held tape recorders. The observers stood far enough away from each other to prevent interference with the other's data collection. During the first year of the study (1984-85), the observations for each vehicle included license plate number, shoulder belt availability, and whether the driver was wearing a shoulder belt. During the second year (1985-86) data regarding driver gender, front-seat passenger shoulder belt use and front-seat passenger gender were also collected. Observers also noted the color of the pledge card if the driver displayed the card on their rearview mirror.

Sometimes it was not possible to observe every vehicle that passed the observation site. After recording the data for a particular vehicle, the observer looked up and targeted the next available vehicle. Occasionally, communication occurred between the two observers in order to ensure that at least 20% of the vehicles were being recorded by both observers.

Pledge Cards Used as Sweepstakes Tickets

Personal commitments to buckle up were solicited campuswide by distributing pledge cards under windshield wipers of cars in campus parking lots and at numerous campus and community locations. Drivers were instructed to fill out and return part of the pledge card form (see Figure 1 on the following page). The top part of the card was designed to be hung on the inside rearview mirror. To increase pledge card signing, three consecutive weekly drawings (by prominent university officials) were held. Each week, ten prizes were given to the winners drawn from the pool of cards deposited in the collection boxes located at various campus and community sites.

Figure 1. THE TWO SIDES OF THE SAFETY BELT PLEDGE CARD USED DURING THE FALL 1985 "PLEDGE CARD SWEEPSTAKES".



FRONT BACK

In addition, drivers could become "instant winners" of prizes distributed by campus police if they displayed the top portion of the card on their rearview mirror. Specifically, while issuing daily parking tickets, campus police officers placed prize coupons (i.e., five per week) on selected vehicles with pledge cards hanging from their rearview mirror. These coupons were redeemed for prizes (valued from $10 to $50) at the campus police department.

Sequence of Experimental Conditions

Spring 1985 Baseline. The observers recorded vehicle and occupant data as inconspicuously as possible. 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 use. If observers were asked what they were doing, they replied that they were taking an "automobile survey for a research grant." Observers recorded vehicle and occupant data for 25 consecutive weekdays (Monday through Friday).

During the last two days of baseline data collection, promotional materials were distributed around campus to announce the upcoming intervention, and pledge cards were placed under the windshield wipers of automobiles parked on campus.

Spring 1985 Pledge Card Sweepstakes. Through a variety of promotional strategies (e.g., news releases, flyers, posters), the faculty, students, and staff of Virginia Tech were made aware of "Pledge Card Sweepstakes 1" sponsored by the Virginia Tech Police Department. Specifically, it was announced that beginning May 1st, drivers on the Virginia Tech campus could be eligible for weekly prize drawings by simply pledging to buckle up for the remainder of the 1985 Spring academic quarter.

Pledge cards were placed under the windshield wipers of approximately 9,000 vehicle parked in campus parking lots. Pledge cards, collection boxes, and promotional posters (see Figure 2 on the following page) were placed in the stores of 15 area merchants who contributed prizes for the drawings and at 18 campus sites (e.g., student union, faculty/staff motor pool, book store, library, classroom buildings, and police department).

Public prize drawings were held on three consecutive weeks. The ten winners were announced eash week in local newspapers and on radio and television. Each winner received a prize valued from $20 to $450. Also, each week campus police awarded five "instant winner" prizes by placing coupons under windshield wipers of parked vehicles with the upper portion of the pledge card hanging from the inside, rearview mirror. Note that these prizes were not given as a direct reward for using a safety belt, rather the instant winner prizes simply rewarded drivers who displayed their signed pledge card. Observations of safety belt use were made on 15 consecutive weekdays during the intervention period.

Figure 2. POSTER USED TO PROMOTE PLEDGE CARD SWEEPSTAKES.

Spring 1985 Withdrawal. The Withdrawal period began on Monday following the last intervention week. Most of the promotional material used during the intervention phase had announced the termination date for "Pledge Card Sweepstakes 1." Observers recorded vehicle and occupant data for four weekdays during withdrawal.

Fall 1985 Baseline. Baseline data collection for the Fall 1985 academic quarter began four months after terminating the Withdrawal period of the prior Spring program and occurred for ten consecutive weekdays. The data collection procedures were the same as those followed during the Spring program except that observations included driver gender, front-seat passenger shoulder belt use, and front-seat passenger gender. Four days before the end of the Baseline condition, promotional strategies similar to those used in the Spring were initiated to announce the next intervention.

Fall 1985 Intervention. The implementation and promotion of "Pledge Card Sweepstakes 2" occurred in the same fashion described previously except that 18,000 (rather than 10,000) pledge cards were distributed. Ten winners in each weekly drawing received prizes valued from $20 to $800. The top prize, a trip for two to the Bahamas that included air travel and hotel accomodations for five days, was publicized in local newspapers and on the radio. Each week campus police officers placed five instant winner prize coupons under the windshield wipers of parked vehicles with a pledge card hanging from the inside rearview mirror. Data collection during the intervention period continued for 17 consecutive weekdays.

Fall 1985 Withdrawal. The Withdrawal period began immediately after termination of "Pledge Card Sweepstakes 2". Observers collected driver and passenger data for six days.

Winter 1986 Follow-up. Follow-up data collection began during the Winter 1986 quarter, two months after termination of Fall Withdrawal and continued intermittently for 16 days during the next two months.

Pledge Card Sweepstakes Entries

The number of pledge card entries received during the Spring and Fall 1985 programs were recorded. Since pledge cards were color coded during the "Pledge Card Sweepstakes 2" (i.e., maroon cards were distributed at pledge card collection box sites and orange cards were placed under the windshield wipers of parked cars), it was possible to determine which distribution method produced more participation. The portion of the pledge card returned in both programs also contained questions regarding gender and university affiliation (i.e., faculty, staff, or student). The Fall 1985 pledge cards also included a question which asked drivers to estimate their safety belt use over the last ten times they drove.

Results

Pledge Card Signing

During the Spring 1985 program, 10,000 pledge cards were distributed to various locations around campus and placed under the windshield wipers of vehicles parked on campus lots. Of these 10,000 cards, 1,432 (14.3%) were signed by campus drivers and entered in the Spring 1985 Sweepstakes. Female drivers returned 680 (47.4%) signed pledge cards and male drivers returned 744 (52.0%) cards. Eight card signers did not specify their gender.

Signed pledge cards were returned by 4.5% of the undergraduate and graduate students (970 cards from 21,357 students). The faculty and staff drivers (5,300 employees) returned 397 signed cards for a participation rate of 7.5%.

For the Fall 1986 program, 18,000 cards were distributed and 1,685 (9.4%) were entered into the lottery. Again, male and female drivers returned approximately the same number of signed cards (51%, n = 861 and 49%, n = 824 respectively).

Like the previous program, faculty and staff had a higher participation rate (returned 450 cards, 8.5% participation) than undergraduate and graduate students (returned 1162 cards, 5.4% participation). Participation in the second Sweepstakes increased among both groups. Total participation increased from 5.4% in the first program to 6.3% in the second Sweepstakes. The increased participation may have been due to the increased number of pledge cards distributed in the second program.

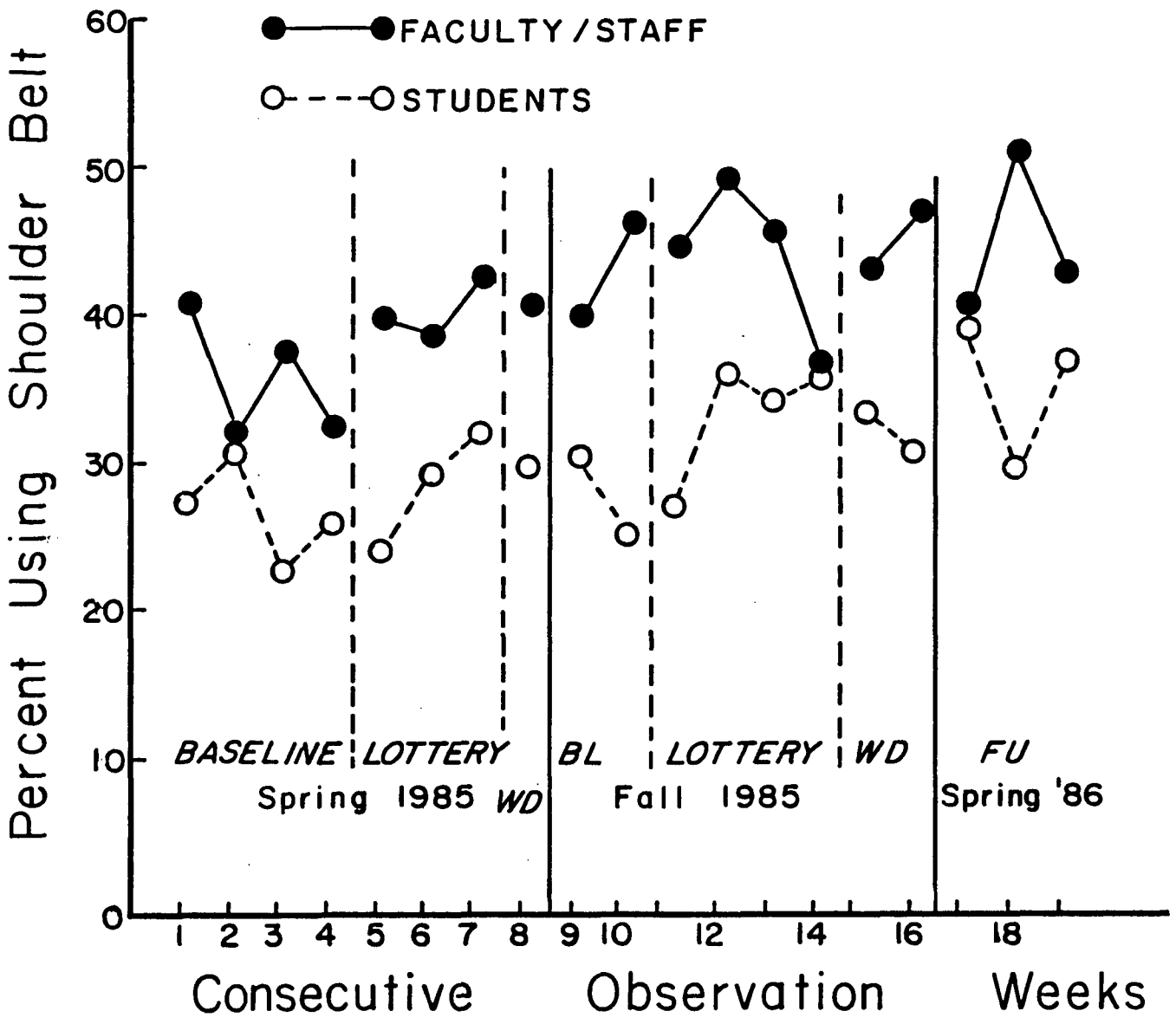
Shoulder Belt Use: Overall

Figure 3 on the following page displays mean weekly shoulder belt use as a function of vehicle category, i.e., faculty/staff drivers versus student drivers. This vehicle categorization was accomplished by comparing the observed license plate numbers with the computer file of registered vehicles maintained by the campus police department.

Faculty/staff safety belt use increased from a Spring 1985 Baseline rate of 36.0% (n = 3400) to a Spring 1986 Follow-Up rate of 46.7% (n = 409), a 30% increase. Student drivers increased their safety belt use from a pre-program rate of 25.3% (n = 2918) to a Spring 1986 Follow-Up rate of 36.6% (n = 320), a 45.0% increase above Baseline.

To assess statistically the impact of the two pledge card programs, a 2 (Type of Driver: Faculty/Staff vs. Student) x 3 (Experimental Condition: Baseline, Intervention, Withdrawal) x 2 (Program Year: Spring 1985 vs. Fall 1985) ANOVA was performed on the daily safety belt use means. This three-way factorial showed

Figure 3. MEAN WEEKLY SHOULDER BELT USE FOR FACULTY/STAFF AND STUDENT DRIVERS THROUGHOUT THE RESEARCH PERIOD. (BL = Baseline, WD = Withdrawal, FU = Follow Up).



a main effect for the academic year in which the program was conducted, with drivers during the Fall of 1985 being more likely to buckle up than those drivers observed in the Spring of 1985, $F(1,150) = 11.08$, $p < .005$. Shoulder belt wearing for all drivers during the Fall of 1985 averaged 39.2% ($n = 5437$) versus 33.2% ($n = 6375$) for drivers during the Spring of 1985.

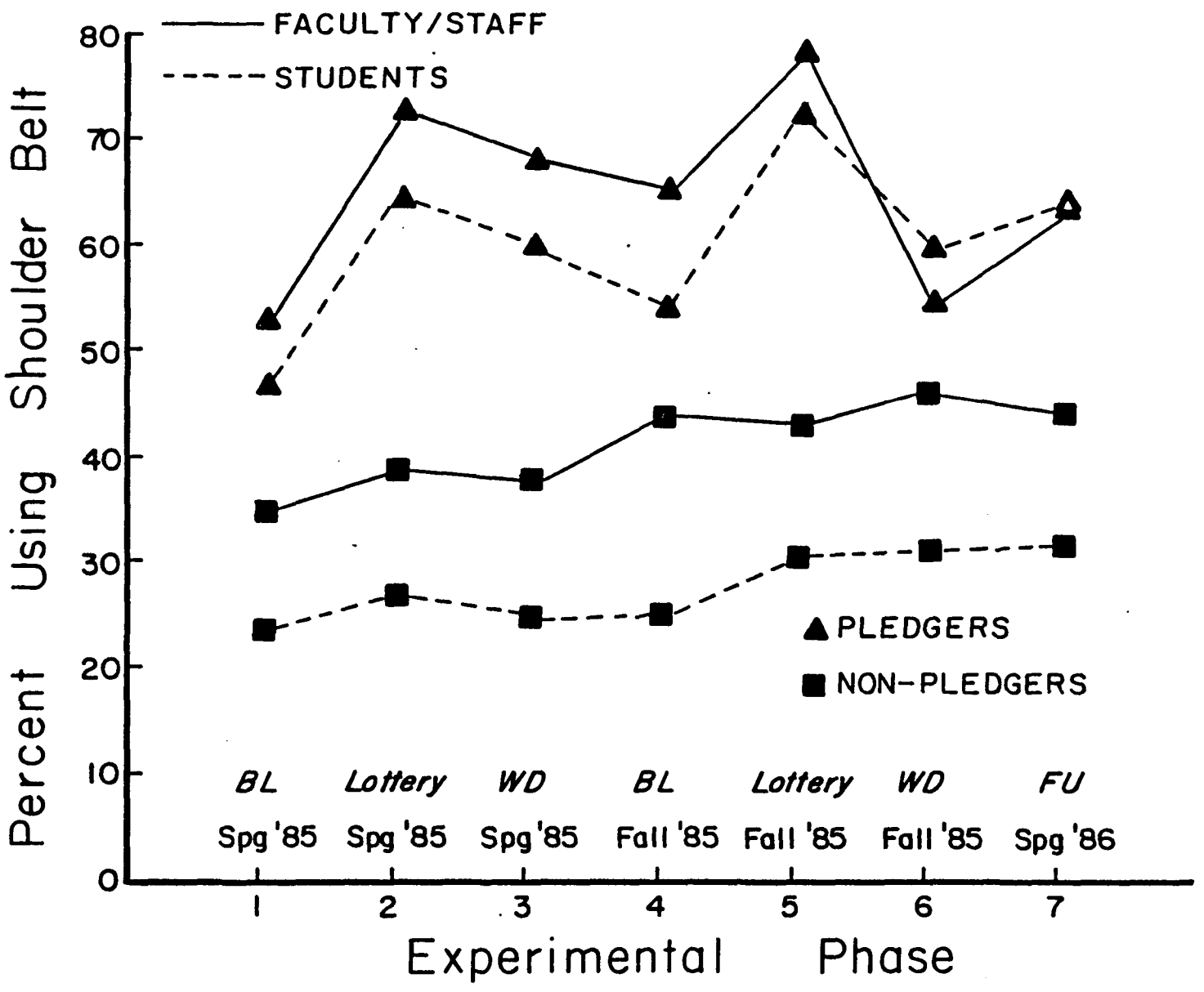
The overall ANOVA also indicated a main effect for experimental condition, $F(2,150) = 5.40$, $p < .01$, with drivers being significantly more likely to be buckled up during the two pledge card interventions, [$M = 38.1$, $n = 5829$, $t(150) = 3.35$, $p < .05$] and during the two withdrawal phases [$M = 36.2$, $n = 1264$, $t(150) = 3.35$, $p < 05$] than in the baseline conditions [$M = 33.3\%$, $n = 4719$]. A main effect was found for type of driver, $F(1,150) = 76.72$ ($p < .0001$), with faculty/staff drivers being much more likely to buckle up ($M = 41.6$, $n = 5362$) than student drivers ($M = 30.0$, $n = 6450$) across all conditions. None of the interactions were significant.

Shoulder Belt Use: Pledge Signers vs. Non-Signers

Drivers wrote their vehicle license plate number on the returned portion of the pledge card. This information was used to trace pledge signers through the course of the study. Although pledge card signers (both faculty/staff and students) were much more likely to be buckled up during the baseline phase than nonsigners ($M = 48.8\%$ for 927 signers observed during baseline vs. 27.6% for 10,110 nonsigners observed during baseline), pledge card signing markedly increased safety belt use. Specifically, the mean safety belt use of faculty/staff pledge signers was 72.9% ($n = 96$) during the Spring Sweepstakes (a 38.3% increase over their high Spring baseline of 52.7% belt use), and was 78.6% ($n = 112$) during the subsequent Fall pledge period (a 20% increase from a record-high baseline of 65.5%). Similarly, students who signed pledge cards during the Spring program were buckled up for 46.6% of the observations ($n = 131$) during baseline and for 64.5% ($n = 121$) of the observations during the sweepstakes intervention (a 38.4% increase). During the following Fall quarter, students who signed pledge cards had a baseline shoulder belt use of 54.2% ($n = 72$) and a mean intervention belt use of 72.8% ($n = 213$), a 34.3% increase above baseline. These data indicate that that for pledge card signers, the Spring Sweepstakes program was equally effective for faculty/staff and students. However, in the Fall program, students who pledged increased their safety belt use by a greater percent than faculty/staff.

Figure 4, on the following page, depicts the shoulder belt use for pledgers and non-pledgers categorized according to type of driver (Faculty/Staff vs. Student). Prominent increases in shoulder belt use during the two intervention periods are evident for both faculty/staff and students who signed and returned pledge cards. To determine if these differences were statistically significant, a 2 (Year of Program: Spring 1985 vs. Fall 1985) x 2 (Commitment Level: Pledgers vs.

Figure 4. MEAN SHOULDER BELT USE DURING EACH PROGRAM PHASE FOR FACULTY/STAFF AND STUDENT DRIVERS WHO SIGNED VS. DID NOT SIGN THE "BUCKLE UP" PLEDGE CARDS.
(BL = Baseline, WD = Withdrawal, FU = Follow Up).



Non-Pledgers) x 3 (Experimental Condition: Baseline, Intervention, Withdrawal) x 2 (Type of Driver: Faculty/Staff vs. Student) analysis was performed using the FUNCAT procedure from the Statistical Analysis System (SAS Institute, Inc., 1982). The FUNCAT procedure performs a weighted least squares analysis of multiple independent categorical variables, and produces output similar to an ANOVA but with effects tested using the Chi-Square statistic (Grizzle, Starmer, & Koch, 1969).

Consistent with the ANOVA described above, the FUNCAT analysis revealed significant main effects for Type of Driver, X^2 (1, n=11,812) = 30.17, $p < .0001$, Year of Program, X^2 (1, n=11,812) = 6.56, $p < .01$, and Experimental Condition, X^2 (2, n=11,812) = 30.39, $p < .0001$. This analysis also revealed a main effect for Commitment Level, X^2 (1, n=11,812) = 216.15, $p < .0001$, since pledgers were more likely to be buckled up than non-pledgers, regardless of experimental condition. An interaction between Commitment Level and Experimental Condition, X^2 (2, n=11,812) = 15.78, $p < .0001$, indicated that pledgers were more likely to be buckled up during the intervention periods (M = 71.5, n = 542), than during either Baseline (M = 54.3, n = 373) or Withdrawal (M = 60.9, n = 97).

It is noteworthy that the pledgers observed during the baseline condition were not necessarily the same individuals sampled during and after the commitment/incentive interventions. When considering only those pledge card signers (n = 481) who were observed during both a baseline and intervention phase (across both the Spring and Fall programs), the results are similar, with 51% buckled up before pledge-card signing and 61% buckled up after returning a signed pledge card.

Gender Effects

Data were collected on driver gender during the Fall 1985 program. Therefore, a 2 (Commitment Level: Pledgers vs. Non-Pledgers) x 2 (Driver Gender) x 3 (Experimental Condition: Baseline vs. Intervention vs. Withdrawal) x 2 (Type of Driver: Faculty/Staff vs. Student) analysis was performed on driver safety belt use using the FUNCAT procedure.

Main effects were found for Type of Driver, Commitment Level, and Experimental Condition. These main effects are congruent with the results reported above. A main effect was also found for driver gender, X^2 (1, N = 5337) = 3.93, $p < .05$, with female drivers being more likely to use a safety belt (M = 53.4%, n = 2,380) than male drivers (M = 47.5%, n = 2,955). No interactions were found between the other independent variables and gender.

Vehicle Passengers

During Fall 1985, data were collected to determine if the program had an impact on vehicle passengers who were not eligible to win prizes. Table 1 on the following page shows that passengers in vehicles with buckled drivers, in general,

Table 1. FALL 1985 "PLEDGE CARD SWEEPSTAKES" PROGRAM SAFETY BELT USE PERCENT BY DRIVER AND PASSENGER PAIRS.

	FACULTY/STAFF			STUDENTS			OVERALL		
	SIGNER	NONSIGNER	OVERALL	SIGNER	NONSIGNER	OVERALL	SIGNER	NONSIGNER	OVERALL
BASELINE	D=85.7% P=78.6% n=14	D=48.6% P=39.1% n=105	D=52.9% P=43.7% n=119	D=37.5% P=25.0% n=16	D=23.6% P=15.7% n=140	D=25.0% P=16.7% n=156	D=60.0% P=50.0% n=30	D=34.3% P=25.7% n=245	D=37.1% P=28.4% n=275
SWEEPSTAKES	D=90.0% P=75.0% n=20	D=44.7% P=34.0% n=215	D=48.5% P=37.5% n=235	D=67.5% P=35.0% n=40	D=27.2% P=22.7% n=361	D=31.2% P=23.9% n=401	D=75.0% P=48.3% n=60	D=33.7% P=26.9% n=576	D=37.6% P=28.9% n=636
WITHDRAWAL	D=66.7% P=66.7% n=3	D=55.0% P=40.0% n=40	D=55.8% P=41.9% n=43	D=16.7% P=00.0% n=6	D=23.4% P=16.9% n=77	D=22.9% P=15.7% n=83	D=33.3% P=22.2% n=9	D=34.2% P=27.8% n=117	D=34.1% P=24.6% n=126

D = Drivers
P = Passengers
n = Paired Observations

were more likely to be buckled up than passengers with unbuckled drivers. In other words, 95.1% of the passengers with unbuckled drivers were unbuckled, and 68.0% of those passengers with buckled drivers were also buckled. These data suggest that when two people are in the same vehicle, their individual responses with regard to safety belt use are more likely to be the same than different.

A 2 (Type of Driver: Faculty/Staff vs. Student) x 2 (Driver Commitment: Pledgers vs. Non-Pledgers) x 2 (Driver Belt Use: Buckled vs. Not Buckled) x 3 (Experimental Condition: Baseline, Intervention, Withdrawal) FUNCAT analysis was performed with passenger belt use (buckled vs. not buckled) serving as the dependent variable. Since only a small number of drivers observed also had vehicle passengers (n = 1,037), this analysis was performed on only a subset of the larger Fall 1985 data set. The analysis showed that passengers with belted drivers were significantly ($p < .0001$) more likely to use a safety belt (M = 68.0%, n = 384) than passengers with unbelted drivers (M = 4.9%, n = 653). In addition, a main effect was found for Type of Driver ($p < .01$), with passengers of Faculty/Staff drivers being more likely to be buckled (M = 41.0%) than passengers of Student drivers (M = 18.8%). No other significant main effects nor interactions were found, perhaps due to the small sample sizes in some of the cells.

Self Report of Belt Use

During the Fall 1986 program, pledge card signers were asked to estimate their safety belt use during their last ten trips. A 2 (Distribution Type: Maroon vs. Orange) x 2 (Gender) x 4 (Type of Driver: Faculty vs. Staff vs. Undergraduate vs. Graduate Student) analysis of variance (ANOVA) was conducted with estimated belt use serving as the dependent variable. This three-way factorial showed a main effect for type of driver, with graduate students and faculty reporting that they used a safety belt more often in the last ten times they drove than either staff or undergraduate students, $F(2,1560) = 10.9$, $p < .001$. However, all self-reported use rates were high. The mean reported frequency of safety belt use on the last ten trips being 9.4 for faculty signers, 9.5 for graduate students, 8.8 for staff signers, and 8.7 for undergraduate students. No other main effects or interactions were statistically significant (all $ps > .10$).

Assessing Distribution Methods

Maroon cards (n = 9,000) were distributed at pledge-card collection box sites and orange cards (n = 9000) were distributed on the windshields of parked cars. A significantly greater number of pledgers deposited maroon pledge cards (n = 1033) than orange pledge cards (n = 652). A test of proportions, using an arcsine transformation (Cohen, 1977), indicated that this difference was statistically significant, $h = .181$, $p < .05$. Since observers recorded the color of pledge cards hanging from the rearview mirror of target vehicles, we

could determine whether those who displayed a pledge card actually turned in the other portion of the card for the lottery drawings. We hypothesized that those drivers who received their pledge card at their vehicle (i.e., orange) would be less likely to deposit a signed card in the collection boxes than those who obtained and signed the maroon pledge cards at the card collection sites.

The analysis supported this hypothesis, with 193 drivers observed displaying orange cards without returning the lottery entry portion and 32 drivers observed displaying maroon cards without a returned portion. This difference was statistically significant, $h = .284$, $p < .05$.

Interobserver Reliability. Interobserver agreement was assessed for 15.3% of the 18,859 vehicles observed 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. Interobserver agreement was 88.3% (n = 921) for observations of shoulder belt use, and 94.3% (n = 1,968) for observing nonuse of the available shoulder belt.

Discussion

Rudd and Geller (1985) reported on a university-wide "Seat Belt Sweepstakes" incentive program that increased vehicle safety belt use from a Fall (1983) baseline mean of 16.6% to a Spring (1984) withdrawal mean of 24.3%. The present research evaluated a follow-up program that was able to increase safety belt use further. The Spring 1985 baseline of 30.4% was slightly more than double the nationwide mean of 13.6% at the time (Steed, 1984). The 1983-84 incentive program for safety belt use may have been a factor in this high baseline. The remarkably high Spring 1986 follow-up safety belt use of 42.3% was perhaps partially due to nationwide media attention given to mandatory belt use laws passed in several states during this period. However, the commonwealth of Virginia failed to pass mandatory belt use legislation during 1985 and 1986. Currently Virginia has passed a safety belt use law for front seat passengers that will be implemented at the begining of 1988.

It might be assumed that some of the overall increase in shoulder belt use found among faculty, staff and students was due to the promotion of the pledge card sweepstakes through radio, newspaper, television, and poster announcements. However, functional control of the buckling response was only shown for pledge card signers (approximately 9% of all registered drivers during each program). Although pledge card signers were more likely than non-signers to buckle up during the pre-pledge, Fall 1985 baseline (i.e., 59.2% vs. 34.0% mean baseline belt use for pledgers vs. nonpledgers, respectively), the signers did significantly increase their safety belt use after signing and turning in a pledge card (i.e., 74.8% vs. 36.5% mean intervention belt use for pledgers vs. nonpledgers, respectively).

The safety belt use increases during the "Pledge Card Sweepstakes" was as great for student pledgers as for faculty/staff pledgers, whereas the 1983-84 Safety Belt program (Rudd & Geller, 1985) was twice as effective for faculty/staff as for students (increasing shoulder belt use 64.2% for faculty/staff and 30.5% for students). Before signing pledge cards, mean observed belt use was 57.0% for faculty/staff ($\underline{n}$ = 170) and 49.3% for students ($\underline{n}$ = 203). After signing a pledge card, average shoulder belt use was 76.0% for the 208 faculty/staff observed (33.3% increase) and 69.8% for 334 students observed (41.6% increase). It should be noted, however, that a greater proportion of faculty/staff than students signed and turned in a pledge card during the Spring (7.6% of the faculty/staff and 5.3% of the students) and Fall (8.7% of the faculty/staff and 6.3% of the students). Only 91 individuals (74 students and 17 faculty/staff) signed and returned a pledge card during both programs.

Most of the incentive programs implemented for safety belt promotion (see Geller, 1984 for a review of 28 programs) have rewarded the actual response of buckling up rather than a

commitment to do so. However, a number of researchers and theorists (e.g., Bem, 1972; Deci, 1978; Kelly, 1971; Kiesler, 1971; Lepper, 1983) would probably prefer a commitment approach over a more direct positive reinforcement strategy. From an empirical perspective, the limited data to date suggest that these two approaches are equally effective at increasing the use of safety belts. Although the commitment approach has been used much less often than a more direct incentive strategy, the present data and some smaller scale studies (Cope, Grossnickle, & Geller, 1986; Nimmer & Geller, in press) indicate that motivating individuals (either through rewards or interactive group discussion) to sign a pledge card that commits them to buckle up results in at least doubling the baseline level of safety belt use. This is also the typical finding when individuals are directly rewarded for being buckled up (Geller, 1984).

The commitment strategy attempted to motivate safety belt use intrinsically by taking advantage of four of the five techniques for increasing commitment detailed by Kiesler (1971). Specifically, the following tactics were applied to increase the impact of a commitment intervention: (1) the act of commitment was made explicit and public by having the pledge card signers display the pledge card on the rearview mirror of their vehicle; (2) although the participants made only one pledge, consistent behavioral compliance of buckling up was requested over numerous vehicle trips; (3) powerful inducements were not used to motivate participants to sign pledge cards -- only information and token opportunities to win a prize; and (4) the display of pledge cards in the vehicle provided a cue to remind participants of their commitment (cf. Halverson & Pallack, 1978; Pallack, Cook, & Sullivan, 1980). Our use of low-value incentives with low probabilities of winning is consistent with several theoretical formulations and empirical investigations that suggest the use of mild or moderate incentives rather than more powerful ones. This facilitates the development of intrinsic motivation by not providing sufficient extrinsic justification to allow people to make external attributions for their behavior (e.g., Bem, 1972; Kelly, 1967; Lepper, 1981).

From a social marketing perspective (Geller & Nimmer, in press), the "Pledge Card Sweepstakes" had several advantages over the prior "Seat Belt Sweepstakes" (Rudd & Geller, 1985), that may account for the greater impact of the latter program on students. Specifically, the pledge cards were tangible products distributed throughout the campus community as evidence of the ongoing program. Pledge cards hanging from rearview mirrors were readily observed by occupants of other vehicles, thereby serving as continual advertisement of the program. The pledge card collection boxes distributed throughout the campus community also served as ongoing promotion of the safety belt campaign. Furthermore, the boxes located in the "shops" of merchants who donated prizes assumed special marketing qualities.

The cost to implement the Spring and Fall "Pledge Card Sweepstakes" was approximately $1,300, with $1,078 of this amount required for printing 28,000 pledge cards and 900 posters and flyers. If community merchants had not donated the prizes and if student researchers had not volunteered their time to prepare and distribute promotional materials, solicit prizes from merchants, manage the pledge card collection boxes, and organize the periodic drawings, the total projected costs for both pledge card lotteries would have been approximately $4,500. The implementation cost for the previous "Seat Belt Sweepstakes" amounted to $1,783 for three intervention periods, which was reduced from a projected $5,769 by volunteer help from two student organizations and prize donations from community merchants (Rudd & Geller, 1985). The prize contributions for the "Pledge Card Sweepstakes" were practically the same as those for the prior campus safety belt program, but volunteer support beyond the second author's research students was almost non-existent.

Although the Chief of Police clearly supported the "Pledge Card Sweepstakes" (e.g., by appearing at pledge card drawings and distributing prize certificates), the active involvement of the police officers in safety belt promotion was minimal during the current program. Consequently, the goal to institutionalize a campus incentive program for safety belt promotion did not materialize, even though efforts were specifically directed at encouraging campus adoption of the life-saving prevention programs. However, the three years of large-scale safety belt promotion at Virginia Tech did precipitate some benefits. The administration passed and disseminated a policy in the Spring of 1986 that requires university staff to buckle up while on-the-job. The campus motor pool has actively promoted this buckle-up requirement by giving a verbal reminder to all persons checking out a vehicle and by posting buckle-up reminder stickers in all their cars. These actions, as well as the cumulative impact of the seat belt and pledge card sweepstakes, have influenced a current safety belt use level of 40% (Winter 1986). This belt use rate should be much higher, given the life saving and injury prevention potential of safety belt use. Nevertheless, this level is probably record high for colleges and universities in states without a mandatory belt use law.

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