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Development of Industry-Based Strategies for Motivating Seat-Belt Use

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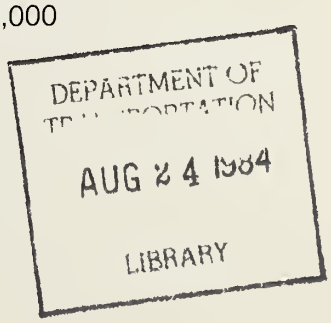

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16. Abstract

A variety of incentive-based programs to motivate safety belt use were tested during the 18-month grant period in order to define optimal incentive strategies for particular corporate settings. Initial programs provoked important research questions which were targeted in subsequent program development and evaluation. For example, initial incentive programs at four industries in Southwest Virginia influenced substantial increases in safety belt wearing at each site with minimal costs; but these programs had dramatic differential impact on blue-collar vs. white-collar employees. Blue-collar workers were much less apt than white-collar workers to participate in a safety belt incentive program, and therefore research efforts were directed toward understanding these differences and developing a program to effect substantial increases in safety belt use among blue-collar employees. Innovative techniques were applied to study the impact of repeated interventions on the safety belt use of individuals, and to evaluate response generalization (i.e., the use of safety belts at times when rewards for belt wearing are not available) and response maintenance (i.e., the continual use of safety belts after a safety-belt incentive program is terminated).

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METRIC CONVERSION FACTORS

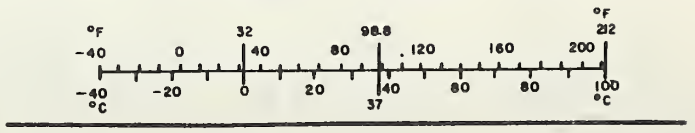
Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.5	kilometers	km
	AREA			
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
	MASS (weight)			
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
	VOLUME			
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
	TEMPERATURE (exact)			
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price $2.25, SD Catalog No. C13.10:286.

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
	AREA			
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
	MASS (weight)			
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
	VOLUME			
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
	TEMPERATURE (exact)			
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



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Executive Summary

The overall goal of this research was to develop and evaluate cost-effective programs for motivating safety belt use among employees at industrial sites. Two basic assumptions influenced the focus and direction of the research, namely: 1) corporate executives can be persuaded to adopt an effective safety belt program because the financial advantages to the industry if employees buckle up can be clearly demonstrated, and 2) the corporate program should include an incentive approach that offers rewards to belt users because such an intervention will be readily accepted and will produce marked increases in safety belt use. A variety of incentive-based programs to motivate safety belt use were tested during the 18-month grant period in order to define optimal incentive strategies for particular settings. Initial programs elicited important research questions which were targeted in subsequent program development and evaluation. For example, initial incentive programs at four industrial settings in Southwest Virginia influenced substantial increases in safety belt wearing at each site with minimal costs; but these programs had dramatic differential impact on blue-collar vs. white-collar employees, and thus subsequent research was designed to address this unexpected finding. More specifically, blue-collar (hourly) workers were much less apt than white-collar (salary) workers to participate in a safety belt incentive program, and therefore research efforts were directed toward understanding the hourly/salary differences and developing a program that would motivate safety belt use among blue collar employees.

The incentive programs were evaluated by observing safety belt use daily at the entrance/exits to target industries before, during, and after the program was implemented. By recording safety belt use both in the morning (during arrival) and in the afternoon (during departure) but rewarding belt

use *only* at one of these times (e.g., in the morning), it was possible to measure the amount of treatment transfer (or generalization) from one time (e.g., morning) to another (e.g., afternoon). Also, by recording license plate numbers it was possible to study the behaviors of individual drivers as a function of repeated exposures to particular experimental conditions. For example, the maintenance of increases in safety belt wearing after program termination was evaluated as a function of the number of rewards received during the safety belt program.

The following conclusions summarize those results of nine field studies which provide recommendations for industry-based promotion of employee safety belt use: 1) every incentive program which offered safety belt users opportunities to win prizes was cost effective, usually influencing more than three-fold increases in safety belt wearing with minimal cost for prizes; 2) when rewards for safety belt use were discontinued belt wearing decreased substantially, but not to levels as low as the pre-intervention baseline; 3) the degree of treatment generalization (i.e., increased belt wearing at times when rewards were not available) and response maintenance (i.e., continued increase in belt wearing after program termination) increased directly with the number of occasions that a reward was received for wearing a safety belt; 4) it was not necessary to stop vehicles and reward safety belt users immediately in order for an incentive program to be successful, and therefore an incentive-based safety belt program is feasible for large industries with high traffic flow at several plant entrances; 5) white-collar (salary) workers were consistently buckled up more often than blue-collar (hourly) employees prior to program implementation, and they buckled up for reward possibilities much more often that did blue-collar workers; 6) an industry program that included special "awareness sessions" for blue-collar employees and a group contingency to promote peer pressure influenced an eight-fold increase in belt

use among blue-collar workers (above the usage levels of white-collar employees); 7) a 20-minute film designed to encourage safety belt use increased verbal intentions to buckle up, but did not increase actual belt wearing; 8) a 20-minute safety belt discussion with blue-collar workers that prompted their verbal involvement resulted in an immediate three-fold increase in safety belt use, suggesting that educational efforts should focus on producing active audience participation rather than passive watching and listening (as with movies and lectures); 9) potential was shown for a commitment approach which encourages employees to sign cards that pledge safety belt wearing for a specified length of time, and 10) the need for much follow-up research was indicated, particularly with regard to the development of long-term incentive programs which do not require vehicular stopping but promote safety belt use at times and in situations when rewards are not available (e.g., in communities and on highways).

Applications

The results of this project readily translate into recommendations for developing a successful corporate program to motivate employee safety belt use. Indeed, such translations were specified in an instructional manual written by the Principal Investigator (PI) entitled, "Corporate Incentives for Promoting Safety Belt Use: Rationale, Guidelines, and Examples." The manual reviews twelve corporate safety belt programs which were remarkably successful in applying incentives for cost effective promotion of safety belt use. Most of these programs resulted from specific reference to the research accomplished under this DOT Contract. To date more than 350 copies of the instructional manual have been disseminated; numerous major industries nationwide have received copies as well as every region and state office of NHTSA and the safety officers of most federal agencies in Washington, D.C.

As a result of this research project the PI has had numerous opportunities to address professional groups regarding the advantages of certain incentive-based strategies for safety belt promotion and to advise the actual development and evaluation of corporate safety belt programs. For example, in 1982 the PI gave workshops on the motivation of safety belt use at special transportation conferences in Little Rock, AR, Topeka, KS, Oklahoma City, OK, and San Antonio, TX; and consulted with executives at General Motors, Fisher Body, Ford Motor Company, and the United Services Automobile Association regarding the cost effective application of incentives for safety belt promotion. The consulting at GM Research Laboratories was instrumental in developing the exemplary incentive program at the GM Tech Center (Warren, MI) which increased safety belt use from 36% to 72% among 6,000 employees. Recently the PI consulted with NHTSA officials regarding the implementation of a safety belt incentive program throughout the Washington headquarters of the U.S. Department of Transportation.

Overview

The rationale, procedures, results and implications of research accomplished under DOT Contract DTRS5681-C-0032 was documented in five technical reports, each submitted after respective phases (Phase I: 6/15/81-9/15/81; Phase II: 9/15/81-12/15/81; Phase III: 12/15/81-3/15/82; Phase IV: 3/15/82-6/15/82; and Phase V: 6/15/82-12/15/82). This final report documents the essence of each of these earlier progress reports, offering most details on the research accomplished during Phase V (since this phase came closest to reaching the overall objective of this research -- i.e., the development of a cost-effective incentive strategy for promoting safety belt use at industrial sites). Research accomplished in Phases I-IV identified special programing problems, many of which were solved in Phase V (as detailed herein). The research preceding Phase V also answered important empirical questions pertinent to the development and evaluation of programs for motivating safety belt use; and the best of this research has been documented in three research articles for publication in professional journals. Two of these articles will be published this year, and the third manuscript is currently under editorial review. These three research documents are included in Appendices A, B, and C of this report.

The research documented in Appendix A (to be published in *Journal of Applied Behavior Analysis*) identifies the "direct and immediate" incentive strategy which produced prominent increases in safety belt wearing at four industries in Southwest Virginia, and details the methodology and outcome of innovative procedures for program evaluation. Most interesting and provocative were the findings that response *generalization* (i.e., belt wearing at times other than reward distribution) and response *maintenance* (i.e., continued belt wearing after program withdrawal) were a direct function of the number of rewards an individual received for safety belt use.

The research detailed in Appendix B (to be published in *Journal of Organizational Behavior Management*) reports the important (and unexpected) findings that blue-collar employees were much less-frequent users of safety belts than white-collar employees and were much less likely than white-collar workers to participate in an incentive program to encourage safety belt use. The article entertains several interpretations for this difference (some prompted by the results of questionnaire surveys), and suggests directions for further research (most of which were followed in the Phase V research detailed herein).

The research report in Appendix C offers an alternative incentive strategy for safety belt promotion than the "direct and immediate" approach typically followed. The delayed "prize-a-day" intervention evaluated in that research was prompted by the concerns of corporate executives (including representatives of the General Motors Technical Center) that in many industrial settings vehicles cannot be safely and conveniently stopped at plant entrances to reward safety belt wearing. The document describes a simple and inexpensive incentive strategy that does not require vehicle stopping and is therefore feasible for large industrial and community applications. The technique proved to be quite effective, with significant impact lasting almost one year after program termination.

The following report of Phase V research includes a rather comprehensive introduction, incorporating a rationale for an incentive approach to safety belt promotion and a review of the relevant literature. The research addressed particular problems identified in earlier studies -- including the differential program impact on blue-collar versus white-collar employees. This research met the challenge of motivating blue-collar workers to buckle up with remarkable success, and identified substantial (and unexpected) impact of a special educational approach. The educational intervention was unlike the

standard (unsuccessful) techniques applied to safety belt promotion (e.g., lectures and films), and was founded in theories and procedures from classic social psychology research.

Throughout this 15-month project the need for dissemination and grass roots implementation was especially appreciated. Throughout the project successful approaches toward addressing the serious societal problem of safety belt non use were identified, and therefore the diffusion of innovations was critical. Consequently, the Principal Investigator took every opportunity to share the success of this research with others who might benefit from appropriate application; and the opportunities for diffusion were rather numerous, given the current nationwide concern for safety belt promotion. The following page summarizes the dissemination accomplished during the grant period; further details are given after the description of Phase V research. Newspaper and magazine reports of the research are included as appendices.

Dissemination Opportunities

- Five lengthy technical reports submitted to DOT over a 1&1/2 year period (from June, 1981 to January, 1983).
- Three research articles accepted for publication in professional journals with high rejection rates (one appearing in 1982, and two in press); and three additional articles in preparation.
- Ten research presentations at professional meetings.
- Five invited addresses at special transportation safety conferences.
- Three invited addresses at other universities.
- Seven safety-belt workshops at industries, professional conventions or transportation conferences.
- A special two-hour symposium on vehicular safety belts at the last American Psychological Association meeting and an accompanying press conference which resulted in nationwide radio coverage.
- Six articles in newspapers in southwest Virginia.
- Four reviews of the research in national magazines or newsletters.
- Two appearances on a local TV talk show.
- Two reports of the research on local TV news.
- Two different radio spots played throughout southwest Virginia.
- Several consultations with industry officials regarding the programing of strategies to motivate employee safety belt use, including special consulting with executives at General Motors, Fisher Body, Ford Motor Company, and the United Services Automobile Association. [The consulting at GM was instrumental in developing the exemplary incentive program at the GM Tech Center which increased safety belt use from 36% to 72% among 6,000 emloyees.]
- Production of two 35-minute videotapes at the Highway Safety Research Center in Oklahoma City to teach industry-based techniques for increasing safety belt use. [A shortened version of these tapes may be produced soon for large-scale dissemination by NHTSA.]
- Development and preparation of a manual for teaching corporate incentive programing to motivate safety belt use. [The research and development for the manual was supported by DOT contract DTRS5681-C-0032; manual documentation was supported by NHTSA contract DTNH22-82-P-05552.]
- Consultation with NHTSA officials regarding the implementation of a safety-belt incentive program for the U.S. Department of Transportation.

Phase V (June 15 to December 15, 1982)

This aspect of the report documents our research efforts throughout the summer of 1982, which had one primary objective: to find a practical technique for motivating blue-collar workers to buckle their safety belts. Our prior research at two industrial sites (i.e., during the summer of 1981) demonstrated substantial impact of an incentive strategy on the seat belt wearing of white-collar (salary) employees, but the program had minimal influence on blue-collar (hourly) workers. In order to develop a program that would be accepted by blue-collar workers we returned to the same two industrial locations of the prior study and interviewed the Personnel Director, conducted a focus group with the Safety Committee at one of the plants, and administered two questionaire surveys among all workers at each plant. We used the information from these procedures to develop an innovative incentive program; and then we tested the impact of the program on blue-collar workers.

Our interviews and surveys suggested that a program to promote safety belt wearing at industrial sites ought to include components to account for the following: 1) employees should trust (or identify with) the program administration; 2) employees should perceive that they have had some influence in the design of the program; 3) employees should contribute to some aspects of program implementation; 4) employees should not perceive the program as another management attempt to control their behavior involuntarily; 5) blue-collar workers (as compared to white-collar workers) are apt to perceive driving as a "macho", riskless task, and are likely to be "hard-core" nonusers of vehicular safety belts; 6) blue-collar workers are less attentive to written information and instructions than are white-collar employees; 7) blue-collar employees are less apt than white-collar workers to appreciate the activities of a research team from a local university; 8) the

incentive for safety belt wearing should reflect a "generalized reward" -- i.e., a reward that has general appeal to individuals with varied backgrounds, interests, needs, and desires; 9) peer pressure and social support are critical motivators of human behavior; and 10) individuals who have not acquired the "seat belt habit" (which includes most people, and more blue-collar than white-collar employees) require continual reminding to buckle up.

The industry-based incentive program evaluated in Phase V was developed with consideration of the ten points listed above, and included the following components: 1) an "awareness session" which attempted to make blue-collar workers aware of the value of vehicular safety belts by involving them in a discussion of their reasons for not wearing seat belts and why it is smart to buckle up; 2) a cash raffle whereby a winning license plate number was drawn weekly and the driver of that vehicle was awarded an amount of cash that depended upon the average daily usage of seat belts during the prior week among members of the winner's work group (i.e., white-collar vs. blue-collar employees) -- one dollar for every 1% of safety belt use; 3) a system for assigning raffle coupons that was based on the daily number of seat belt wearers per vehicle observed; i.e., the license plate number of a given vehicle was entered into the weekly raffle once for each vehicle occupant observed wearing a safety belt while entering or exiting the plant's two parking lots; 4) a verbal presentation to blue-collar workers of the incentive scheme; 5) a feedback system whereby the daily average and cumulative week's average of seat belt wearers among blue-collar vs. white-collar workers was posted in a location clearly visible to all incoming and exiting employees; and 6) a public raffle each week which involved a drawing of the winning license plate number by the Personnel Director or his assistant.

The incentive program outlined above was very effective at motivating safety belt use among blue-collar workers, effecting an eight-fold increase in the percentage of seat belt wearers (i.e., from a baseline average of approximately 5% usage to a mean usage rate that exceeded 40% during the intervention phase). The research design enabled a conclusion that the "awareness session" was a necessary component of the intervention package. Indeed, a three-fold increase in belt wearing among blue-collar workers was attributed to the "awareness session" alone. Following removal of the five-week incentive program (i.e., the cash raffle) safety belt use decreased substantially, but did not fall as low as the pre-intervention, baseline level.

Literature Review and Rationale

There is much evidence indicating that wearing seat belts in automobiles reduces serious injuries and saves lives. In fact, it is estimated that the use of seat belts could reduce traffic accident injuries by 50% and traffic accident fatalities by 25% (Highway Safety Research Center, 1976; *Proceedings*, 1973). In spite of these rather impressive statistics, seat belt usage in this country is quite low. A study by the United States Department of Transportation, for example, showed that only 10.9% of 150,000 drivers observed in 19 metropolitan areas from November 1977 to November 1979 were wearing safety belts ("Two Year Study," 1980).

Prompted by such information, the promotion of seat belt wearing has become a national concern. In May 1979, an interdisciplinary committee of transportation safety experts was formed by the National Highway Transportation Safety Administration to assess strategies for increasing the use of vehicular safety belts. This committee specifically recommended that industry be encouraged to develop procedures to motivate seat belt usage by its employees, since injuries and deaths due to automobile accidents entail significant employee costs, amounting to "a total of about $1.5 billion in 1978" (Transportation Research Board, 1980, p. 6). The current research was designed to develop and evaluate an industry-based program for motivating seat belt usage, with hourly (blue-collar) employees being the primary target population.

Most large-scale attempts to promote the use of safety belts can be categorized as educational, engineering, or legal approaches. A variety of educational strategies, including signs, billboards, radio and television advertisements, school programs, films, slide shows, and pamphlets have been applied; their effects, however, have been minimal. For example, in a study involving a multimedia public education campaign in Ontario, Canada,

Cunliffe, DeAngelis, Foley, Lonero, Pierce, Siegel, Smutylo, and Stephens (1975) reported that a comprehensive educational program had no effect on seat belt usage. Their evaluation showed a baseline seat belt usage of 17.4% among 5583 drivers, compared to 17.2% belt use among 6040 drivers following the educational program. Similarly, Phillips (1980) reported nonsignificant usage gains as a result of a nine-month educational program which included newspaper articles, posters, booklets, a film, and a demonstration at two industrial plants. Increases of only 2.2% and 1.1% were reported at the two plants, respectively. Finally, Geller (1981b) showed that while a seat belt promotion film increased verbal reports of intentions to wear seat belts, it had no effect on actual safety belt usage.

Engineering approaches to encourage the use of restraint systems include ignition interlock systems, buzzer/light reminder systems, and automatic passive restraint systems. Ignition interlock systems, which require that seat belts be fastened before the car can start, were discontinued after only one year; this was probably the result of negative public reaction (Robertson, 1975).

Two basic types of buzzer/light reminder systems are found in vehicles. In an "unlimited" system, the buzzer/light operates until the occupants of the front seat fasten their safety belts; hence this type of system can be viewed as a negative reinforcement strategy. That is, the "aversive stimulus" (i.e., the buzzer) is removed when the "desired response" (i.e., buckling up) is emitted. Hence, in an unlimited system the person buckles up to *escape* an aversive experience. Research has shown that unlimited systems are effective in motivating seat belt usage. Geller, Casali, and Johnson (1980), for example, found that 54.3% of those drivers who had working reminder devices of this type wore their safety belts. However, these and other authors (Robertson, 1975; Westefeld & Phillips, 1976) have also reported that such

systems are frequently defeated by disconnection or circumvention (e.g., buckling the belt behind the occupant). Geller *et al.* (1980) showed a 57% defeat rate among 328 drivers with unlimited buzzers.

In a "limited buzzer system", the buzzer/light operates for only a short period of time (3 to 8 seconds) if front seat belts are not engaged; hence, this type of system can be viewed as a prompting strategy. While limited systems are less intrusive than their unlimited counterparts, they also appear to be less effective. For example, Geller *et al.* (1980) observed 19% belt usage among 268 drivers with limited buzzers, only 22% of which were defeated. This level was not significantly higher than the 15% usage observed for the 55 drivers with only a light reminder system.

Dashboard-mounted airbags which automatically inflate upon impact and passive shoulder belts which are automatically placed around front-seat occupants when the car doors are closed are the two currently available passive (or automatic) restraint systems. Both of these systems have as their drawbacks the facts that they only protect front seat occupants and that they are a less effective means of protection than are manually positioned lap and shoulder belts (i.e., the three point system currently available in most vehicles). Airbags provide adequate protection only in the case of a frontal impact and are unable to keep unbelted occupants from being thrown from the vehicle (Transportation Research Board, 1980). In certain types of accidents, occupants can slide out from underneath the automatic shoulder belt. Further, there is evidence to suggest that automatic shoulder belts are often permanently defeated by being cut (Peck, 1981).

Compulsory seat belt laws, under which vehicle occupants are fined if they are observed not wearing a safety belt, constitute the legal approach to promoting seat belt usage. Although most of the larger countries have adopted this strategy, it is unlikely to be implemented in the United States

(Transportation Research Board, 1980). Current state legislation mandating the use of child restraints may, however, represent a step in this direction.

In response to high death and injury rates among child victims of automobile accidents, 1,000 children killed and 100,000 injured each year (Phillips, 1980), Tennessee (in 1978) became the first state to mandate the use of child safety seats for all children under four years of age. Other states, including Rhode Island, West Virginia, Kansas, Minnesota, New York, and Michigan, have followed Tennessee's lead. Virginia has also passed such legislation; effective January 1, 1983 drivers of vehicles in which a child under four is unrestrained are subject to a $25 fine. If the program in Tennessee is indicative, such legislation will effectively reduce child injuries; by the second year of the Tennessee child restraint mandate there was a 75% reduction in auto-related fatalities and injuries among Tennessee children ("Car seats for kids: It's the law," 1981).

Unfortunately, while legislation mandating the use of seat belts for adult passengers has drastically increased seat belt usage (Adams, 1981; Pierce, Toomer, Gardner, Pang, & Orlowski, 1976), mandatory seat belt use has not necessarily reduced highway deaths and injuries. For example, Adams (1980) showed that the road death index decreased by an average of 25% for countries without seat belt usage mandates, and decreased by only 17% for countries with such laws (Adams, 1981). Peltzman (1975) suggested that drivers take more risks while driving in cars with safety appliances because the presence of these devices makes them feel more protected. It is also possible that drivers of cars containing mandatorily-installed safety devices become riskier drivers as a form of psychological reactance to perceived external control of their behavior (Geller, 1982c). It is noteworthy, however, that empirical tests of Peltzman's risk compensation theory have not been supportive, showing no differences in driving speed between users and

nonusers of safety belts (Geller, 1982c), or demonstrating shorter headway distance in high-flow freeway traffic (i.e., riskier driving) by nonusers of shoulder belts (Evans, Wasielewski, & von Buseck, 1982; von Buseck, Evans, Schmidt, & Wasielewski, 1980).

The National Highway Traffic Safety Administration (NHTSA) has recognized the importance of finding alternative strategies for motivating the use of seat belts. As shown in prior research, incentive programs represent a viable, cost-effective approach to community-based interventions for encouraging seat belt use. One of the earliest studies in this area was conducted by Geller, Johnson, and Pelton (1982) in which the impact of incentive programs administered in two community settings (a crosswalk intersection on a university campus and a drive-in window of a bank) was evaluated. In the first study, seat belt promotion fliers were distributed to drivers who stopped at a pedestrian crosswalk. When drivers received their first flier they were told that a prize would be awarded to those who collected each of six different fliers. This reward was not contingent on the wearing of seat belts -- that is, all drivers received fliers, regardless of seat belt usage. The recording of license plate numbers enabled a categorization of drivers according to frequency of treatment experiences. Analyses of these data showed that, of 180 drivers who received two fliers, 17.2% were wearing safety belts when they received their first flier; 42.2% of these drivers were wearing safety belts upon receipt of their second flier. Of 25 drivers who received four or more fliers, 52% were wearing a safety belt when they received their fourth flier.

In the second study reported by Geller, Johnson, and Pelton fliers encouraging seat belt use were distributed for 17 days at the drive-in window of a bank (following nine days of baseline observation). Baseline recording was reinstated for 13 days; then a Prompting/Reinforcement intervention

which gave bank patrons a chance to win a Bingo game only if they were wearing their seat belts was implemented for 11 days. Results showed a consistently increasing trend of seat belt usage. Specifically, 15.9% of drivers were observed wearing seat belts during initial baseline, 23.1% wore seat belts during Prompting and 34.6% wore safety belts during Prompting/Reinforcement. Analysis of license plate data showed a marked increase in seat belt wearing as a function of the first three consecutive observation experiences, regardless of initial safety belt usage.

One question raised by the Geller, Johnson, and Pelton research concerns the necessity of a response-reward contingency. That is, a marked increase in seat belt usage was observed when an incentive was given regardless of belt wearing (Study 1) and also when a response-reward contingency was implemented (Study 2). Studies by Geller, Paterson, and Talbott (1982) and Johnson and Geller (in press) addressed this issue more systematically. In the Geller, Paterson, and Talbott study, drivers were observed as they entered two large faculty/staff parking lots on a university campus. Following the collection of baseline data, a Contingent Reward condition in which belted drivers received an incentive flier, was put into place at one of the lots; whereas a Noncontingent Reward condition in which drivers received an inventive handbill regardless of belt usage was implemented at the other lot. Under the Contingent Reward condition, mean belt usage increased from 26.3% during baseline to 45.7% during treatment; whereas under the Noncontingent Reward condition the increase was only to 24.1%, from a baseline level of 22.2%. Analysis of repeated exposures via license plate categorization verified that only contingent rewards prompted substantial increases in belt usage. This analysis also showed that most of the impact occurred after the initial contact with the incentive flier.

Johnson and Geller (in press) showed similar outcomes following their

comparison of contingent versus noncontingent rewards at the drive-in windows of two banks. At the bank with contingent rewards, mean belt usage increased from 21.9% during baseline to 34.7% during treatment; at the bank with noncontingent rewards, the increase was from 19.2% to 27.7%. Again, sequential analyses showed the largest increase in belt usage at the point of drivers' second reward experience.

Geller and his students (e.g., Geller, 1983a, b, c; Geller, Davis, & Spicer, in press) sought to correct several weaknesses in the previous studies. First, the prior studies did not result in a substantial number of drivers receiving several repeated exposures to response-contingent rewards and to extinction (or non-reward) trials. Hence, response maintenance could not be adequately assessed. In follow-up research, each driver experienced several repeated exposures to baseline, incentive, and extinction conditions. Second, in all prior parking lot experiments, it was possible for drivers to park in other lots in order to avoid observation, thus potentially creating artificially high treatment effects. In this follow-up research, observations and treatment occurred at the only entrance to each parking lot facility. Finally, it is possible that in the prior studies drivers buckled up just prior to observation and unbuckled immediately after receiving the reward. In this follow-up research, seat belt wearing was observed while the incentive program was in effect (e.g., when employees arrived for work) as well as when the program was not being implemented (e.g., when employees departed from work).

The industrial settings of the follow-up research by Geller and his students also represented an improvement over previous studies of incentive strategies for motivating safety belt use. Given the cost-effectiveness of current incentive programs, industry seems to be an ideal place for large-scale intervention, since management of such programs would be facilitated

simply by the structured nature of such settings. Further, since many industries already support a variety of safety promotion programs, a seat belt safety program seems compatible with other intact industrial functions. And, studies comparing the cost to companies for accidents involving buckled and unbuckled employees have shown that industry could benefit greatly by increased seat belt usage, e.g., through reduction of work compensation payments, production losses resulting from loss of skilled workers, and replacement costs incurred by restaffing positions left vacant due to injury or death (Bigelow, 1982; Pabon, Sims, Smith, & Associates, 1982).

Geller and his students (1981a, 1981b) implemented an incentive program for motivating seat belt usage at four industrial complexes. Belt wearing was observed daily at parking lot entrances to each plant as employees arrived for work in the morning and departed in the afternoon. A response contingent reward program, which consisted of giving incentive fliers to all drivers wearing safety belts, was implemented only during the morning or afternoon at a particular plant. This procedure allowed for measurements of response maintenance and stimulus generalization (Geller, 1983c). At two plants it was possible to separate hourly (*blue-collar*) and salary (*white-collar*) workers, since blue-collar and white-collar employees parked in different lots (Geller, Davis, & Spicer, in press).

The following listing summarizes the results of these industry-based studies: (1) at all plants, some drivers began buckling after learning that their belt wearing practices were being observed; (2) a substantial number of drivers buckled their safety belts so as to receive incentive fliers; (3) the incentive program increased belt use to levels which were at least twice as high as that observed during baseline observations; (4) the program had its greatest impact where the baseline usage rate was highest, where the risk of work-related injuries was highest, and where on-the-job safety was most

stressed; (5) some treatment generality was demonstrated by the fact that during the incentive phases there were generally increases in belt wearing during the observation sessions in which rewards were not distributed; (6) once rewards for belt wearing were permanently withdrawn, belt use decreased dramatically, however pre-treatment baseline levels were not completely recovered; and (7) where it was possible to separate hourly and salary employees, differential impact was observed, with salary workers buckling their shoulder belts to receive rewards substantially more often than hourly workers.

It is noteworthy that, in a recent fine-grained analysis of the data at one plant in which drivers were categorized (via analysis of license plate numbers) according to their number of treatment exposures (i.e., incentive fliers), Geller (1983c) showed that response maintenance was a function of the number of prior treatment experiences. Specifically, drivers who had been rewarded three or more times maintained belt usage higher than baseline during as many as ten follow-up observations (during which no rewards were given). On the other hand, drivers who had received only one or two rewards exhibited lower belt usage during every follow-up observation than that observed on their first treatment day.

One important point to note about this data, however, is that those individuals who exhibited the highest response maintenance also exhibited the highest baseline rate of belt usage. This may indicate that a significant post-withdrawal impact of an incentive program should be expected only for those individuals who were part-time belt users prior to the initiation of the program, since these individuals need to make less adjustment in their driving behavior than "hard core" nonusers of safety belts.

Geller (1982c) and Geller *et al*. (in press) provided specific information regarding these hourly/salary differences. At one plant (Federal Mogul),

hourly workers showed a mean increase in belt wearing from 2.8% to 4.6%, while salary workers showed a mean increase from 17.9% to 50.6% when incentive fliers were offered in the morning. At another plant (Hubbell Lighting), hourly employees showed a mean increase from 1.9% to 9.4% at the same time as salary employees showed a mean increase from 14.7% to 28.6% during morning arrival to work. Figures 1 to 4 on the following four pages depict the shoulder belt usage of the hourly (Figures 1 and 3) and salary (Figures 2 and 4) workers at Federal Mogul and Hubbell Lighting, respectively. It is noteworthy that belt usage in the afternoon increased somewhat during the administration of incentive fliers in the morning, but remained below the morning rate for all groups. Further, both salary groups exhibited some post-treatment response maintenance. Most noteworthy, however, is the simple fact that most hourly workers at both plants refused to participate in the incentive program. This result raised several questions, the most obvious being "Why?"

In order to explore the reasons for the hourly/salary differences, a questionnaire was administered which focused on potential variations between salary and hourly workers (Geller, 1982c). This questionnaire was concerned with differences in : (1) solidarity among blue-collar and white-collar workers; (2) perceptions of on-the-job risk; and (3) perceptions of freedom to make job-related decisions. The results showed significant differences in terms of both on-the-job risk and freedom, with hourly workers reporting significantly *more* personal risk and *less* freedom to make work-related decisions than salary employees.

Geller (1982c) offered two interpretations of these results. First, it is possible that the hourly workers' perception of substantial external control (in comparison with the perceptions of salary workers) made them more apt to resist another perceived attempt to control their behavior. That is, the seat

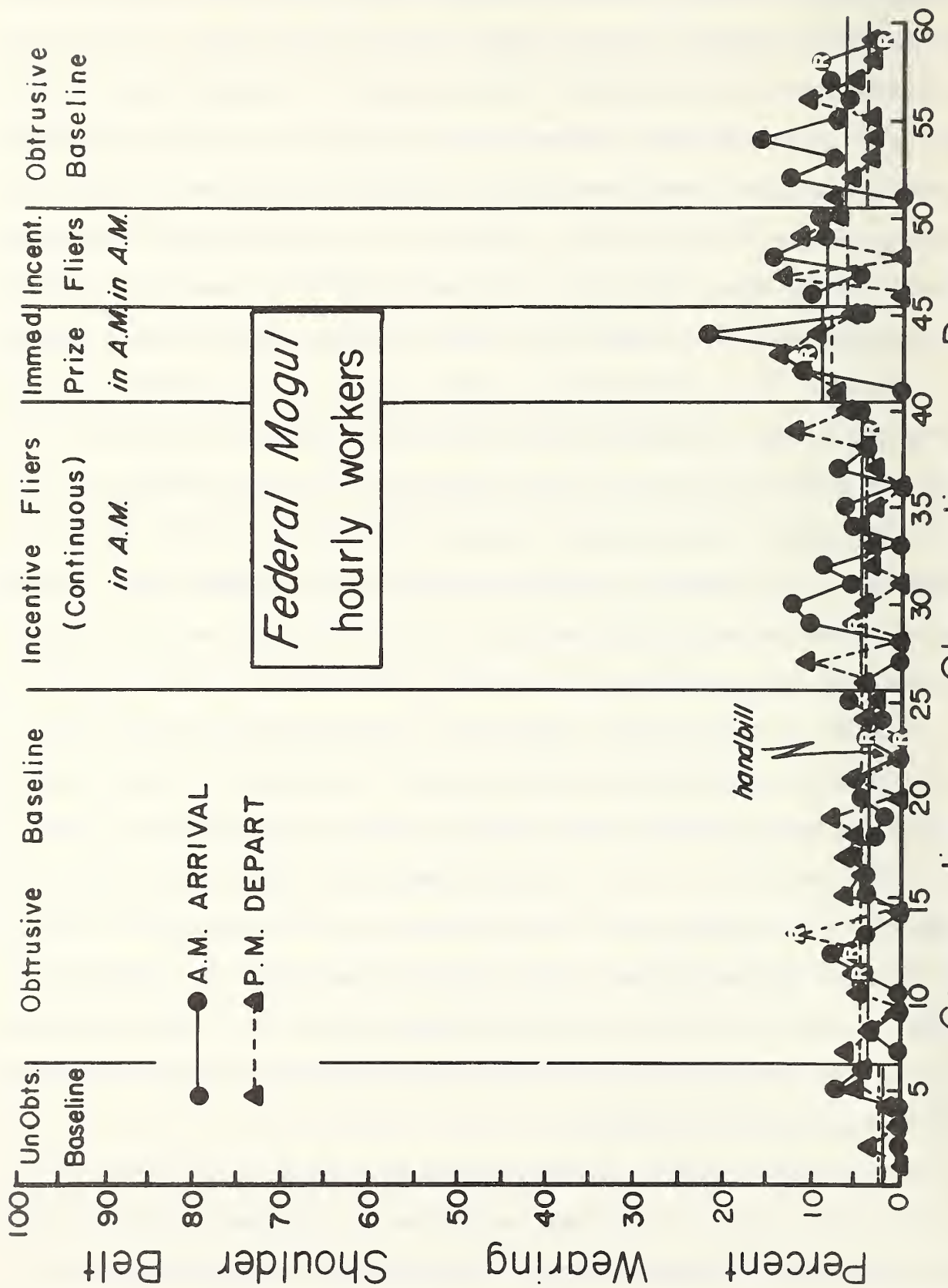


Figure 1. Mean shoulder-belt usage among hourly (blue-collar) employees at Federal Mogul during consecutive morning and afternoon observation sessions throughout Summer, 1981.

Figure 2. Mean shoulder-belt usage among salary (white-collar) employees at Federal Mogul during consecutive morning and afternoon observation sessions throughout Summer, 1981.

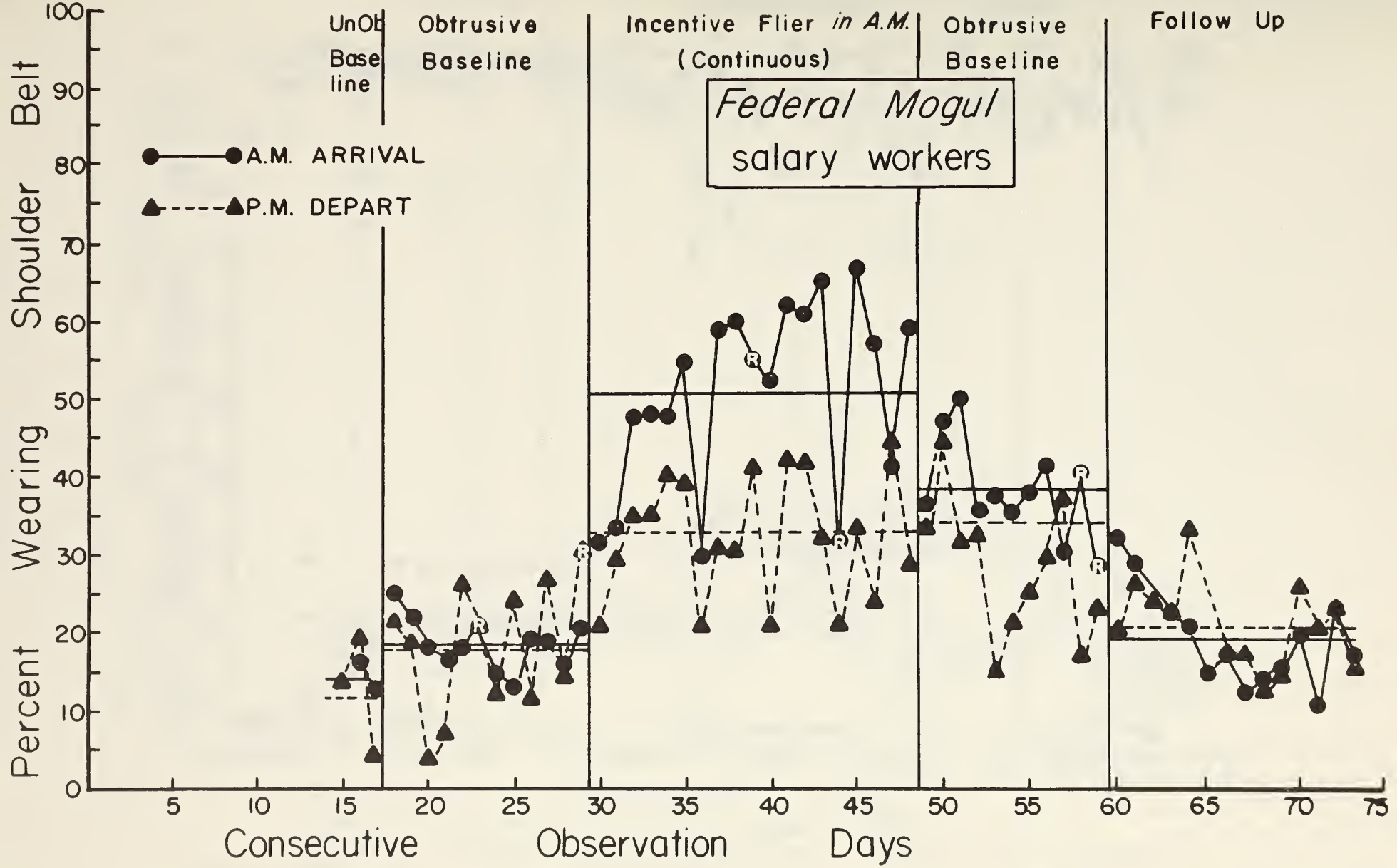


Figure 3. Mean shoulder-belt usage among hourly (blue-collar) employees at Hubbell Lighting during consecutive morning and afternoon observation sessions throughout Summer, 1981.

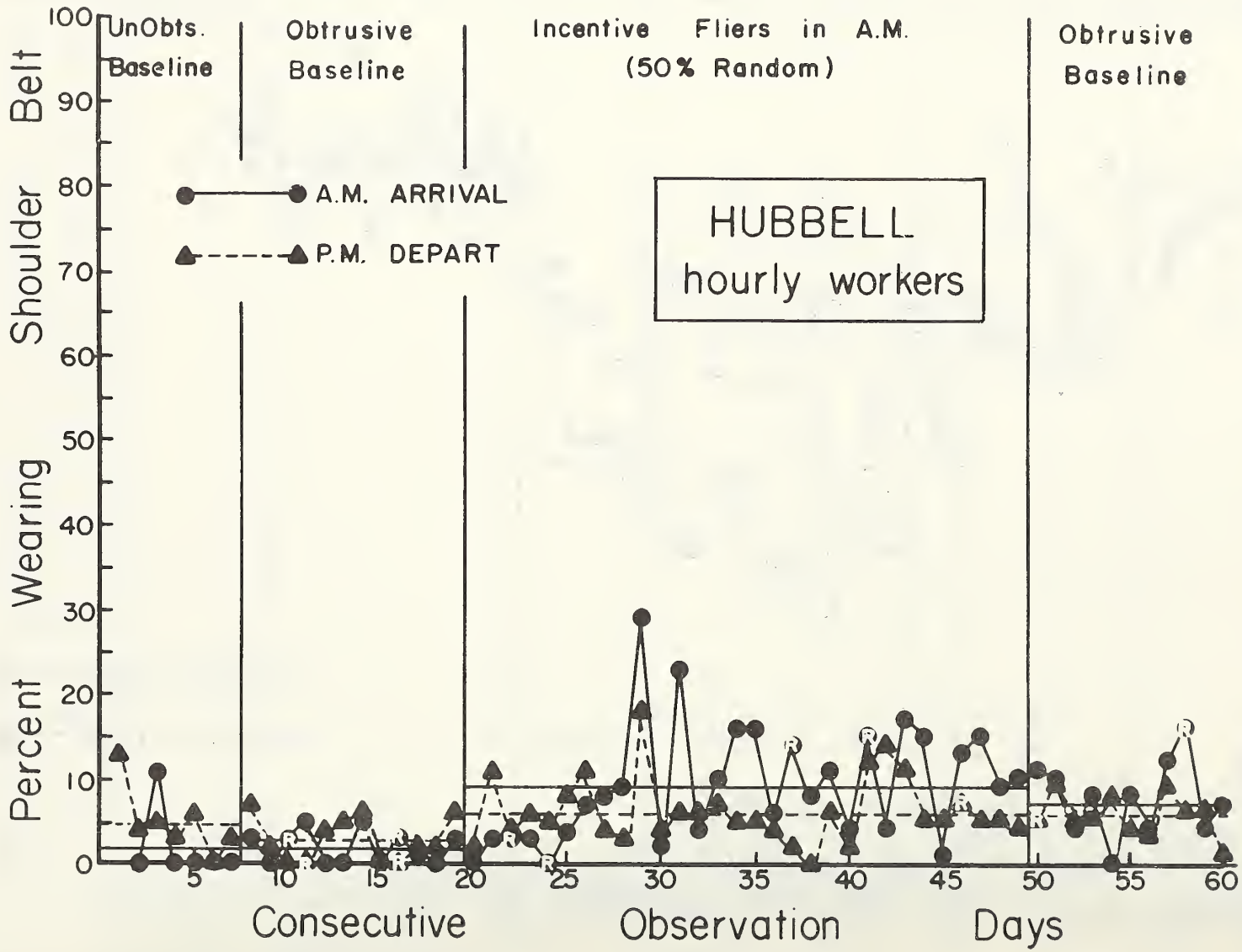
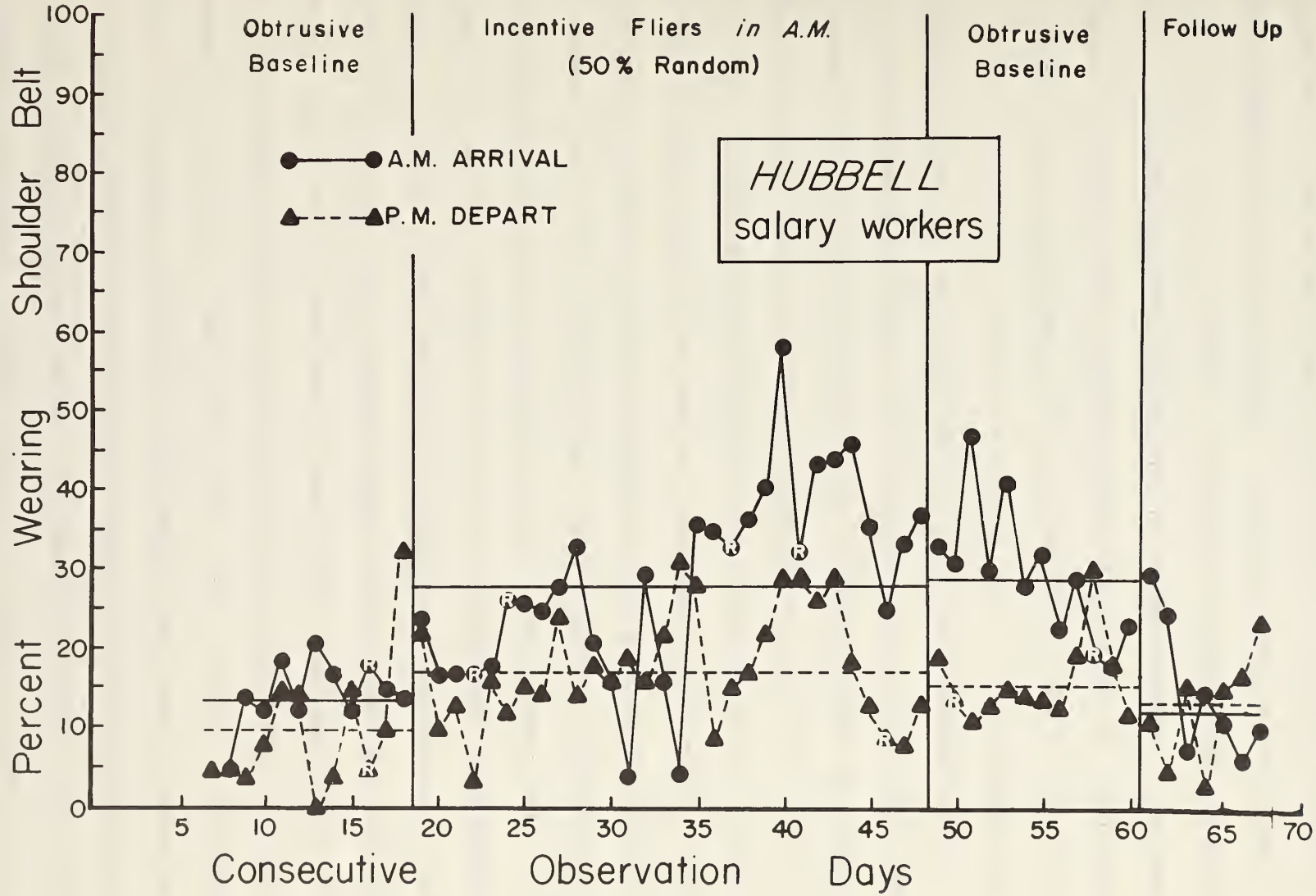


Figure 4. Mean shoulder-belt usage among salary (white-collar) employees at Hubbell Lighting during consecutive morning and afternoon observation sessions throughout Summer, 1981.



belt incentive program was viewed as "just another restriction." Second, it is possible that the contrasting perceptions and experiences of personal risk during the work day of hourly versus salary employees influenced differential judgments of risk with regard to driving. That is, the degree to which one perceives the driving environment as risky may depend upon the amount of perceived risk experienced in the proximal environmental setting, such that perceptions of driving risk vary inversely with recent (i.e., preceding) or expected (i.e., subsequent) risk perceptions (e.g., in the work environment).

Conversations (i.e., focus groups) with the personnel managers at each plant one year later supported both of these interpretations as well as pointing to several additional potential factors influencing the previous failure to induce seat belt wearing among hourly employees: (1) the lack of advance publicity led to confusion and suspicion among employees (this would have had a greater impact on hourly workers who are more wary of "innovations" at the plant than are salary workers); (2) hourly workers identified less with Virginia Tech and the college researchers than did salary workers; (3) the lower education of the hourly employees made them less apt than salary employees to be affected by fliers and posters that attempt to increase safety awareness; (4) hourly workers may be more likely to have a "negative macho" image of seat belt wearers, which serves as a disincentive to buckle up; (5) the prizes awarded in the previous incentive program (i.e., dinners at the best local restaurants) may have been less desired by hourly than by salary employees; and (6) the behavior of hourly workers is already rather controlled at the plant (compared with salary workers) -- if seat belt incentive programs are viewed as just another restriction workers are apt to resist the perceived attempt to control their behavior. These results corroborate the reasoning of Geller (1982c). [See Geller (1983b) for the

specific interview data gathered during the focus-group discussions that resulted in these conclusions.]

The plausibility of the last of these interpretations is supported in the industrial and social psychology literature. In the industrial realm, Lawler and Hackman (1969) studied the effects of blue-collar employee participation on the success of pay incentive plans designed to reduce absenteeism. Four conditions were employed: (1) subjects developed their own pay incentive programs to reward good attendance; (2) pay plans developed by subjects in Condition 1 were imposed on subjects in Condition 2; (3) attendance was discussed with subjects, but no pay adjustment was made; and (4) subjects received no intervention. The results of this study showed that a significant increase in attendance followed only Condition 1, thus supporting the notion that workers are more likely to "go along" with policy changes when they have perceived control over those changes.

Lawler and Hackman (1969) offered three possible explanations for their results. First, it is possible that participation caused subjects to be more committed to the plan, a point raised earlier by Lewin (1958). Second, it is likely that workers who participated in program development were more knowledgeable about the program. Finally, it seems that participation increased the employee's trust in the management's good intentions regarding the plan. This explanation also seems to support two of the interpretations given for the failure of the research reported by Geller (1982c) and Geller *et al*. (in press), namely, suspicion on the part of hourly workers and lack of identification with (or trust in) the researchers.

The notion that differential education on the part of hourly and salary workers influenced lower belt wearing among hourly workers is well supported in the preventive health literature. For example, Kelley (1979) found that lower educational levels of subjects resulted in less susceptibility to

preventive health campaigns on their part than was exhibited by subjects with a higher educational level.

Given this somewhat discouraging data, the challenge of the present research was to increase the susceptibility of a low-education target population (i.e., hourly employees) to the notion of preventive health. As Matarazzo (1982) noted, this endeavor is worthwhile since encouraging currently healthy citizens to fasten their safety belts at the individual level is one facet of preventive health efforts whose outcome will be to reduce human and financial costs at the societal level.

Several approaches to alleviating the weakness in previous incentive programs to promote safety belt use were attempted in the current research. Publicity in the form of prominently displayed posters was provided for the duration of the program. Surveys and fliers handed out at the plants served as additional publicity, as did histogram feedback charts posted during the incentive phase.

Attempts were made to involve the hourly employees in the program through "awareness sessions", which consisted of a three minute film followed by a 15 minute discussion of "What holds us back from buckling up?", during which the workers were encouraged to comment. It was also hoped that these sessions would foster some identification with the researchers and the program itself, as was the case in the Lawler and Hackman (1969) study.

In addition to the work by Lawler and Hackman (1969), the potential efficacy of the awareness sessions in motivating behavior change was also eloquently demonstrated by Kurt Lewin (1958) in a series of studies aimed at changing food habits to accomodate wartime needs. Most relevant to the current research is a study which compared the impact of lectures and group discussions to increase the use of beef hearts, sweetbreads, and kidneys. For the Lecture condition, health and economic aspects of the meats were

stressed and preparation techniques were given. In the Group Decision condition, the same topics were covered, however, a discussion format was used (as in the awareness sessions of the present study). More specifically, techniques were offered only after the groups had become sufficiently involved to be interested in knowing whether potential obstacles to using these meats could be overcome. At the end of the meeting, the group members were asked to raise their hands if they would be willing to try one of the meats. That is, commitment was solicited. Thus, the awareness sessions in the current study were quite analogous to Lewin's group decision procedure in that they were also designed to elicit both involvement and commitment.

The results of Lewin's study showed that, of the women exposed to the Lecture condition, only 3% tried one of the recommended meats, compared to a 32% trial rate among women exposed to the Group Decision condition. Several of the factors to which Lewin attributes this difference are relevant to the present study. First, Lewin (1958, p. 202) noted that "discussion, if conducted correctly, is likely to lead to a much higher degree of involvement (than is lecture)." Correct conduct of a discussion session, according to Lewin, includes securing high involvement while not impeding freedom of decision. That is, discussion sessions should not be high-pressure sales pitches. These recommendations were adhered to in the design of this study's awareness sessions.

Given Lewin's classic research, then, one would expect the awareness intervention used in the present study to meet with more success than that encountered in previous studies using educational strategies in an attempt to motivate seat belt use, since the awareness sessions fostered involvement within the target population while all previous programs paralleled the passive lecture approach (e.g, Cunliffe *et al.*, 1975; Geller, 1981b; Phillips, 1980).

Lewin also pointed out that, while neither lectures nor group discussions typically lead to a decision, there is "a great difference in asking for a decision after a lecture or after a discussion (p. 203)." That is, the audience will be more ready to make up its mind after a group decision than after a lecture. Lewin also noted that "group-carried-changes" are more readily brought about than either individual or "mass approach" changes, since individuals are generally unwilling to depart from group standards. Hence, "if a change of sentiment of the group becomes apparent during the discussion, the individual will be more ready to come along (p. 204)." This notion of group conformity was capitalized upon in the current study.

Prize Preference Surveys[1] were distributed to workers at both plants in order to determine hierarchies of reward preference, as well as to provide a test of the hypothesis concerning differences in hourly/salary reward preferences and the appropriateness of rewards used previously.

Several other considerations influenced the design of the present study. First, the incentive approach used in the aforementioned hourly/salary research involved stopping cars to distribute incentive fliers. This procedure is impractical in high-traffic areas since it may cause slow-downs as well as being overly intrusive. Hence, an incentive scheme that did not involve stopping cars was evaluated in this research.

Second, constraints imposed by the management at the plants as well as the existing procedures at the plants shaped the design. At Federal Mogul, it was impossible to conduct awareness sessions like those conducted at Hubbell Lighting. This, however, was not particularly a detriment since the Federal Mogul baseline data could be considered a control for the Hubbell Lighting

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[1]Funds from the DOT grant were *not* used for the questionnaire aspects of this study. Rather, the design, administration, and analysis of the questionnaires used in this research were supported by General Motors Research Laboratories.

post-awareness session data. Distribution of the Prize Preference Survey was feasible at Federal Mogul, however, so it was possible to separate effects of the survey alone versus the survey in conjunction with the awareness session.

At both plants, group contingencies, as opposed to rewards for individual usage, were preferred by the management. In addition, since group contingencies capitalize upon the group conformity principles discussed above, such a strategy was also preferred. Typically, implementation of a group contingency would imply setting a group performance goal which would have to be met in order for the entire group to win a prize. In the current study, a cost-effective refinement of this technique was employed, which required less rewards to be given at one time. In particular, the magnitude of prizes awarded to contest winners was determined by the overall performance of that person's work group. A prime advantage to such a contingency is its practicality for a variety of industrial settings, since it requires only an assessment of some group's performance (e.g., performance of hourly versus salary workers, or performance of the entire work force), and a method of awarding prizes to individuals (e.g., through a lottery system).

In a few cases, however, the wishes of the management had to be (tactfully) overriden in favor of good experimental design. For example, in the planning stages of this study, the plant manager at FM suggested what seemed to be an extremely viable incentive, namely, providing coffee and donuts or cake and ice cream for everyone in the plant once some group belt use criterion had been reached. This was a procedure that was already in use in the plant, thus it should have been readily accepted; it appeared to be cost effective in that every employee could have received a reward for not more than $300; and it would have been easily administered either by the researchers or the in-house food service. While this incentve plan seemed

particularly appealing to the researchers, the results of the Prize Preference Survey showed that neither of the suggested rewards were desired by the workers. Hence, a prize that was determined to be desirable to the workers, namely cash, had to be substituted and the recommendation that the entire group be rewarded was not followed. Naturally, any such changes were cleared with plant management prior to their implementation.

Hypotheses

1. Attempts at involving employees in the seat belt promotion program will increase seat belt usage. Administration of the Prize Preference Survey (PPS) will make workers feel as though they have some input into the program, and should therefore increase belt usage at both plants.
2. The awareness session given to HL hourly workers will increase seat belt usage in that group relative to FM hourly workers, who will not receive an awareness session. Hence, awareness sessions combined with the PPS will have a greater impact than the PPS alone, thus demonstrating the efficacy of the awareness session.
3. Since neither salary group (at HL and FM) will have experienced an awareness session, belt usage between these groups will not differ.
4. Group contingencies coupled with a prize of the employees choosing will increase belt usage. This effect will be greatest among hourly workers at HL, since they will feel the most personally involved in the incentive program as a result of the awareness session.
5. Treatment effects among salary workers at both plants will be greater than those found previously, since the current intervention should provoke peer pressure through a group contingency, whereas the previous incentive program at these plants (one year earlier) included only an individual contingency. For the same reasons, the impact of the current incentive program will be greater among hourly workers at FM

than that found previously.

6. Response patterns among hourly workers at HL will differ significantly from those found previously. That is, HL's hourly workers will respond favorably to treatment, and will show marked increases in belt usage.

Method

Subjects and Settings

Subjects were sampled from the employees of two large industrial complexes in Southwest Virginia: Federal Mogul, Inc. (FM) in Blacksburg, Virginia, and Harvey Hubbell Lighting Division, Inc. (HL) in Christiansburg, Virginia.

Federal Mogul (FM). Federal Mogul manufactures engine bearings, and operates in three shifts: a day shift (7:00 a.m. to 3:30 p.m.), an evening shift (3:00 p.m. to 11:00 p.m.), and a night shift (11:00 p.m. to 7:00 a.m.). Approximately 450 hourly employees are involved in production, inspection, and maintenance jobs; whereas about 100 people are employed in salary positions including engineers, accountants, and management and personnel staffs.

Vehicles were observed as they entered and exited the only two parking lots of FM. One lot is used only by blue-collar (hourly) employees, while the other is used by white-collar (salary) workers. Observation sessions occurred from 6:15 to 7:15 a.m. and 2:45 to 3:45 p.m. at the hourly lot and from 7:20 to 8:00 a.m. and 4:00 to 4:45 p.m. at the salary lot, Monday through Friday. These session times allowed for observation of the arrival and departure of salary and day-shift hourly employees, as well as the departure of night-shift and arrival of evening-shift hourly employees.

Hubbell Lighting (HL). Of those employed at HL, approximately 325 are employed on an hourly basis while about 150 are salary employees. The plant produces lights and lighting fixtures, the hourly employees being responsible

for the complete construction of such fixtures. Salary workers include members of marketing, accounting, engineering, personnel, and secretarial staffs.

Individuals were observed as they entered and exited the only two parking lots of HL. Observation of the hourly workers occurred Monday through Friday from 7:00 to 7:45 a.m. and from 2:45 to 4:15 p.m. Salary employees were observed from 7:45 to 8:15 a.m. and from 5:00 to 5:15 p.m.

General Observation Procedure

As vehicles entered and exited a lot, two observers (at least one of whom was wearing an orange safety vest) independently recorded whether a shoulder belt was available in the driver's and front-seat passenger's (if applicable) location and whether the occupant was wearing a shoulder belt on a special data collection sheet. There was no attempt to observe every vehicle that entered or exited a parking lot. After completing the data recording of a particular vehicle, the observers looked up and targeted the next available vehicle for observation. At times, communication occurred between observers in order to clarify which vehicle was being observed. This was especially necessary when a continuous flow of traffic made discrimination difficult. On days when it rained, field observations occurred with the observers sitting in a parked car.

Experimental Conditions

Obtrusive Baseline. The two observers stood off to the side at the entrance/exit to the parking lots and recorded vehicle and occupant data following the procedures outlined above. Large posters inside the plants reminded employees of seat belt observations.

Awareness Sessions. Following Obtrusive Baseline, two sets of awareness

sessions were conducted at HL's regular monthly safety meetings for all hourly employees. All awareness sessions (i.e., both sets) were conducted in a room adjacent to the plant cafeteria. The room had approximately 50 folding chairs arranged in rows facing the front of the room. During the sessions, the room was crowded but not uncomfortable. Food and beverages were available from the cafeteria and vending machines.

All awareness sessions were conducted during the last 15 to 20 minutes of the monthly departmental meetings of the hourly employees. Both sets of awareness sessions were preceded by a 20 to 30 minute film and discussion of quality control presented by a company representative.

Each session was conducted by the PI and attended by project personnel who kept written records of attendance, the information presented by Dr. Geller, and questions or comments from the audience.

The first awareness session for HL employees was comprised of a three-minute film and 12 to 16 minutes of presentation/discussion about the potential positive and negative effects of using seat belts. The general format of each session was identical, hence, the following outline of a typical awareness session is representative of all those conducted.

A three minute film, entitled "Egg, Pumpkin, Headache," produced by NHTSA, was shown first. It contained three different "spot messages" for television which demonstrated the potential effects of being unrestrained during an auto accident. The theme of each segment was "What's holding you back?" (from wearing your safety belt.)

Immediately following the film, Dr. Geller introduced himself as "Scott," stated that he wanted to discuss "what holds us back" from using safety belts, and noted that belt usage was only 5% among the hourly workers at the plant. Factual (educational) information was presented during the session. However, this information was contained in personal anecdotes and responses

to the questions and comments of the participants. Information presented in the sessions focused on reasons for wearing seat belts, including the following: (1) to lessen the chance of being injured in an accident; (2) to model appropriate behavior for one's children; (3) to protect oneself from the unskilled and drunk drivers on the road; (4) to avoid government legislation mandating some form of nonvoluntary and expensive restraints; and (5) to reduce expense to HL through savings of work compensation and insurance payments. Also presented was information about the relative risk of injury when restrained in the car rather than thrown clear of the accident.

Since the focus of these sessions was to encourage participation on the part of the hourly workers, Dr. Geller asked several questions designed to promote comments from the participants. These included: (1) How many of you have been in a serious accident? What happened? (2) How many of you feel that seat belts really aren't useful? Why? and (3) What keeps us from wearing safety belts?

At the close of the meeting , Dr. Geller told the workers that he wanted to know what prizes they would like to receive for wearing their seat belts and that he had a survey to give them. This survey, termed Prize Preference Survey, was handed to each worker as s/he left the meeting room. [Appendix D details the format, content, and outcome of the first set of awareness sessions, including a table of specific dates, times, and attendance figures.]

The second set of awareness sessions was conducted one month after the first awareness sessions and included a 10 to 15 minute discussion about the impending incentive program. Appendix E presents the dates, times, and attendance data for this second set of awareness sessions, as well as specific information on content. The session format was the same for all sessions, hence, the following outline is representative.

Dr. Geller introduced himself as "Scott" and reminded the employees that he had been at the previous month's safety meeting. He said that he was not going to "preach" again about why they should wear their seat belts and indicated that seat belt usage was up to 20% (from a 5% baseline) among hourly workers. He indicated that such usage was impressive, and expressed hopes that belt usage would increase even more when the Incentive Program began.

The information presented during this session was concerned with details of the Incentive Program. Specific "rules" of the program were discussed, including: (1) every time the driver of a vehicle is observed wearing a seat belt, that vehicle's license number will be entered in a raffle; (2) passenger wearing will also be recorded and an additional raffle ticket will be given for each buckled passenger; (3) wearing lap belts also earns raffle tickets, but employees must alert observers to their lap belt usage; (4) a raffle will be held every Monday and the prize will be cash in the amount of the group's average usage during the previous week; and (5) a large chart will be posted on the two employee bulletin boards, showing the previous week's average belt usage, each day's average percent belt use, and the current week's average usage for both hourly and salary workers. A sample poster was shown and explained.

Concerns about the Incentive Program were raised by both Dr. Geller and the participants. These concerns included: (1) the division of prize money among carpoolers; (2) the fact that those whose vehicles have no seat belts and motorcyclists are excluded from the program; (3) the decision that, since evening shift workers are not observed when leaving the plant at 1:00 a.m., these workers will be given two raffle tickets if they are observed wearing a seat belt, in order to make their chances of winning equal to those of the day shift workers; and (4) the possibility that some belt wearers would not be

entered in the raffle because their entrance or exit route did not take them past the observers.

At the close of the meeting, Dr. Geller told the participants that he wanted to know their reactions to the previous month's safety meeting and that he had another survey to distribute. Dr. Geller also noted that a written summary of the incentive program (see Appendix F) would be given out. Both the survey and the summary sheet were handed to each worker as s/he left the meeting room.

Data collection following both sets of awareness sessions was the same as for Obtrusive Baseline.

Questionnaire Distribution. At HL, a Prize Preference Survey (see Appendix G) was distributed to both hourly and salary workers. This survey consisted of five demographic questions, four questions concerning the utility of an incentive program for motivating seat belt usage, and twenty questions dealing with the desirability of various possible prizes. Hourly workers received surveys as they left the first set of awareness sessions. For the salary workers, a sign announcing the survey and the procedure for participating were placed in the plant along with a return box. As an incentive for completing and returning the questionnaires, all employees were told that they would be eligible to win a $50 cash prize (from a raffle of returned surveys) if they filled out the questionnaire and returned it to a box that had been placed in their cafeteria.

"Awareness Session Follow-up Surveys" (labelled "Driver Questionnaire" in Appendix H) were distributed to hourly and salary workers at the time of the second awareness sessions (i.e., one month following the first awareness session and the distribution of the Prize Preference Survey). These questionnaires were designed to assess safety belt wearing both before and after the first awareness session as well as to ascertain reasons why workers

were or were not wearing safety belts following the first awareness session. The procedures for disseminating this survey and attempting to motivate its completion (i.e., the $50 drawing among returned questionnaires) were the same as that used for the Prize Preference Survey.

At FM, researchers handed out the Prize Preference Survey on the road leading to the plant as the employees were either entering or exiting (as per the recommendation of the plant's personnel manager). Boxes were placed inside the plant to facilitate return of the questionnares and, as was the case at HL, employees were eligible to win $50 in a raffle drawing if they returned a completed survey.

Since no awareness sessions were conducted at FM, the follow-up survey was not given at this plant. The incentive program summaries were distributed the same way as were the Prize Preference Surveys (i.e., handed to drivers as they entered or exited the plant). This summary and the feedback poster (both described in the previous section) were posted on the two employee bulletin boards at FM.

At both plants, belt usage observations following distribution of all questionnaires was the same as in the Obtrusive Baseline condition.

Incentive Program. As noted earlier, the Incentive Program included three basic ways in which employees could participate in the "Seat Belt Sweepstakes": (1) drivers who were wearing seat belts would have their vehicle entered in the raffle; (2) buckled passengers would earn a raffle entry for the vehicle in which they were riding; and (3) drivers and passengers who were wearing *lap* belts would earn one raffle ticket per buckled occupant provided that they notified the observers that they were buckled.

For the collection of field data, the observation procedures were the same as during Obtrusive Baseline (i.e., observers were stationed at the same

locations and recorded the same information). In addition to collecting their data, however, the observers also issued raffle tickets, posted feedback information daily regarding percent of usage, and conducted raffles throughout the entire incentive period.

The procedure for giving raffle tickets was as follows: after all data collection periods, the two observers compared their data sheets and noted on special raffle forms the license number of any vehicle in which drivers or passengers were wearing shoulder or lap belts. One notation was made for each belt-wearing occupant. All belt wearers observed by *either* recorder were entered in the raffle (i.e., it was not required that *both* observers see the belt being used for a raffle ticket to be awarded). Upon returning to the laboratory, the observers cut up the raffle forms to make individual raffle tickets and placed these tickets in raffle boxes. Records were kept of how many tickets were awarded to hourly and salary workers during each data collection period.

Following afternoon data collection, the researchers entered the plants and posted the following information on two posters--one poster located in the blue-collar area of the plant, and the other in the white-collar area: (1) the previous day's average belt wearing for both hourly and salary workers; (2) that morning's average wearing for both groups; and (3) the current weekly average (i.e., up to the previous day) for both groups. In addition, on Mondays the previous week's average was posted for each group, as was the date of the next raffle.

Every Monday afternoon, prior to field observations, the data collectors conducted a raffle at each plant. The general procedure was for the data collectors to bring the raffle box (containing the previous week's raffle tickets) to the plant's personnel office where a staff member drew the winning ticket. The license plate number on that ticket was posted on the plant

bulletin board and the winner reported to the personnel office to receive the prize money. The amount of the prize was determined according to the average seat belt usage of that employee's group (i.e., hourly or salary) for the previous week. Hence, if the winner was an hourly worker, and the hourly average for the previous week was 38.1%, the prize awarded was $38.10.[2]

The only exception to these incentive procedures was that, at FM, the last raffle was held two weeks after its predecessor in an attempt to assess the impact of fading out the Incentive Program (i.e., decreasing the frequency of the raffles). In this condition, the only procedural difference was that the raffle tickets were accumulated over a two-week period before a drawing was held. Employees at the plant were notified of this change via signs in the plant indicating the date of the next raffle.

Withdrawal. On the Monday following the last raffle at each plant, fliers indicating that the Incentive Program was being discontinued were distributed. At HL this flier distribution occurred as follows: fliers were posted on the same bulletin boards where the feedback posters were displayed; these fliers were also placed in the entrances to the building for employees to pick up. At FM fliers were posted on the feedback bulletin boards, and were also handed to drivers on the access road to the plant as they entered or exited. Data collection during this phase was the same as in all previous conditions. In addition, the provision of daily feedback regarding safety belt usage via the bulletin-board posters was continued at both plants.

Data Summarization

After each observation period, the data was summarized according to the

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[2]Funds from the DOT grant were *not* used for this cash expense. The PI issued personal checks for the cash awards.

following scheme: (1) the number of observations, seat belt availability, and the number and percent of seat belt wearers were recorded independently for each observer; (2) the number of observations made by *both* observers, the safety belt availability judged by *both* observers, and the number and percent of seat belt wearers observed by *both* recorders were noted; and (3) interobserver reliability was calculated by dividing the total number of observations agreed upon for a particular data category (i.e., license plate number, sex of driver, availability of shoulder belt, and belt-wearing usage) by the total number of observations for that category, and multiplying by 100. The license plate check involved comparing the two observers records of each vehicle's license plate number for agreement. An overall coding check involved a comparison of the occupant sex, wearing status, and availability status for both observers; disagreement on any of these categories resulted in lowered interrater reliability. Finally, the belt-wearing check separated out information regarding wearing status from the general coding check. That is, only agreement regarding belt-wearing was considered in this category.

Results

Prize Preference Survey

An hourly versus salary analysis of the Prize Preference Survey (PPS) was conducted for each plant. At FM, the overall return rate for questionnaires was quite low (i.e. 29.5%) resulting in 90 completed surveys, 75 from hourly workers (a return rate of 28.4%) and 15 from salary workers (a return rate of 36.6%).

The return rate at HL was substantially greater than that at FM. One hundred ninety two surveys were completed for an overall return rate of 52.3%. Of these, 130 came from hourly workers (a return rate of 50.6%) and

62 came from salary workers (a return rate of 56.4%). For both groups , then, the return rates were significantly different at the two plants (for hourly workers, $t=5.27$, $p<.001$, and for salary workers, $t=2.23$, $p<.05$). The robustness of this result with hourly workers is particularly impressive and could be taken as support of the efficacy of the awareness sessions in motivating cooperation among blue-collar workers.

Basically, the PPS was composed of three types of questions: those dealing with demographic variables, those dealing with receptiveness toward a seat belt incentive program, and those dealing with actual prize preferences. In addition, for the FM survey, questions dealing with preferred probabilities of winning certain amounts of cash were included in the questionnaires.

Federal Mogul (FM). At FM, hourly and salary groups differed significantly on one of the four demographic variables, namely, self-report of safety belt wearing ($\chi^2= 11.2$, $p<.01$). That is, at the time of the survey, salary workers reported that they wore their safety belts significantly more often than hourly workers (who were more likely to say that they did not wear their seat belts). These groups did not differ on the other demographic variables of interest, namely, age, sex, and place of residence.

With regard to utility of a seat belt program, the groups at FM did not differ in their response to the question dealing with whether or not individuals would wear their seat belts in order to win a prize, both groups answering "yes" slightly more often than "no". They did, however, differ significantly in their response to a question regarding the usefulness of an incentive program ($\chi^2=44.4$, $p<.001$), FM hourly workers reporting more often than salary workers that they considered such a program to be useful. There were no differences between the groups on two questions dealing with program strategies.

On the questions dealing with prize preferences, there was only one

significant difference between the work groups at FM: FM salary workers found dinner at a high-priced restaurant to be more desirable than did hourly workers (χ^2=19.1, p<.01). Interestingly, neither work group found in-house refreshments (i.e., coffee and donuts, or ice cream and cake) to be a particularly desirable reward.

In addition to chi square analyses, the preference data were subjected to a weighted rank ordering within each group, as determined by adding a weighted version of the preference ratings for each item. The result was a hierarchy of prize preferences, as shown in Table 1 on the following page. Note that for both salary and hourly workers the most desired prize was a gift certificate for groceries, followed by coupons to be used at restaurants. As noted previously, however, the type of restaurant desired differed between groups. Note also that both groups considered an ice cream break the least desirable of the potential prizes. Finally, although it is not reflected in the questionnaire analysis, a space was provided on the surveys for respondents to suggest other reasonable prizes. The most common (reasonable) prize suggested was a cash award, occuring on 5 of 14 surveys containing written comments. For comparison, it should be noted that the two second most common suggestions were gas and tools, each of which were written twice.

In order to assess the workers' trade-off preferences for prize money versus probability of winning the money, a question was asked in which employees specified the desirability of each of the following options: (1) one person wins $5000; (2) ten people win $500; (3) 50 people win $100; (4) 100 people win $50; or (5) 500 people (all plant employees) win $10. Note that, in each case, the expected value was the same (i.e., $5000). However, there was a decided preference among both hourly and salary workers for the option in which 100 people would win $50. Also, both groups found the option

Table 1

Weighted Rank Order of Prize Preferences for Hourly (Blue-Collar) and Salary (White-Collar) Workers at Federal Mogul

HOURLY WORKERS	*SALARY WORKERS*
Groceries (308)	Groceries (62)
Restaurants (290)	Restaurants (57)
Steak (132)	High Priced (28)
Fast Food (110)	Steak (26)
High Priced (91)	Fast Food (18)
Ice Cream (78)	Ice Cream (17)
Appliances (268)	Auto Maintenance (55)
Emergency Kits (251)	Lawn Tools (54)
Recreation (250)	Sporting Goods (53)
Indoor Movies (132)	Emergency Kits (53)
Drive-Ins (119)	Recreation (51)
Bowling (109)	Indoor Movies (22)
Mini Golf (95)	Bowling (21)
Skating (91)	Drive-Ins (19)
Video Arcades (89)	Mini Golf (18)
Auto Maintenance (246)	Video Arcades (16)
Records (243)	Skating (14)
Lawn Tools (226)	Appliances (50)
Jewelry (215)	Sporting Events (49)
Amusement Parks (208)	Jewelry (48)
Books (203)	Records (44)
Sporting Goods (195)	Vending Tokens (42)
Vending Tokens (193)	Amusement Parks (42)
Sporting Events (192)	Books (40)
Toys (191)	Toys (40)
Coffee and Donuts (190)	Coffee and Donuts (38)
Hair Styling (188)	Hair Styling (31)
Ice Cream Break (181)	Ice Cream Break (31)

Note -- The numbers in parentheses are scores derived by summing the number of responses to a particular question, each of which was weighted by a factor from one to five, according to the following point scheme: 'not at all desirable'= 1; 'slightly desirable'= 2; 'somewhat desirable'= 3; 'moderately desirable'= 4; and 'extremely desirable'= 5. The sub-categories under "Restaurants" and "Recreation" had only two alternatives per question: 'yes'= 2 or 'no'= 1.

in which one person would win $5000 to be least desirable. This is shown in Table 2 on the following page, which gives a weighted rank ordering of the five options.

Hubbell Lighting (*HL*). At HL, hourly and salary workers differed significantly with regard to two demographic variables: the hourly group was predominantly female, while the salary group was predominantly male (χ^2=13.0, p<.01); and the hourly group was less likely to report that they wore their seat belts than was the salary group (χ^2=19.0, p<.01).

Hourly and salary workers at HL responded differently to both questions dealing with receptivity to an incentive program: hourly workers were more likely to report that they would buckle-up to win a prize than were salary workers (χ^2=12.0, p<.01); and hourly workers were also more likely to feel that the giving of prizes was an appropriate method of motivating seat belt wearing than were salary workers (χ^2=32.0, p<.001). As was the case at FM, there were no between-group differences on questions dealing with program management.

With regard to prize preferences, hourly and salary workers differed in their responses to two items, namely, a steak dinner and a gift certificate for merchandise at an ice cream parlor. In the case of the steak dinner, significantly more hourly than salary workers found the prize desirable (χ^2=9.0, p<.01). In the case of the ice cream parlor, the opposite was the case; that is, the prize was more desirable to salary workers than to hourly workers (χ^2=22.9, p<.01). Although the chi square analysis showed a significant difference between the groups, a weighted rank ordering of the prize options shown in Table 3 placed each of these two rewards in the same rank for each group. Hence, it would seem that both of these options would be equally appropriate for either group. In addition, as was the case at FM, cash was the prize most often written in the open-ended suggestion section of

Table 2

Weighted Rank Order of Probability and Value Options for Hourly (Blue-Collar) and Salary (White-Collar) Workers at Federal Mogul.

HOURLY WORKERS	*SALARY WORKERS*
1) 100 get $50 (206)	1) 100 get $50 (50)
2) All get $10 (197)	2) 50 get $100 (44)
3) 50 get $100 (181)	3) All get $10 (36)
4) 10 get $500 (153)	4) 10 get $500 (33)
5) 1 gets $5000 (5)	5) 1 gets $5000 (12)

Note -- The numbers in parentheses are scores derived by summing the number of responses to a particular question, each of which was weighted by a factor from one to five, according to the following point scheme: 'not at all desirable'= 1; 'slightly desirable'= 2; 'somewhat desirable'= 3; 'moderately desirable'= 4; and 'extremely desirable'= 5.

Table 3

Weighted Rank Order of Prize Preferences for Hourly (Blue-Collar) and Salary (White-Collar) Workers at Hubbell Lighting

HOURLY WORKERS	*SALARY WORKERS*
Groceries (563)	Groceries (243)
Restaurants (510)	Restaurants (243)
Steak (245)	Steak (99)
High Priced (166)	High Priced (83)
Fast Food (158)	Fast Food (76)
Ice Cream (137)	Ice Cream (76)
Auto Maintenance (498)	Auto Maintenance (209)
Appliances (491)	Appliances (204)
Emergency Kits (456)	Lawn Tools (206)
Hair Styling (424)	Hair Styling (195)
Records (411)	Recreation (187)
Sporting Goods (394)	Movies (100)
Lawn Tools (392)	Drive-Ins (84)
Recreation (388)	Mini Golf (84)
Movies (207)	Bowling (82)
Drive-Ins (206)	Skating (76)
Bowling (185)	Arcades (67)
Mini Golf (170)	Records (187)
Skating (162)	Sporting Goods (185)
Arcades (161)	Emergency Kits (183)
Coffee and Donuts (376)	Coffee and Donuts (176)
Amusement Parks (372)	Sports (175)
Vending Tokens (356)	Books (165)
Jewelry (334)	Vending Tokens (160)
Sports (320)	Jewelry (146)
Books (316)	Amusement (138)
Cake and Ice Cream (314)	Cake and Ice Cream (132)
Toys (287)	Toys (124)

Note -- The numbers in parentheses are scores derived by summing the number of responses to a particular question, each of which was weighted by a factor from one to five, according to the following point scheme: 'not at all desirable'= 1; 'slightly desirable'= 2; 'somewhat desirable'= 3; 'moderately desirable'= 4; and 'extremely desirable'= 5. The sub-categories under "Restaurants" and "Recreation" had only two alternatives per question: 'yes'= 2 or 'no'= 1.

the questionnaire (suggested on 15 of 36 surveys containing written comments). Gasoline was the second most suggested prize (written in on five surveys).

Awareness Session Survey

The "Awareness Session Survey" given at HL was also subjected to an hourly versus salary analysis. For this survey, the return rate was not nearly as high as for the PPS. Ninety-one surveys were returned for an overall return rate of 24.9%. Of these 58 were from hourly workers (a return rate of 22.3%) and 33 were from salary workers (a return rate of 31.4%). In general three types of questions were asked in this survey: (1) those soliciting information about the vehicle driven; (2) those soliciting information about driving behavior following the first set of awareness sessions; and (3) those soliciting information about the reasons for a change in driving behavior, or the lack thereof, following the first set of awareness sessions.

With regard to demographic information concerning the vehicles driven, there were no differences between hourly and salary workers in terms of vehicle type, vehicle size, or available seat belt equipment. Hourly and salary workers differed significantly in their responses to four of five questions dealing with behavior following the awareness sessions. [Recall that salary workers did not receive the awareness session, but were given the PPS at the same time.] Hourly workers were significantly more likely to report increased belt wearing (as compared to the period one month prior -- i.e., before the awareness sessions and PPS) than were salary workers (χ^2=10.2, p<.01). Blue-collar workers reported feeling *safer* while driving at the time of the survey as compared to one month previous to the survey more often than did white-collar workers (χ^2=8.3, p<.05). Salary workers were more likely to report taking the same amount of risks while driving at the

time they responded to the questionnaire; hourly workers were more likely to report taking *fewer* risks at survey time than in the previous month (χ^2=9.7, p<.05). Finally, hourly workers were more likely to say that they were comparatively more comfortable behind the wheel at the time of the survey than were salary workers (χ^2=7.5, p<.05). Both groups of workers, however, reported driving at the same speed before and after the awareness sessions or PPS.

Of those respondents who said that they were wearing their seat belts more often following the initial awareness sessions and PPS, hourly workers were significantly more likely to cite the desire to be a good model for their children as a reason for their behavior change than were salary workers (χ^2=6.5, p<.05). [Note that at the awareness sessions for HL hourly workers, Geller emphasized modeling for children as a reason for buckling up.] Hourly workers were also significantly more likely to say that the convenience of belt-wearing was an important factor motivating their belt usage than were salary workers (χ^2=6.9, p<.05), another point discussed at the awareness sessions.

Finally, of those respondents who claimed not to be wearing their seat belts more following the initial awareness sessions or PPS, hourly workers were more likely than salary workers to attribute their non-wearing to disbelief in the effectiveness of seat belts (χ^2=6.9, p<.05). Also, salary workers were more likely than hourly workers to report that they were already wearing their safety belts as often as they could remember to prior to the PPS; hence they could not have increased their usage after the PPS (χ^2=6.2, p<.05).

Interobserver Reliability

Two researchers made independent data recordings for 92.4% of the 29,061

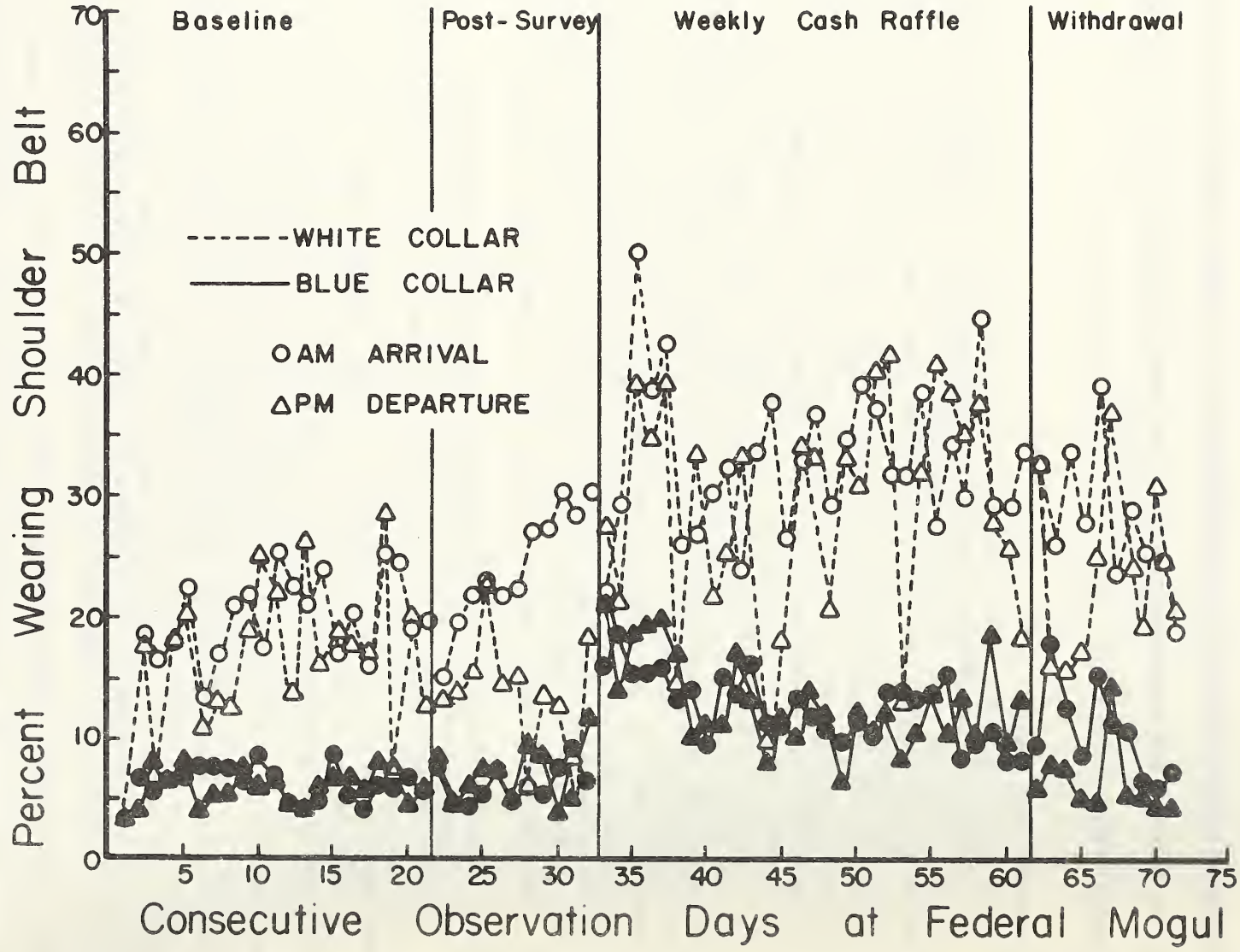
vehicle observations at FM and for 89.4% of the 24,497 vehicle observations at HL. Interobserver agreement regarding the vehicle license number was 95.3% at FM and 97.0% at HL. For the overall coding check, the percent of agreement was 87.0% at FM and 93.0% at HL. For the observation of shoulder belt wearing, the agreement percentages were 89.2% and 91.0% at FM and HL, respectively.

Shoulder Belt Usage

As noted in the Method section, the observation procedure included the recording of whether or not a shoulder belt was available for front seat occupants and whether or not a shoulder belt was worn by the occupant(s) during each observation period. This allowed for an assessment of the daily a.m. versus p.m. wearing habits of each work group at each plant. Combining the data from the two daily observation periods resulted in a daily calculation of the percent of shoulder belt usage by hourly and salary workers at each plant. This, in turn, provided an assessment of the percent of shoulder belt usage for each group per experimental condition. Each of these three approaches to analyzing the data are discussed below.

Federal Mogul (FM): A.M. vs. P.M. Vehicles without shoulder belts were eliminated from all analyses. However, since shoulder belts were available in most vehicles, most observations were included in the following results. The mean percentage of vehicles with shoulder belts available at FM was 76.1% for hourly workers and 86.9% for salary employees. At HL these percentages were 86.0% and 89.1% for hourly and salary workers, respectively. Figure 5 on the next page shows the morning and afternoon percentages among both the blue- and white-collar workers at FM. In order to enable assessment of potential differences in wearing based on arrival versus departure, this analysis included only people arriving for work in the morning and leaving

Figure 5. Mean shoulder-belt usage among hourly vs. salary workers at Federal Mogul during consecutive morning and afternoon observations throughout Summer, 1982.



work in the afternoon. The mean number of observations per graph point was 95.1 in the morning (ranging from 29 to 113) and 87.4 in the afternoon (ranging from 22 to 137) for the blue-collar workers, and 33.4 in the morning (ranging from 26 to 45) and 26.2 in the afternoon (ranging from 16 to 45) for white-collar workers.

During the 19 days of the Incentive Program, *hourly* belt usage in the a.m. increased to a mean of 15.8%, compared to 7.7% mean usage during the 11 preceding days of the post-survey condition and a 7.4% mean usage during the initial 21-day baseline period. Belt usage among hourly workers in the p.m. also increased during the Incentive Program (from means of 6.3% during baseline and 8.3% during the post-survey period to a mean of 14.1% during incentives). During the ten days of incentive fading, usage remained high during both the morning and afternoon (13.2% and 12.6%, respectively). However during the ten days of complete withdrawal of incentives, only the a.m. usage did not show a return to baseline. The mean a.m. usage during withdrawal was 12.4%, and the p.m. usage decreased drastically to a mean of 6.7%. The trend of a.m. wearing averages being higher than those in the p.m., combined with the sharp drop-off in wearing during the p.m. withdrawal period, indicates that the blue-collar workers were more apt to be buckled while coming to work in the morning than when departing in the afternoon. One possible reason for this is that the rush to leave work interfered with buckling behavior for some workers who buckled up in the morning.

The same trend of higher a.m. usage can also be seen among white-collar workers at FM. During the incentive condition, morning usage increased to a mean of 32.5%, compared to a mean a.m. usage of 19.8% during baseline and a mean a.m usage of 24.0% during the post-survey period. Belt usage in the afternoon increased to a mean of 29.2%, from a baseline p.m. mean of 16.3%

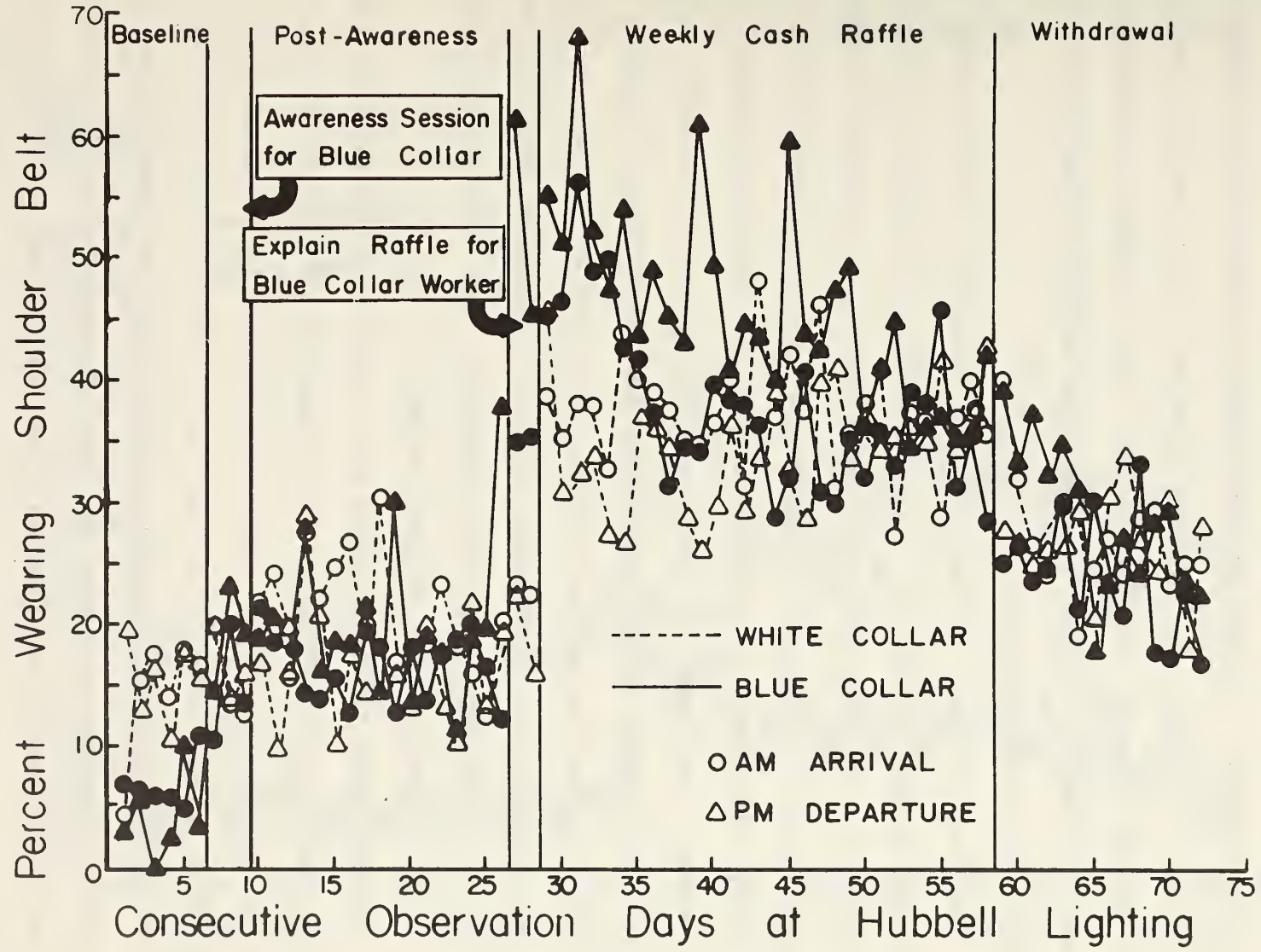
and a post-survey p.m. mean of 13.9%. As was the case with the hourly workers, belt usage remained high during the fade-out of incentives: mean usage was 32.7% in the morning and 31.0% in the afternoon. Unlike the hourly workers, however, the salary workers did not show a complete return to baseline usage during either the a.m. or p.m. data collection period once incentives were removed. The a.m. mean usage during the withdrawal condition was 27.4%, while the p.m. mean usage was 23.8%. Hence, following the withdrawal of incentives, salary workers exhibited some response maintenance during both morning and afternoon.

Hubbell Lighting (HL): A.M. vs. P.M. The a.m. and p.m. wearing percentages for the workers at HL are shown in Figure 6 on the following page. In the morning, there was an average of 85.0 observations per graph point for hourly workers (ranging from 32 to 118) and 57.9 observations per graph point for salary workers (ranging from 42 to 74). During the afternoon, the mean observation frequencies were 79.6 (with a range of 56 to 110) for hourly workers and 49.0 (with a range of 31 to 64) for salary workers.

Hourly belt usage in the morning increased to a mean of 38.2% during the 29 days of the incentive condition. This contrasts with an average a.m. usage of 18.8% following the awareness session and survey distribution (over 23 days) and an average seven-day a.m. baseline usage of 7.1%. During the afternoon, blue-collar belt usage increased to a mean of 45.7% while the cash raffle was in effect, compared to means of 6.2% during baseline and 23.2% throughout the month following the initial awareness sessions.

During a 15-day withdrawal period, neither a.m. nor p.m. usage among hourly workers returned to baseline: the a.m. mean was 23.6% whereas the p.m. mean was 29.5%. Hence, the belt wearing response was maintained to a significant extent among hourly workers. It is noteworthy that the FM trend

Figure 6. Mean shoulder-belt usage among hourly vs. salary workers at Hubbell Lighting during consecutive morning and afternoon observations throughout Summer, 1982.



of higher a.m. belt usage was broken by the HL hourly workers. In fact, following the awareness sessions and continuing throughout the program, belt wearing among hourly workers was significantly greater in the afternoon than in the morning; i.e., for the month following the initial awareness sessions ($t=3.10$, $p<.01$), for the incentive condition, ($t=5.37$, $p<.001$), and for the withdrawal condition, ($t=3.35$, $p<.001$). [One plausible explanation for this result is that peer support throughout the workday served as a reminder to buckle-up upon leaving the plant.]

With the HL salary workers, however, this peer support system did not appear to be in effect: a.m. usage exceeded p.m. usage in all experimental conditions. Morning belt usage among white-collar workers increased to a mean of 37.4% during the incentive phase, as compared to 20.5% following survey administration and 15.7% during baseline data collection. In the afternoon, belt usage for this group increased only to 34.1% during the Incentive Program, from a post-survey mean of 16.4% and a baseline mean of 15.3%. As was the case with salary workers at FM, following withdrawal of the incentives, HL's white-collar workers continued to wear seat belts at a level substantially greater than baseline in both the morning (27.7% mean usage) and afternoon (27.0% mean usage).

Federal Mogul (FM): Daily Belt Use. Figure 7 on the following page shows the daily usage rates for both work groups at FM. At FM the mean number of observations per graph point was 120.6 for the hourly workers (ranging from 50 to 179) and 29.9 for the salary workers (ranging from 16 to 45). During the Incentive Program at FM, safety belt wearing among hourly workers increased to a mean of 13.4%, as compared to a 6.0% baseline rate and a 6.9% wearing rate following survey distribution. Although this baseline to incentive increase is a statistically significant one ($t=12.55$, $p<.001$), it may not be a cost effective outcome, since a 13.4% wearing rate under incentive

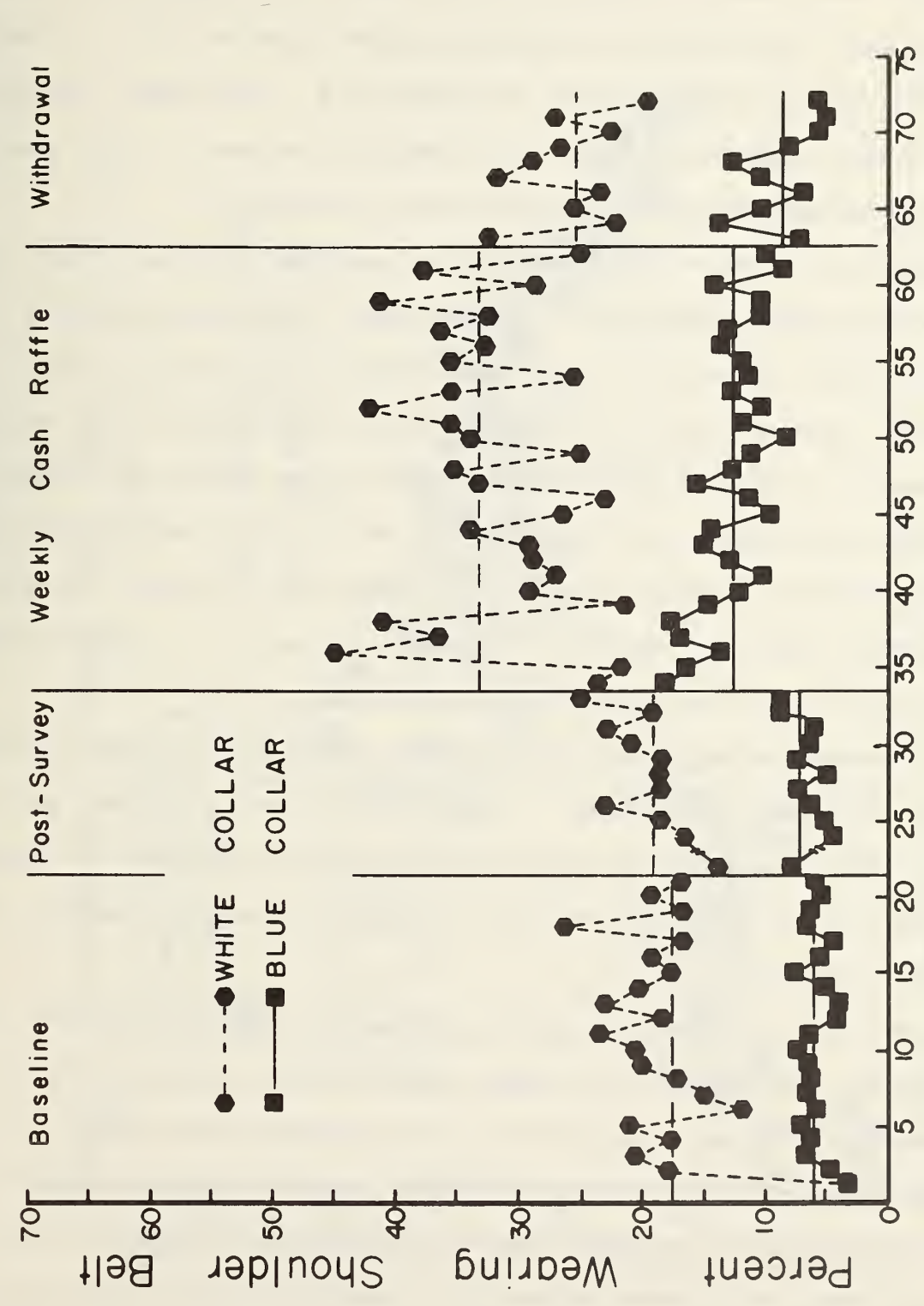


Figure 7. Mean shoulder-belt usage among hourly vs. salary workers at Federal Mogul over daily observations throughout Summer, 1982.

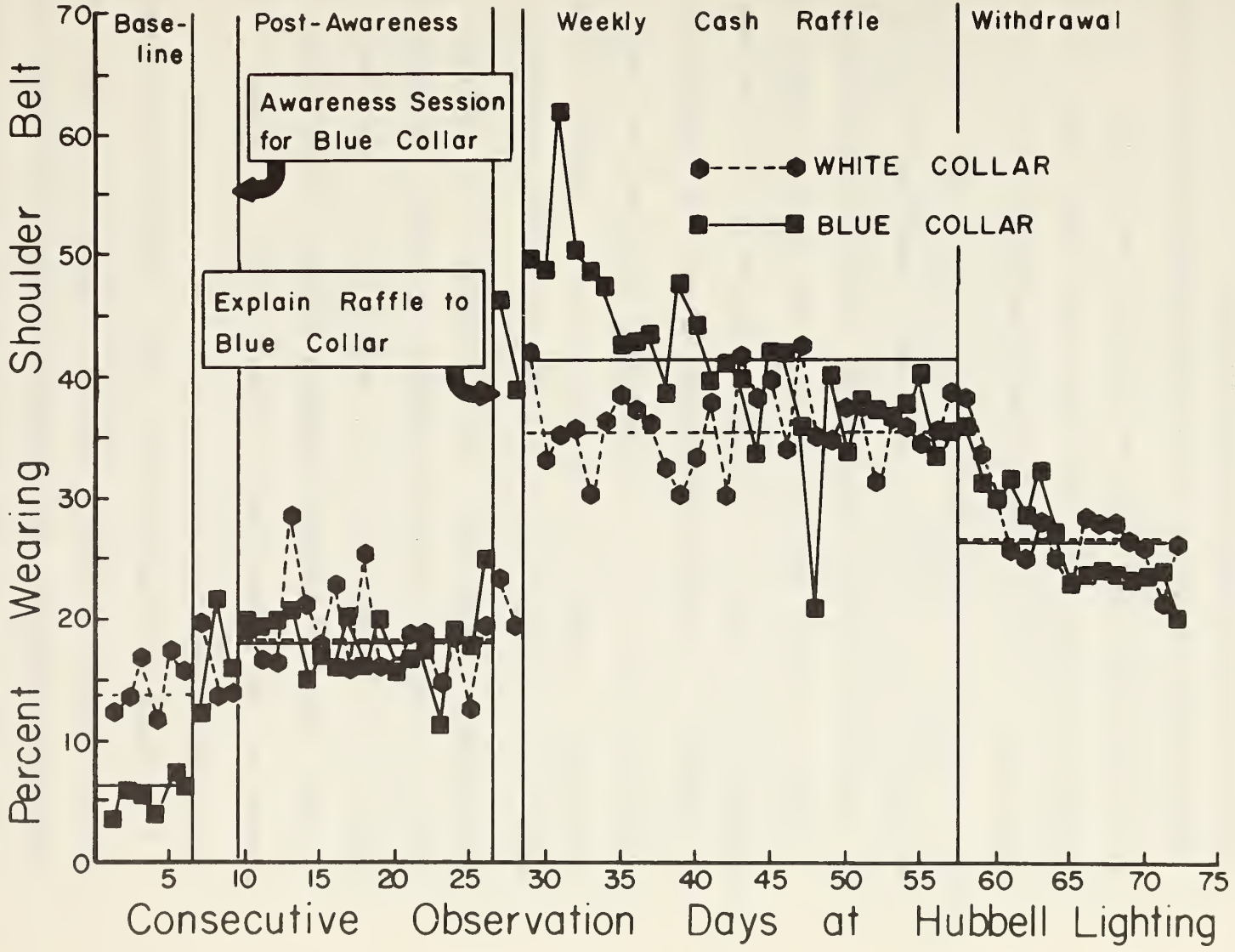
conditions is not substantially different than the nationwide wearing rate of 10.9% under baseline conditions. In addition, the usage rate declined to 11.6% when the frequency of incentive awards decreased (i.e., under fading conditions) and returned nearly to baseline (i.e., 7.9%) when incentives were withdrawn completely. Hence, the significant increase in belt wearing by hourly workers during the incentive phase was transient.

Salary workers at FM also showed a significant increase in belt wearing ($t=7.75$, $p<.001$) during the incentive phase. This group averaged a 31.6% wearing rate during the weekly cash raffles, compared to a rate of 17.7% during baseline and 19.5% following survey distribution. For this group, however, there was some response maintenance during the fading phase (shown by a usage rate of 31.9%), as well as under withdrawal conditions (exhibited by a 25.8% usage rate). Hence, even during the withdrawal condition there was significantly greater belt wearing by salary employees ($t=3.99$, $p<.001$) than during baseline conditions.

Hubbell Lighting (HL): Daily Belt Use. Figure 8 on the next page depicts the daily usage percentages for hourly and salary employees at HL. The average number of observations per graph point was 161.6 for the hourly workers (ranging from 107 to 209) and 107.2 for the salary workers (ranging from 81 to 140).

Mean usage for *hourly* workers increased to 41.7% during the Incentive Program as compared to a mean usage of 20.9% following the awareness sessions and a mean usage of 6.7% during baseline observations. As was the case with the hourly workers at FM, this represents a statistically significant increase over baseline usage ($t=32.68$, $p<.001$). This outcome is also socially valid since the increase represents a comparatively high usage rate (i.e., four times above the national average). Further, after withdrawal of the incentives, usage was still significantly higher than the initial wearing rate,

Figure 8 - Shoulder belt usage among blue-collar vs. white-collar workers as a function of a 20-minute awareness session (given only to blue-collar workers) and a direct and delayed incentive scheme (explained at a group session for only blue-collar workers).



i.e., at a mean of 26.8% (t=16.73, $p<.001$). Thus, belt wearing was maintained without incentives for three weeks at two and a half times the national average and at four times the usual wearing rate for blue-collar workers.

Among salary workers at HL, belt usage also increased significantly during the incentive phase to a mean of 35.9% (t=11.44, $p<.001$). This represents a substantial increase over the 18.6% mean usage after the surveys were administered and the 15.5% mean belt wearing during baseline. As was the case at FM, the salary workers at HL maintained a significantly greater wearing rate (27.4%, t=6.69, $p<.001$) under withdrawal conditions than during the baseline observations, hence, some response maintenance is indicated.

Tables 4 and 5 (on the following two pages) present summary data including the number of observations, percent of shoulder belt availability, and percent of shoulder belt wearing across work groups and experimental conditions at each plant. In these tables, one condition, formerly within the "post-survey" category on the figures (i.e., "incentive explained" in the tables), was evaluated separately so that the differential impact of announcing the programs at each plant could be studied. The comparisons of interest here are two-fold. Specifically, safety belt usage is comparable between work groups within a single plant (i.e., hourly versus salary workers at FM and HL) and within a particular employee category across plants (i.e., hourly workers at FM versus hourly workers at HL, and salary workers at FM versus salary workers at HL.)

A comparison of hourly versus salary usage at FM revealed the typical pattern reported in previous research. In general (with the exception of one experimental condition), salary workers exhibited significantly greater wearing rates than did hourly workers (t's ranged from 7.75 to 12.37 and all were significant at $p<.001$). The only experimental condition at FM in which mean usage did not differ among hourly and salary workers was when the incentive

TABLE 4: SUMMARY DATA FOR FEDERAL MOGUL

DATA CATEGORY	EXPERIMENTAL CONDITION					
	Baseline (21 days)	Post-Surveys (11 days)	Incentive Explained* (1 day)	Incentive Program (19 days)	Fade Incentives (10 days)	Withdrawal (10 days)
Frequency of hourly observations	6347	3544	195	6629	3016	3019
% hourly shoulder belt availability	77.8	76.9	71.8	74.8	74.5	80.3
% hourly shoulder belt wearing	6.0	6.5	10.0	13.4	11.6	7.9
Frequency of salary observations	1358	677	26	1332	759	731
% salary shoulder belt availability	85.6	89.2	84.6	84.1	87.0	91.1
% salary shoulder belt wearing	17.7	19.4	18.2	31.6	31.9	25.8

*A flier which explained the weekly cash raffle was distributed to all workers.

TABLE 5: SUMMARY DATA FOR HUBBELL LIGHTING

DATA CATEGORY	EXPERIMENTAL CONDITION				
	Baseline (7 days)	Post-Surveys (19 days)	Incentive Explained* (2 days)	Incentive Program (29 days)	Withdrawal (15 days)
Frequency of hourly observations	981	3341	505	6023	2921
% hourly shoulder belt availability	89.3	87.7	84.6	83.3	85.0
% hourly shoulder belt wearing	6.7	17.8	41.9	41.7	26.8
Frequency of salary observations	717	2137	295	3677	1853
% salary shoulder belt availability	89.4	90.3	90.5	88.3	87.0
% salary shoulder belt wearing	15.5	18.4	21.0	35.9	27.4

*Verbal explanation of Cash Raffle given to hourly workers; flier which explained the weekly cash raffle was distributed to all workers.

program was explained via posters and fliers ($t=1.14$, $p<.13$). Since this condition was only in effect for one day, however, it seems entirely plausible that sampling bias could account for the lack of significance.

An analysis of the HL hourly versus salary data, revealed a pattern different from FM (and that reported in prior research). Whereas hourly workers had a significantly lower usage rate than salary workers during baseline ($t=5.30$, $p<.001$), hourly workers had a significantly higher usage rate during both the period following incentive explanation ($t=3.97$, $p<.001$) and the incentive phase ($t=5.31$, $p<.001$). However, during the post-survey and withdrawal conditions at HL, there were no significant differences between salary and hourly employees. Thus, the present study represents the first successful attempt at increasing belt wearing of blue-collar employees to the levels typically attained by white-collar workers. [A discussion of the reasons for this provocative result is included in the subsequent Discussion Section].

The atypical differences between hourly and salary workers at HL were not due to an abnormally low usage among the salary workers, but rather, were due to unusually high participation by hourly employees at HL. If one allows that both work groups at FM exhibited a typical response pattern (i.e., as shown by earlier research), a between-plant comparison illustrates this point. While the baseline usage among salary workers was significantly less at HL than FM ($t=2.65$, $p<.05$), HL's salary usage during the Incentive Program was significantly higher than FM's salary usage ($t=2.65$, $p<.01$). There were no between-plant differences among salary workers during any other condition. Indeed, the fact that HL's salary workers showed higher usage during the Incentive Program relative to FM's salary workers requires that hourly workers at HL would have to increase their belt wearing that much higher in order to surpass the salary wearing averages at FM (as was indeed the case).

Comparing the usage rates among hourly workers at the two plants demonstrates just how high the hourly usage at HL was relative to "normal" hourly usage. While the groups started out at substantially the same baseline rate (i.e., the between-plant baseline rates of hourly workers were not significantly different), the hourly employees at HL had a significantly higher usage rate during every subsequent experimental condition than did hourly workers at FM. (The t's ranged from 9.2 to 31.7, and all were significant at $p<.001$).

Discussion

As noted previously, programs that increase the use of safety belts by employees can be extremely beneficial to industry insofar as they reduce accident injuries and fatalities, thereby decreasing costs for wage compensation, insurance, and employee substitutions. Hence, the present study has obvious applied significance, since it demonstrated the efficacy of an inexpensive seat belt promotion program. Perhaps the most important outcome of the present research, was the demonstration that a seat belt education/incentive program can motivate belt-wearing among blue-collar workers, a group which has not been particularly receptive to industry-based incentive programs (Geller, 1982c; Geller, Davis, & Spicer, in press).

As hypothesized, the awareness sessions given to hourly workers at Hubbell Lighting (HL) increased seat belt usage in that group relative to hourly workers at Federal Mogul (FM) who did not have an awareness session. Specifically, at HL daily belt usage after the initial set of awareness sessions increased to a mean of 20.9% compared to the baseline daily usage mean of 6.0%. Thus, while administration of the Prize Preference Survey (PPS) alone had no impact on the belt usage of hourly workers at FM, the PPS combined with the awareness session had a relatively large impact on belt usage among hourly workers at HL. This result demonstrated the efficacy of

the awareness sessions alone (without incentives) in increasing safety belt use among blue-collar workers. The substantially greater PPS return rate among HL's blue-collar workers than among FM's blue-collar workers, could also relate to the impact of the awareness sessions. It is likely that the awareness sessions motivated program participation among the hourly workers at HL, and that this increased motivation was responsible for the impressive return rate of the PPS in that group.

Having the awareness sessions precede the Incentive Program also increased program acceptability among blue-collar workers. Specifically, at HL belt usage among hourly workers increased to a daily average of 41.7% during the incentive condition, while at FM, hourly usage increased to a daily average of only 13.4% during the Incentive Program. Thus, the awareness session had an apparent response priming effect. A variety of tenable explanations for this result are found in the literature. Both Lewin (1958) and Lawler and Hackman (1969) noted increased commitment among subjects who participated in the planning of programs in which they were involved. Lawler and Hackman also found that subjects who participated in program development were more knowledgeable about the program and were more trusting of the program and the program managers.

At least one other possible explanation should be considered for the differential effects of the Incentive Program on hourly workers at FM versus HL. That is, it could be argued that the incentive plan was more appropriate for blue-collar workers at HL than the blue-collar group at FM (e.g., because of differences in reward preferences or a priori opinions of incentive tactics). An inspection of the PPS data, however, allows dismissal of this possibility on two counts: (1) both groups supported the idea of using an incentive program to motivate belt use, and (2) both groups supported the use of a cash prize.

Given the seminal work of Lewin (1958), the efficacy of the awareness sessions in motivating behavior change is not at all surprising. Indeed, the design of the awareness sessions capitalized upon the same two ingredients with which Lewin was successful over 25 years ago, namely *commitment* and *involvement*. What makes the current study innovative, then, is the application of these well-known principles to an area in which they were previously untried and in which other types of educational methods had failed dismally (e.g., Cunliffe *et al.*, 1975; Geller, 1981b; Phillips, 1980).

Several other results are noteworthy. First, it was predicted that there would be no substantial differences between the two groups of salary employees (i.e., FM versus HL), since each received equivalent treatment throughout the program. This result, however, was not obtained. Rather, salary workers at HL exhibited significantly higher usage rates during the incentive phase ($t=2.65$, $p<.01$) than did salary workers at FM. One possible explanation of this result is that the high motivational level of the HL hourly workers was to some extent diffused into the salary group at that plant. At first such diffusion may seem improbable, given that the two work groups are largely separated during the work day (with white-collar workers spending their day in offices and blue-collar workers spending their day on the production floor), and do not typically intermingle after work hours. However, there was a plausible medium for such diffusion, namely the feedback charts posted in the hourly and salary sections of the plant. Since these charts reflected both hourly and salary usage rates, the salary workers could have ascertained the motivational level of the hourly workers via their high usage rates. Since prizes were based on within group wearing percentages, the salary group may have sought to make the reward situation more equitable by maintaining their belt usage at a level similar to that of hourly workers. This notion is supported by the fact that belt usage differed

between the salary groups at HL and FM *only* when rewards were available.

Also interesting was the reversal among HL's hourly workers of the typical finding that belt wearing is higher in the morning than the afternoon. Heretofore, all work groups had shown consistently greater belt wearing as they were coming to work in the morning than when they were leaving work in the afternoon (e.g., Geller, 1981b; 1982c, 1983c; Geller, *et al.*, in press). This was interpreted as "forgetfulness" (especially on the part of part-time belt users). That is, in their hurry to leave work people simply forgot to buckle up. In the present study both work groups at FM, and the salary workers at HL followed the typical pattern of lower p.m. belt usage; but hourly workers at HL showed consistently higher wearing in the p.m. than the a.m. after the Incentive Program had been initiated. One plausible explanation for this result is that peer support, which was fostered through the awareness sessions, served to prompt belt wearing at the end of the work day. Furthermore, the feedback chart (posted near the entrance/exit door) may have reminded employees to buckle up as they left the plant.

It was hypothesized that a group contingency would be more effective in increasing safety belt use than the individual reward programs used previously (e.g., Geller, 1981b; 1983c; Geller, *et al.*, in press). An evaluation of this notion can be accomplished by comparing usage during incentives of the three groups who were subjected to the group contingency without the awareness session (e.g., hourly and salary workers at FM, and salary workers at HL) with usage rates during the incentive phase of the study accomplished previously at HL and FM -- i.e., an individual-based reward program with no awareness session (Geller, 1982c; Geller *et al.*, in press). It should be noted, however, that in the previous study, incentives were given only in the mornings; hence, a.m. versus p.m. comparisons across studies must be made with caution.

Previously, FM hourly workers exhibited a daily usage mean of 9.3% during individual incentives. In the present study, the daily usage mean for this group was 13.4% during the group contingency. For FM salary workers the daily usage mean during incentives was approximately 41% in the prior research (with individual-based incentives), compared to a daily usage mean of 31% among FM salary workers in the present study. The HL salary workers exhibited a daily usage mean of only 23% during individual incentives, compared to a 35.9% daily mean usage rate in the current research. [It is important to note, however, that the individual-based incentive program at HL was not only limited to a.m. arrival, but also occurred on a random 50% schedule in the morning. That is, individual rewards for belt wearing were only available on a random 50% of the morning sessions].

The rough comparisons of the prior individual-based incentive strategy at HL and FM with the group-based incentive program of the present study suggest that individual rewards were more effective with salary workers, whereas the group rewards were more effective with hourly workers. This differential outcome is certainly tentative, but is provocative and suggests an obvious need for further research in this area.

The follow-up observations were disappointing but not unexpected. In all cases, belt usage decreased substantially upon removal of the incentives. Here, however, the typical pattern of response maintenance being greatest in the groups with the highest initial baseline wearing rates (i.e., salary workers) was reversed at HL. That is, hourly workers at HL maintained belt wearing at 26.8% (for four weeks) as compared to a baseline rate of 6.7%; whereas the salary workers at HL demonstrated a post-treatment usage mean of 27.4%, only 12 percentage points higher than their baseline mean of 15.5%. Nonetheless, a decline in response maintenance following removal of the reward is a matter of concern. Obviously, a strategy is needed for

maintaining commitment to belt-wearing at the end of an incentive program.

As noted previously, a major consideration in the design of the present research was not only to achieve impressive increases in safety belt use, but to achieve such behavior change in a manner that is feasible for a variety of settings. Thus, the aim here was to develop a program that was easily managed and cost effective. In terms of management, the current study represents an improvement over previous research in that the reward system was not as intrusive as past reward strategies (i.e., it did not involve stopping cars). Further, the techniques were simple enough to be readily taught to industrial managers. Hence, the total program could be undertaken as an in-house project -- that is, industry itself could easily manage its own program of the sort described in this report.

In terms of cost effectiveness, the incentive strategy evaluated in this study fared well. At FM, five rewards were given (one per week) at a total cost of $65. At HL, where the program had its greatest impact, the cost was only $224.90 for six weekly rewards. [Recall that this cost was directly tied to usage]. This seems a small price to pay in return for the potential savings in injuries and lives that could result from such substantial increases in belt use. In fact, others are convinced that expenditures much greater than this are still cost effective. For example, an incentive program implemented at the Berg Electronics plant (of 1200 employees) in New Cumberland, Pennsylvania entailed expenditures of approximately $25,000 for the first year and $10,000 for each year thereafter (Spoonhour, 1981; 1982).

The present study leads to several questions which could become the topics for future projects. One research area concerns the extent to which the positive effect of an industry-based safety belt program becomes diffused into the more general population (i.e., through workers encouraging their relatives, friends, vehicle passenger, etc. to buckle-up). The question then,

is whether or not the impact of industry-based programs generalize to family and community settings . This could be addressed via questionnaires that ask to what extent employees' "new" motivation to buckle up has also motivated them to encourage others to buckle and under what types of circumstances this occurs. Although such an assessment could feasibly have been made in this study (via the Post-Awareness Session Survey), several considerations prevented it: (1) the Post-awareness Session Survey, in order to assess the effect of the awareness sessions, was already necessarily quite long; and (2) it was feared that such questions might be viewed as overly intrusive by some (hourly) respondents. Since a lack of rapport was cited as contributing to the failure of previous research using these employees, the risk of loosing the hard-won rapport evidenced here was considered too great.

It seems evident that the awareness sessions were responsible for the impressive behavior change among hourly (blue-collar) workers at HL, since this was the only component that was substantially different from that implemented at FM, and from the program studied previously at both HL and FM (Geller, 1982c; Geller *et al.*, in press). At the awareness session, however, employees were promised that they would receive rewards at some future time for belt wearing, and therefore it is possible that the incentive aspect of this intervention was most responsible for the behavior change. What is required, then, is the use of the same type of awareness session strategy without promise (or delivery) of any rewards. It seems unlikely, however, that a single awareness session of this type would maintain long-term increases in safety belt wearing. Rather, a strategy that would help maintain commitment to belt usage would have to be built into the program. One viable approach would be to make awareness sessions a periodic event and to distribute pledge cards at each awareness session. These cards could

ask employees to agree to wear their safety belts for some specified period of time (e.g., until the next awareness session). Thus, an appropriate mix of incentive strategies, awareness sessions, and pledge-card signing might result in long-term increases in safety belt use, both at industrial sites and in the community at large.

In conclusion, the present research demonstrated the efficacy of the combined Awareness Session/Incentive Program in motivating seat belt usage among blue-collar workers, a feat not previously attained. This implies that the wearing habits of "hard-core nonusers" can be changed with convenient and inexpensive tactics. Given the potential benefits of increased safety belt use, the effort involved in the successful interventions defined herein is clearly cost effective. The current study also has some import for behavioral community psychology in general, since it introduces a behavior change intervention from Lewin's approach to Social Psychology which is not commonly used in the community realm, but which could likely be implemented with remarkable success.

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Geller, E. S. *A practical incentive strategy for large-scale motivation of safety belt use: A test of long-term impact.* Under Editorial Review, March 1983.(a)

Geller, E. S. *Corporate incentives for promoting safety belt use: Rationale, guidelines, and examples.* Final Report for NHTSA Contract DTNH22-82-P-05552, October 1982.(a)

Geller, E. S. *Development of industry-based strategies for motivating seat-belt usage: Phase I.* Quarterly Report for Department of Transportation Contract DTRS5681-C-0032, Virginia Polytechnic Institute and State University, Blacksburg, Virginia, September 1981.(a)

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Transportation Contract DTRS5681-C-0032, Virginia Polytechnic Institute and State University, Blacksburg, Virginia, December 1981.(b)

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Geller, E. S. *Development of industry-based strategies for motivating seat-belt usage: Phase IV*. Quarterly Report for Department of Transportation Contract DTRS5681-C-0032, Virginia Polytechnic Institute and State University, Blacksburg, Virginia, June 1982.(c)

Geller, E. S. *Development of industry-based strategies for motivating seat-belt usage: Phase V*. Quarterly Report for Department of Transportation Contract DTRS5681-C-0032, Virginia Polytechnic Institute and State University, Blacksburg, Virginia, January 1983.(b)

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Dissemination of Project Outcomes

Corporate Incentive Manual

With direct financial support from NHTSA DTNH22-82-P-05552, the Principal Investigator prepared a manual for corporate executives which presented the rationale for using incentives to motivate employees safety belt use and suggested guidelines for implementing and evaluating an industry-based program for safety belt promotion. Most of the guideline information was gleaned form the outcomes of research on the current project, although nine of twelve case examples were obtained from successful industry-based programs in areas other than the domain of the current project. The Executive Summary of this manual is given in Appendix I; copies of the complete are available from the Principal Investigator upon request. At the time of this writing more than 350 copies of this manual had been disseminated, many to representatives of industrial firms.

Professional Publications

To date, one professional publication has appeared in the literature from research supported by this grant. Two additional publications of research accomplishments on this project will appear in 1983 (see Appendices A & B), another article is currently under editorial review (see Appendix C), and three other research articles on project results are currently in preparation. The current biographical references to these articles are as given below.

1. Geller, E. S., Patterson, L. and Talbott, E. A behavioral analysis of incentive prompts for motivating seat belt use. *Journal of Applied Behavior Analysis, 1982, 15,* 403-413.
2. Geller E. S. Rewarding safety belt usage at an industrial setting: Tests of treatment generality and response maintenance. *Journal of Applied Behavior Analysis,* 1983, *16,* 43-56.

3. Geller, E. S., Davis, L., and Spicer, K. Industry-based incentives to promote seat belt use: Differential impact on salary vs. hourly employees. *Organizational Behavior Management*, in press.
4. Geller, E. S. A practical incentive strategy for motivating large-scale safety belt use: A test of long-term impact. Under editorial review.
5. Geller, E. S., and Hahn, H. A. Promoting safety-belt use at industrial sites: An effective program for the blue-collar employee. In preparation.
6. Geller, E. S., and Wilhelm, M. Industry-based incentives to promote seat belt use: A test of inter-employee generalization. In preparation.
7. Geller, E. S. Commitment strategies for increasing safety belt use. In preparation.

Professional Presentations

The following list documents the formal opportunities for the Project Director to disseminate aspects of this project. Several of the presentations were invited addresses or workshops. [It is noteworthy that *none* of the travel, food or lodging expenses for these presentations were charged to the DOT contract].

1. Geller, E. S. *Community applications of behavioral science for transportation safety: Promoting seat belt usage.* Invited address at Association for Behavior Analysis meeting, Milwaukee, WI, May 1981.
2. Geller, E. S. *Behavioral incentives to motivate seat belt usage.* Invited seminar address at General Motors Research Laboratories, Warren, MI, July 1981.
3. Geller, E. S. Large scale attempts to influence transportation behavior: Psychological implications. Invited presentation at transportation energy conservation workshop sponsored by U. S. Department of

Energy, Blacksburg, VA, August 1981.

4. Geller, E. S. *Specific industry-based incentive strategies for motivating employee safety belt use*. Consulting presentations at the Environmental Activities and Societal Analysis Departments of General Motors Research Laboratories, Warren, MI, October 1981.

5. Geller, E. S. *Industry-based incentives to increase seat-belt usage*. Research presentation to the Seat Belt Promotion Task Force of the National Highway Traffic Safety Administration, Washington, D.C., 1981.

6. Geller, E. S., and Bigelow, B. *Cost effective incentive strategies for promoting seat belt use*: *Applications in communities and industrial settings*. Paper presented at the 61st Annual Meeting of the Transportation Research Board, Washington, D.C., January 1982. (Presented by B. Bigelow)

7. Geller, E. S. *Behavioral science and the quality of life*. Invited series of four college-wide lectures at Augusta College, Augusta, GA, February 1982.

8. Geller, E. S. *Community psychology*: *From ivory tower research to grass roots applications*. Symposium Organizer and Chairperson at Southeastern Psychological Association meeting, New Orleans, LA, March 1982.

9. Geller, E. S. *Development of industry-based strategies for motivating seat belt usage*. Two hour topical discussion presented at Southeastern Psychological Association meeting, New Orleans, LA, March 1982.

10. Geller, E. S. *Incentive procedures to promote safety belt usage*: *Tests of generalization and response maintenance*. Invited address at General Motors Research Laboratories, Warren, MI, March 1982.

11. Geller, E. S. *Incentives and seat-belt promotion*. Workshop presentation at the First National Life Savers Conference, Detroit, MI, March 1982.

12. Thompson, W., and Geller, E. S. *Applications of behavior analysis for the refinement of strategies to increase seat-belt wearing*. Paper presented at the Virginia Academy of Science meeting, Blacksburg, VA, April 1982.

13. Geller, E. S. *Industry-based incentive strategies to encourage safety-belt usage*. Invited address at Ford Motor Company, Dearborn, MI, April 1982.

14. Geller, E. S. *Large scale application of experimental behavioral analysis to support quality of life*. Invited Sigma Xi lecture at East Carolina University, Greenville, NC, April 1982.

15. Geller, E. S. *The psychology of seat belts*. Keynote luncheon address at the Arkansas Highway Safety Conference, Little Rock, AR, April 1982.

16. Geller, E. S. *The potential of behavioral community psychology to improve quality of life*. Invited college-wide lecture at Lafayette College, Easton, PA, May 1982.

17. Geller, E. S. *Positive approaches to promoting seat belt usage*. Keynote address at Governor's Conference for Transportation Safety, Topeka, KS, May 1982.

18. Geller, E. S. *Research on practical methods for promoting use of safety belts by adults*. Workshop presented at Governor's Conference for Transportation Safety, Topeka, KS, May 1982.

19. Geller, E. S., and Gope, J. G. *Behavioral community psychology*. Three-hour workshop presented at Association for Behavior Analysis meeting, Milwaukee, WI, May 1982.

20. Geller, E. S. *Applied behavior analysis and seat belt usage: A third look!* Invited address at Association for Behavior Analysis meeting, Milwaukee, WI, May 1982.

21. Geller, E. S., and Winett, R. A. *Large scale behavioral systems analysis: Recent research and potential applications to substance abuse.* Invited address at a special meeting of the National Institute on Drug Abuse, Annapolis, MD, June 1982.

22. Geller, E. S. *Encouraging safety restraint use through private sector strategies.* Symposium presentation at the American Psychological Association meeting, Divisions 25, 27, 34, Washington, D.C., August 1982.

23. Geller, E. S., and Albers, W. A., Jr. *Vehicular safety belts: Issues, problems, and research applications.* Symposium Organizers and Chairpersons at American Psychological Association meeting, Divisions 9, 25, 27, Washington, D.C., August 1982.

24. Cope, J. G., and Geller, E. S. *Relationships between safety belt wearing and driving speed.* Symposium presentation at American Psychological Association meeting, Washington, D.C., August 1982.

25. Geller, E. S. *Motivation.* Invited 1-1/2 hour address at the Oklahoma Safety Belt Conference -- "The Protection Connection", Oklahoma City, OK, September 1982.

26. Geller, E. S. *Motivation and safety belt use.* Invited luncheon address at the United Services Automobile Association, San Antonio, TX, October 1982.

27. Geller, E. S. *Communitywide techniques for motivating transportation safety.* Consulting presentations at the special conference: Community for Automobile Responsibility and Safety (CARS), San Antonio, TX, October 1982.

28. Geller, E. S. *Motivating safety belt use*. Two 35-min. video-tapes produced at the Highway Safety Research Center, Oklahoma City, OK, October 1982. [These teaching/learning tapes were produced to stimulate interest in the incentive manual referred to above and summarized in Appendix I.]

29. Geller, E. S. *Strategies for increasing safety belt use among blue-collar employees*. Consulting presentation to executives from Fisher Body, Inc. at General Motors Research Laboratories, Warren, MI, November 1982.

30. Geller, E. S. *Behavioral community psychology: Strategies for encouraging large-scale transportation safety*. Symposium presented at the Southeastern Psychological Association meeting, Atlanta, GA, March 1983.

The papers in this symposium were presented by Dr. Geller's students as follows:

(a) "The comparative impact of differential strategies for motivating safety belt use: Engineering, legislative, educational, and incentive approaches." by Ann Talton and Karen Brown.

(b) "Vehicular reminder buzzers and safety belt usage: Effects of current systems and innovations for increased impact." by Cheryl D. Bruff, Liza Davis, and Heidi Ann Hahn.

(c) "A communitywide evaluation of a legislative mandate requiring the use of child car seats." by Judith Steed, Leslie Heinz, and Janet Faller.

(d) "The awareness session: An effective educational approach toward motivating safety belt wearing." by Liza Davis, Andrea Dunn, and Tawna Parker.

(e) "Incentive strategies for motivating seat belt usage in

industrial settings: Differential immpact of blue-collar vs. white-collar workers." by Heidi Ann Hahn and Mark A. Davis.

(f) "Individual differences and behavior analysis: An innovative approach toward analyzing behavioral impact." by Martha A. Wilhelm and David Purks.

(g) "Large-scale strategies for improving transportation safety: Yesterday - ivory tower speculation; Today - small scale application; Tomorrow...?" by Jim Rudd, Agustin Reyna, and Bill Brooks.

31. Geller, E. S., Cope, J. G., Davis, L., Dobbins, G. H., Hahn, H. A., & Rudd, J. *Organizatinal behavior management: Benefiting workers safety and health for improved quality of life and corporate profits*. Three-hour workshop at Southeastern Psychological Association meeting, Atlanta, GA, March 1983.

32. Geller, E. S. *The components of a program to increase safety-belt wearing on a large scale*. Workshop presentation to be given at the Second National Life Savers Conference, Denver, CO, April 1983.

33. Geller, E. S., & Bigelow, B. E. *Industry-based programming to increase safety-belt use: The value of evaluation*. Invited address to be presented at the Third Symposium on Traffic Safety Effectiveness (Impact) Evaluation Projects, Chicago, IL, May 1983.

News Releases

1. The first page of the February 17 (1982) of *Status Report*, the news periodical of the Insurance Institute for Highway Safety, summarized the pilot work for this project, emphasizing the remarkable success of low-cost incentives in promoting seat-belt use and the apparent transience of the incentive impact ("Toward the end of the follow-up period, belt use levels were about the same at both lots and no higher than during the period before the program began," Vol. 17, No. 3, February 17, 1982). A conclusion that incentives have only temporary effects is *not* an inaccurate interpretation from our earlier data; however, the follow-up data analyses (i.e., Geller, 1982b, 1983c) suggest that such a conclusion is overly pessimistic. We have now shown significant stimulus generalization and response maintenance.

The *Status Report* article led to a T.V. interview for local (Roanoke, VA) CBS news (aired March 29, 1982 at 6:00 p.m. and 11:00 p.m.) during which the PI summarized the industry-based incentive programs of the present project and acknowledged the collaborative support of the local industries (i.e., Radford Army Ammunition Plant, Corning Glass, Hubbell Lighting, and Federal Mogul).

2. In mid-January (1982) a news report of our seat-belt research appeared in several Virginia newspapers, including: The *Roanoke Times & World News* (January 18, 1982) and the *Richmond Times-Dispatch* (January 19, 1982). A copy of that is included in Appendix J.

3. The April 26, 1982 issue of *Behavior Today*, the newsletter for social and behavioral sciences professionals, included a feature on the PI's seat belt research, most of which was accomplished on this contract. A copy of this article is included in Appendix K.

4. *Business Insurance*, July 15, 1982. This issue of *Business Insurance* included a lengthy article on industry-based incentive programs for promoting

state laws mandating the use of child "restraints" is stressed; also emphasized are needs for special techniques to enforce "restraint laws" and for additional interventions to motivate the use of child safety seats.

8. *APA Monitor*, Vol. *13*, No. 12, December 1982. This lengthy article in the professional news magazine of the American Psychological Association (See Appendix P), reviews two symposia on safety belts which were given at the 1982 annual meeting of the American Psychological Association. One symposium was organized by Dr. Geller and by Dr. Walter A. Albers, Jr. (Head of the Societal Analysis Department, General Research Laboratories, Warren, MI). This symposium was preceded by a special APA news conference which resulted in several radio presentations, including a six-minute spot on National Public Radio's "Morning Edition" on August 26. The symposium itself included the following addresses, and each was very well received.

(a) "The Federal Answer to the Safety Belt Issue" by Dr. Bruce E. Bigelow of the National Highway Traffic Safety Administration.

(b) "Low Cost Strategies for Promoting Safety Belt Usage" by Dr. Patricia F. Waller of the Highway Safety Research Center, University of North Carolina.

(c) "Parental Training and Modeling for Promoting Usage of Child Restraints" by Dr. Dennis Embry of the Bureau of Child Research, University of Kansas.

(d) "Effects of Risk Perception on Seat Belt Usage" by Dr. Norman Schwalm of Perceptronics, Inc. and Dr. Paul Slovic of Decision Research, Eugene, Oregon.

(e) "Relationships Between Safety Belt Wearing and Driving Speed" by Dr. John G. Cope of East Carolina University and Dr. E. Scott Geller of Virginia Tech.

The second APA symposium reviewed in this special article in the APA

Monitor was chaired by Drs. Steve Fawcett and Tom Seekins of the University of Kansas. The symposium focused on the promotion of car safety seats for children, although the industry and community-based incentive programs developed by Dr. Geller and his students were also reviewed in the symposium. The particular titles and authors of the papers presented at this symposium were as follows:

(a) "Experimental analysis of child passenger safety legislation in seven states" by Drs. Stephen B. Fawcett and Tom Seekins of the University of Kansas.

(b) "Ineffectiveness of social planning approach for child safety restraint use" by Dr. John P. Elder of the Pawtucket Heart Health Program.

(c) "The measurement and assessment of a child passenger restraint law" by Dr. Stanley H. Cohen of West Virginia University.

(d) "Legislative action and compliance: An analysis of child restraint legislation" by Dr. Leonard A. Jason of DePaul University.

(e) "Public sector regulation: Behavioral science input" by Dr. Richard A. Winett of Virginia Polytechnic Institute and State University.

(f) "Encouraging safety restraint use through private sector strategies" by E. Scott Geller of Virginia Polytechnic Institute and State University.

Appendix A

"Rewarding safety belt usage at an industrial setting:
Tests of treatment generality and response maintenance."
[*Journal of Applied Behavior Analysis*, 1983, *16*, 43-56]

Journal of Applied Behavior Analysis

In press, December 1982

Rewarding Safety Belt Usage at an Industrial Setting: Tests of Treatment Generality and Response Maintenance

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Running Head: Promoting Seat Belt Usage

Abstract

An incentive program to motivate seat belt use was implemented at a large munitions plant. Seat belt usage was assessed daily at an entrance/exit gate of the industrial complex when employees arrived for work in the morning and departed in the afternoon. During Treatment incentive flyers, which prompted seat belt usage and gave belt wearers opportunities to win prizes, were distributed only in the afternoon. Seat belt wearing increased from Baseline means of 20.4% and 17.3% during the morning and afternoon, respectively, to averages of 55.5% during afternoon departures and 31.1% during morning arrivals. During Follow Up, mean belt use dropped almost to Baseline levels. Categorizing vehicles according to driver sex and license plate number enabled a study of belt wearing practices of individuals, and revealed that the incentive program influenced some drivers to wear their seat belts during morning arrival when incentives were not distributed (i.e., treatment generalization) and during a follow-up period after the incentives were withdrawn (i.e., response maintenance).

Descriptors: behavior community psychology, organizational behavior management, transportation safety, incentives, seat belts, cost effectiveness.

Rewarding Safety Belt Usage at an Industrial Setting: Tests of Treatment Generality and Response Maintenance

In the Fall of 1981 the U.S. National Highway Traffic Safety Administration (NHTSA) lauched a nationwide effort to increase safety belt usage, which has included: media programing, the promotion of educational efforts and organizational belt usage policies, and the implementation of industry-based incentive programs (Bigelow, Note 1; Nichols, Note 2). In a series of field studies, Geller and his students demonstrated the beneficial impact of using incentives to motivate seat belt wearing at community and university settings (Geller, Johnson, & Pelton, 1982; Geller, Paterson, & Talbott, 1982; Johnson & Geller, in press). This research was instrumental in influencing NHTSA to advocate the application of incentives for seat belt promotion, (Bigelow, Note 3); and served as the impetus for the development of several industry-based incentive programs (Geller, Note 4), including a large-scale effort at the General Motors Technical Center in Warren, Michigan ("Buckle up and win a car", 1982).

The incentive programs developed and evaluated thus far by Geller et al. and by other researchers (e.g., Elman & Killebrew, 1978; Campbell, Note 5; Sengbush, Oros, & Elman, Note 6) have not examined issues related to treatment durability or generality. Indeed, the apparent transience of incentive procedures (as suggested by these studies) was the focus of substantial criticism in a widely disseminated report by the Insurance Institute for Highway Safety ("Rewards raise belt use", 1982). The conclusion that seat belt wearing decreases to levels close to baseline rates after removal of the incentive program is an appropriate interpretation of the prior research; however, these investigations did not include adequate tests of response maintenance. More specifically, the evaluation procedures

involved the observation of drivers' seat belt practices over several days, and fluctuations in belt usage could have resulted from changes in the vehicle sample rather than changes in individual behavior[2]. Furthermore, when the belt wearing practices of individuals were accounted for by recording license-plate numbers (Geller, Johnson, & Pelton, 1982; Geller, Paterson, & Talbott, 1982), too few post-treatment observations were made per individual to warrant any conclusions about response maintenance. The present study collected enough follow-up observations per individual driver to apply rather unique tests of response maintenance.

An additional advantage of the present study over prior evaluations of seat-belt promotion programs was an attempt to study the generalizability of an incentive program. Specifically, seat belt usage was observed during the implementation of a particular incentive program (i.e., in the afternoon when employees departed from work) and at times when the incentive program was not in effect (i.e., in the morning when employees arrived for work). Thus, the belt usage of individuals during morning arrival was studied as a function of the number of belt-usage rewards received during afternoon departures from work.

The incentive program of the present study was most similar to that applied by Geller, Paterson, and Talbott (1982), in which drivers wearing a seat belt were given seat-belt promotion flyers which could be exchanged for prizes donated by community merchants. Unlike the earlier studies, the setting for the present investigation was an industrial complex, which offers more potential for large-scale application than exchange windows of banks (Geller, Johnson, & Pelton, 1982; Johnson & Geller, in press), and parking lots of high schools (Campbell, Note 5), universities (Geller, Paterson, & Talbott, 1982), and department stores (Elman & Killebrew, 1978; Sengbush, et al., Note 6).

Financial contingencies make it likely that industry will adopt an effective program to motivate seat belt wearing. That is, wearing a seat belt in a vehicular accident reduces the probability of death and serious injury by at least 50% (e.g., Bohlin, Note 7; Levine & Campbell, Note 8), thereby substantially reducing wage compensation, insurance costs and productivity losses. The National Highway Traffic Safety Administration has recently gathered information regarding the financial benefits to industry of employee seat belt usage by comparing the costs to employers of pairs of similar accidents in which seat belts were worn in one case but not in the other. The results of such comparisons were dramatic, with seat belt usage holding costs to little or nothing while employer costs mounted to thousands of dollars in parallel accidents where seat belts were not used (Bigelow, Note 1; Geller, Note 4; Pabon, Sims, Smith, & Associates, Note 9).

Method

Participants and Setting

Participants were sampled from the employees of Radford Army Ammunition Plant (RAAP) in Radford, Virginia. The RAAP complex includes over 7,000 acres of land and more than 4,000 buildings. At the time of the study 3,023 employees worked at RAAP, of which 83% were male. The average age of these employees was 45 years. Many different types of workers are involved in the manufacturing of the dangerous propellents produced at RAAP, including construction workers, scientists, engineers, research and development personnel, maintenance workers, secretaries, and general laborers.

Vehicles were observed while entering and exiting one of the three most frequently used gates, which was manned by two uniformed security officers. Traffic at this gate flowed at a rate of approximately 15 vehicles per minute

during peak use (when the observations were taken). Daily observations were taken each morning (from 7:00 to 8:00 a.m.) and afternoon (from 4:00 to 5:00 p.m.), when most of the RAAP employees entered and left the plant. The three RAAP gates were more than three miles from each other, and each provided access to the most convenient travel route to a different town (i.e., Radford, Christiansburg, or Blacksburg, Virginia). Thus, each gate was used consistently by the same employees.

General Observation Procedure

As vehicles passed through the gate, two observers (wearing orange safety vests) independently recorded the sex of the driver and whether or not the driver was wearing a shoulder belt, lap belt, or shoulder and lap belt. During those conditions when drivers were not prompted to stop, only shoulder belt practices were observed. The license plate number of each vehicle was also recorded. There was no attempt to observe every vehicle that entered or exited the gate. After completing the data recording of a particular vehicle, the observers looked up and targeted the next available vehicle for observation.

During those conditions when drivers were prompted to stop the observers held up their clipboards with the message "PLEASE STOP AGAIN" to the next driver that approached the observation area after the observers completed recording the data of a particular vehicle. In cases when more than one vehicle was approaching the gate, the driver in the last vehicle of the line was prompted with the stop sign. This arrangement prevented traffic congestion or slow downs from being attributed to the seat belt observers.

Interobserver Reliability

Two researchers made independent data recordings for 61.5% of the 14,781 vehicle observations. Observer agreement was calculated by dividing the

total number of observations agreed upon for a particular data category by the total number of observations, and multiplying by 100. The percentage of matched observations was 99.1% for the sex of the driver, and 95.4% for categorization of belt usage (i.e., shoulder belt worn or not worn, lap belt worn or not worn[3], shoulder belt available but not used, no shoulder belt available).

Experimental Conditions

Unobtrusive Baseline. Two observers stood off to the side of the gate and recorded vehicle and driver data as inconspicuously as possible. Orange safety vests were not worn during this condition, which occurred for six consecutive days at the start of the project (excluding Saturday and Sunday). Field observations occurred in this fashion during subsequent conditions when it rained.

Obtrusive Baseline

Following six days of Unobtrusive Baseline an article appeared in the employee newspaper which announced the seat belt observations. From this point on the observers wore orange safety jackets and stood in full view of oncoming vehicles. This condition occurred before and after the incentive intervention and was essentially the same as that for Unobtrusive Baseline, except that the observers were more conspicuous. That is, vehicle and driver data were recorded daily as vehicles entered the complex in the a.m. and exited in the p.m.

Incentive Flyers

Following 12 days of Obtrusive Baseline, the afternoon observers prompted the exiting drivers to stop by holding up their clipboards which bore the message, "PLEASE STOP AGAIN." Drivers who stopped were handed an

incentive flyer by one of the observers who verbalized, "Just checking to see if you're wearing your seat belt. Here's a description of how you can win valuable prizes. If the driver asked for an explanation of the contest described on the flyer, the observer gave one as quickly as possible. The flyer was the same as depicted in Geller, Paterson, and Talbott (1982), and described a combination game whereby certain combinations of the symbols printed on each flyer could be exchanged for prizes. The employee newspaper also described the combination game, specifying that workers should deliver their winning flyer combinations to the seat belt observers when arriving to or departing from work in order to claim their prizes. The prizes were gift certificates and dinners at local establishments, and ranged in monetary value from $2 to $15. The logos of the 26 different merchants who donated prizes were displayed on the back of each flyer[4].

The flyers given to drivers wearing a seat belt contained a contest symbol; whereas the flyers given to drivers not wearing a seat belt did not contain a valid contest symbol, but had a slip of paper stapled to the bottom which read, "NEXT TIME WEAR YOUR SEAT BELT AND RECEIVE A CHANCE TO WIN A VALUABLE PRIZE!"

After the fifth day of distributing incentive flyers, the observers changed their verbal statement to non-wearers of seat belts and said, "Just checking to see if you're wearing your seat belt. Have you heard about our combination game?" When drivers answered "yes," they were thanked for stopping, and when answering "no," they were given a voided flyer which explained the combination game. This flyer condition was in effect each afternoon for 15 consecutive workdays, and then for 15 additional workdays the flyers were distributed on alternate afternoons. On days when flyers were not distributed, the Obtrusive Baseline condition was in effect. If drivers stopped and asked for a flyer the observers responded with the

statement, "We weren't given any flyers today."

Follow Up

After 30 days of the Incentive condition, drivers were no longer prompted to stop in the afternoon, and observations continued in the a.m. and p.m. for 13 workdays according to the Obtrusive Baseline condition. Then the observers left the industrial site for two weeks before returning for 17 consecutive workdays of a.m. and p.m. Follow-Up observations. This observation procedure was the same as that during Unobtrusive Baseline.

Results

Daily Shoulder Belt Use

The daily observation procedures included a recording of whether a shoulder belt was present on the driver's side of the vehicle and whether a shoulder belt was worn by the driver. These recordings enabled daily calculations of the percentage of shoulder belt users and an evaluation of belt usage as a function of experimental condition. Vehicles without shoulder belts for drivers were necessarily eliminated from this analysis, although shoulder belts were available in a majority (i.e., 83.8%) of the observed vehicles.

Figure 1 depicts the daily percentages of belt wearing over the 78 observation days. The horizontal lines in each phase represent mean percentages -- solid line for morning observations and broken line for afternoon observations. The average number of observations per graph point was 82.5 in the a.m. (range = 38-103) and 76.3 in the p.m. (range = 44-102 vehicles).

Insert Fig. 1 about here

During Unobtrusive Baseline, shoulder belt wearing at RAAP was slightly higher in the a.m. than p.m. (means of 16.8% and 12.9%, respectively). Mean belt usage increased slightly after announcement of the observation procedure, from an overall mean of 14.9% during Unobtrusive Baseline to a mean of 20.3% during Obtrusive Baseline.

As shown in Fig. 1, shoulder belt use during afternoon departure increased noticeably from the first to the fifteenth session of distributing incentive flyers daily (i.e., the continuous schedule). During this 15-day phase, p.m. usage ranged from 21.1% (on the first day) to a high of 80.4% (mean = 57.0%). Of particular interest was the steady increase in shoulder belt usage during a.m. arrival, when incentive fliers were not distributed. Belt usage in the morning ranged from 11.8% (on the first day of p.m. Treatment) to 39.7% (on the last day of p.m. Treatment). Mean a.m. usage during continuous incentives in the p.m. was 28.0%, compared with the 22.1% mean a.m. usage observed during the preceding phase of Obtrusive Baseline.

When incentive flyers were distributed on alternative afternoons, daily usage declined somewhat during both the a.m. and p.m. The daily p.m. percentages show an alternating pattern that corresponds with the alternating reward schedule. That is, the first day of this phase (Day 35) was a non-reward day and is followed by a decrease in belt usage (i.e., on Day 36). Day 36 was a reward day and is followed by an increase in shoulder belt wearing on the next day. This alternating pattern continued throughout this phase. The mean percentage of belt wearing over these 15 days was 54.0% in the p.m. and 34.2% in the a.m.

When the incentive flyers were discontinued completely, shoulder belt wearing decreased during both a.m. and p.m. sessions, but still remained higher than the pre-treatment rates. More specifically, during the post-treatment Obtrusive Baseline, belt usage averaged 31.2 % (in a.m.) and 41.7% (in p.m.), in contrast with mean usage during pre-treatment Obtrusive Baseline of 22.1% (a.m.) and 18.5% (p.m.).

Figure 1 also depicts the 17 follow-up days, and shows similar low levels of shoulder belt usage during both a.m. arrival and p.m. departure. Indeed, a rather steady decline in belt wearing is apparent during this period, with belt usage at the end of Follow Up approximating the pre-intervention, baseline levels. The mean percentages of shoulder belt wearing during Follow Up were 25.1% and 26.1% for the a.m. and p.m. observation sessions, respectively.

Sequential Analyses

The data in Fig. 1 do not provide information regarding changes in individual belt wearing. Thus, fluctuations in usage from one day to the next (and across experimental conditions) could be partially due to changes in the sample of vehicles observed. The most significant change in the observation samples probably occurred during Follow Up, since this phase was initiated in the Fall, when transitions in the work force were most frequent.

Confounding due to daily fluctuations of the driver sample was controlled by a sequential examination of belt usage by individual drivers under different experimental conditions. More specifically, license plate numbers and sex were used to categorize drivers and their seat belt usage according to consecutive exposures within each phase of the experiment. Such an analysis for pre-treatment Baseline showed only minimal increases in individual belt usage as a function of repeated exposures to the observation procedure[5].

However, the sequential analysis for the incentive phase demonstrated that the marked increases in belt wearing shown in Fig. 1 were due to behavior change at the individual level.

Figure 2 depicts safety belt use as a function of consecutive experiences during the Incentive phase (i.e., both the continuous and alternating reward schedule). During p.m. departure, the vehicles observed were stopped in order to distribute incentive flyers; therefore, it was possible to determine usage of lap belts for these observations. Figure 2 shows two functions for p.m. departures, one for only shoulder belt wearing and one for usage of shoulder belt or lap belt. Both of these functions depict consistent and marked increases in belt usage with increased exposure to the intervention.

Insert Fig. 2 about here

Shoulder belt wearing was less frequent in the a.m. (when incentive flyers were not distributed) than during the p.m. However, Fig. 2 does show a direct increasing relationship between percentage of shoulder belt users in the a.m. and number of exposures to the a.m. observations. To determine whether this function (as well as that shown for p.m. departure) was the result of sampling bias rather than changes in individual belt usage, a "traceback analysis" was conducted, whereby the belt wearing practices of individuals were studied over sequential exposures to the same experimental condition.

Figure 3 shows this experience traceback analysis for p.m. departure during the Incentive phase. These drivers had stopped their vehicles to receive an incentive flyer and therefore it was possible to observe lap belt usage. Regardless of initial belt wearing (which was a direct function of the

number of reward exposures)[6], each exposure group showed a consistent increase in seat belt wearing as a function of treatment experiences (i.e., number of incentive flyers received). Up to four treatment experiences, the increase in belt wearing was considerable for each exposure group (amounting to total increases of 25 to 35 percentage points). The first flyer had the maximum influence, although substantial numbers of drivers were added to the belt user samples following receipts of a second and a third incentive flyer. Belt wearing had essentially reached peak levels at the point when the fourth flyer was distributed. In other words, if drivers had not been motivated to buckle up (and receive flyers with valid reward symbols) after receiving their third invalid incentive flyer, additional flyers had minimal influence.

Insert Fig. 3 about here

The experience traceback analysis for a.m. arrivals during the Incentive phase (when flyers were handed out in the p.m.) showed a slight but consistently increasing relationship between belt use and exposure frequency over the first five experience categories. This relationship occurred for each exposure group, thereby indicating that the increasing trend in Fig. 2 was not due to sampling bias[5].

A Generalization Measure

Figure 4 depicts the percentage of shoulder belt users during a.m. arrivals in the Incentive phase as a function of the number of prior incentive flyers received in the afternoon (i.e., p.m. treatments). A p.m. treatment was defined as receiving an incentive flyer with a valid reward symbol (i.e., the recipient was wearing a lap or shoulder belt). The function shows a

consistent increase in a.m. belt usage as a function of the first four p.m. treatment exposures; although the 95% confidence intervals indicate that the only significant difference ($p<.05$) was between drivers receiving no p.m. treatments and those having received one or more rewards. In other words, drivers who had received at least one reward for wearing their safety belt when departing from work were more apt to be buckled up when arriving to work on a subsequent morning than were drivers who had received no p.m. rewards.

Insert Fig. 4 about here

It is noteworthy that the negatively accelerating function in Fig. 4 reached asymptote after four consecutive reward flyers. The relationship between p.m. belt usage and number of reward flyers received also leveled off after the fourth exposure to the intervention (see Fig. 3). Taken together, these data suggest that some drivers who were motivated to wear their safety belt during the p.m. distribution of incentive flyers, continued to buckle their shoulder belt at a time when flyers were not distributed. And, the amount of apparent generalization was generally a direct function of the number of prior rewards (up to four).

A Response Maintenance Measure

Response maintenance was studied by categorizing drivers according to the number of treatments they experienced, and then examining their belt wearing over consecutive a.m. and p.m. observations during Follow Up. Belt usage during Follow Up as a function of prior rewards for belt wearing revealed a clear grouping of the data with regard to response maintenance. That is,

drivers who had received three or more rewards during the Incentive phase showed substantially more shoulder belt wearing during Follow Up than drivers who had received only one or two rewards; and those drivers with one or two reward experiences were more apt to be wearing their shoulder belt during Follow Up than were drivers who had not received any incentive flyers for belt wearing.

Figure 5 depicts percentage of shoulder belt users over consecutive Follow Up observations for three data groupings: 1) drivers who received three or more reward flyers, 2) drivers who received one or two rewards, and 3) drivers who received no valid reward flyers. The initial data point for the two treatment groups (i.e., drivers who received at least one reward) indicates seat belt use at the time these drivers received their first incentive flyer, and serves as a control point for examining treatment durability. The 95% confidence interval is shown for those percentages which are significantly different ($p<.05$) from the corresponding percentage of the nearest group. Seat belt use of the two treatment groups was not significantly different when the first incentive flyer was received; but for five of their first six exposures during Follow Up, those drivers who had received three or more rewards were significantly more likely to be wearing their shoulder belt than drivers who had received one or two rewards during the treatment phase ($p<.05$). Further, drivers who received one or two rewards were buckled up significantly more often on three of the first four follow-up observations than were those drivers who had no intervention experience.

Insert Fig. 5 about here

Response maintenance is shown only for drivers who had received three or

more rewards. These drivers showed high levels of belt usage throughout Follow Up (i.e., greater than 50%), although a marked decrease in percentage of belt usage did occur over the first four follow-up observations (i.e., from 74.8% belt usage at the first follow-up observation to 57.3% usage at the fourth observation). More specifically, of the 111 drivers who had received three or more incentive flyers and at least one follow-up observation, 45.9% had been wearing a shoulder belt when receiving their first incentive flyer; and of these same drivers, 74.8% were wearing their shoulder belt at the time of their first follow-up observation. And over ten follow-up observations, the belt usage percentage for this treatment group never dropped as low as it had been when the first incentive flyer had been received; although it should be noted that the sample size was relatively small for frequent follow-up observations.

No response maintenance was shown for drivers receiving only one or two reward flyers. Belt usage for this treatment group was not higher at the time of the first follow-up observation than when the first incentive flyer had been received, and the percentage of belt wearers showed a rather steady decline over consecutive follow-up observations. For the initial follow-up observations this treatment group does show higher shoulder belt usage than drivers who had not received any incentive flyers. Again, for the frequent follow-up observations the sample sizes were quite small, and therefore substantial changes in percentages could have resulted from the behavior change of only a few drivers.

Discussion

This study demonstrated quite clearly that an incentive program can be conveniently and successfully implemented at industrial sites to increase seat belt usage. However, the efficacy of response-contingent incentives to

increase seat belt wearing has been shown previously in the parking lots of a shopping mall (Elman & Killebrew, 1978; Sengbush, et al., Note 6), a high school (Campbell, Note 5), and a large university (Geller, Johnson, & Pelton, 1982). The fact that the present study applied response-contingent rewards to effect prominent increases in seat belt wearing at an industrial complex is noteworthy; especially since employers can reap substantial financial benefits from increased seat belt use (Bigelow, Note 1; Geller, Note 4; Pabon et al., Note 9), and since the promotion of employer programs to increase belt usage is currently a major large-scale effort of NHTSA (Bigelow, Note 1; Nichols, Note 2). The primary import of the present research, however, is its application of innovative methodology and data analyses to isolate factors related to generalization and maintenance of treatment effects.

The selective control of positive reinforcement was shown by: 1) the markedly greater increase in belt usage during the p.m. (when belt wearing was rewarded) than during the a.m. (when rewards were not available); 2) the alternating fluctuations in daily belt usage during only the afternoon session when p.m. rewards were available on an alternating schedule, and 3) the fading of differential a.m. and p.m. belt practices after the incentive program was withdrawn.

The application of license plate numbers and sex of driver to study changes in the belt wearing of individuals was introduced in earlier seat belt research (Geller, Johnson, & Pelton, 1982; Geller, Paterson, & Talbott, 1982; Johnson & Geller, in press); but the number of observations per individual was not large enough in those studies to conduct comprehensive sequential analyses of repeated exposures to the same condition. Furthermore, only the present study provided an opportunity to study treatment generalization, by observing the same individuals at two time periods per day (a.m. arrival and p.m. departure) while consistently implementing the treatment intervention

during only one of these sessions (i.e., p.m. departure). The analysis of daily shoulder belt wearers showed marked increases in a.m. belt use while belt wearing was reinforced in the p.m. Sampling bias in this demonstration of treatment generalization was apparently minimal, as shown by the analysis of individuals' a.m. belt wearing as a function of p.m. treatment exposures. This latter analysis also demonstrated that treatment generality was a direct function of the frequency of treatment exposures (at least up to four). Such a finding was certainly not unexpected, but does substantiate the utility of repeatedly reinforcing a target behavior (even in community settings).

Results of the follow-up observations were also not surprising. A substantial number of drivers did reduce their belt usage after the incentive program was withdrawn, as shown by the daily observations of shoulder belt wearing in this and other studies (i.e., Geller, Johnson, & Pelton, 1982; Geller, Paterson, & Talbott, 1982; Johnson & Geller, in press). However, the more extended follow-up observations in the present research allowed for an evaluation of post-treatment belt wearing as a function of prior treatment exposures, and the outcome of this analysis was quite informative. As was the case for treatment generality, the extent of response maintenance was dependent upon the prior number of treatment experiences. Drivers who had been rewarded on three or more occasions for belt wearing maintained their belt usage above that observed on their first treatment day for as many as ten follow-up observations. In contrast, the percentage of belt users among drivers who had received only one or two rewards for belt wearing was lower for every follow-up observation than that observed on the day that these drivers received their first incentive flyer. An important qualification here is that those individuals who showed the greatest response maintenance also evidenced the highest baseline rate of seat belt usage (thereby leading to the highest reinforcement frequency during Treatment). Thus, it may be that

substantial maintenance of belt usage following the withdrawal of an incentive program should only be expected among those individuals who have a relatively high base rate of seat belt usage (i.e., are part-time users of seat belts) and thus do not have to make as much of an adjustment in their driving behavior to be rewarded for belt wearing as do those who infrequently or never wear their seat belt.

Related to the potential impact of an individual's base rate of belt usage on his or her response to the incentive intervention of the present study is the fact that all drivers were essentially administered a partial reinforcement schedule. As detailed earlier, the observers could not prompt every driver to stop and in fact usually targeted less than 50% of the exiting or entering vehicles on any given day. Thus, it was likely that drivers who had buckled up on a particular occasion (in order to receive an incentive flyer) did not actually receive the expected reward. This partial reinforcement schedule (which was reduced by half during the alternating schedule) might have selectively reinforced the part-time belt user (who consistently buckled up for a reward) and frustrated the non-user who intermittently remembered to buckle up for a reward (perhaps on days when he or she was not prompted to stop for an incentive flyer). In other words, the beneficial impact of an intermittent reward program (as applied in the present study) is apt to be a direct increasing function of an individual's baseline rate of seat belt usage. Thus, given that baseline percentages of belt use are typically very low, especially among the hourly workers of industrial settings (Geller, Note 4; Note 10), it may be advisable to derive seat belt programs that reinforce every occurrence of belt wearing, at least initially. However, some may question the cost of a continuous reinforcement program for seat belt promotion.

Regarding the cost effectiveness of the incentive strategy evaluated in this

paper, it is noteworthy that only nine individuals claimed a prize (total value of $126), and four of these prizes had been donated by local merchants (amounting to $51 or 40% of the incentive cost). This low number of contest winners and minimal expenditure for prizes contrast sharply with the incentive costs of the recent study by Geller, Paterson, and Talbott (1982) which used the same "combination game" on a university campus. About the same number of flyers were distributed in each project, yet in the university study 81 faculty and staff claimed prizes amounting to a total value of $1008. There are a number of possible interpretations for this difference (including differential work contingencies, prize claiming procedures, and identification with the research staff; and the possiblity that more trading of flyers occurred in the university setting in order to obtain winning flyer combinations), but the critical point is that the impact on belt wearing of the response-contingent incentive flyers was much the same in both studies. The implication of this comparison is that the incentive costs for effective seat belt promotion can be quite minimal. On the other hand, the findings of the present study also imply (as discussed above) that much higher usage rates (with improved generalization and maintenance) could be achieved with an incentive program that starts with a continuous reinforcement schedule (i.e., every belt user receives a prize) before fading to partial reinforcement.

Offering rewards to all belt users would necessitate much higher expenditures for incentives than required in this and prior field evaluations of belt promotion programs, but if implemented in industrial settings the benefits might far outweigh the costs. For example, the incentive program implemented for the 1200 employees of the Berg Electronics plant in New Cumberland, Pennsylvania cost approximately $25,000 the first year and about $10,000 annually for prizes distributed on a continuous reinforcement schedule (Spoonhour, Note 11). Berg management is convinced of the cost

effectiveness of their incentive program which has been in effect since April, 1980 and has produced an average belt usage rate of 90% (Spoonhour, 1981).

In conclusion, the present research demonstrated the efficacy of intermittently rewarding safety belt usage at an industrial setting. The study introduced methodology for testing treatment generality and maintenance, which is particularly relevant to the current national effort to increase usage of vehicular safety belts, and may have some import for the field of behavioral community psychology in general. The impact of the short-term incentive program was prominent but quite transient for the majority of the cases. Some response maintenance was demonstrated, but only for drivers who received three or more response-contingent rewards. This implies that an incentive approach to motivate safety belt wearing should be long term and attempt to reach individuals on several occasions. The substantial financial benefits to industry if employees consistently wear vehicular seat belts would make it extremely cost effective to implement a long-term, industry-based program that rewarded individuals frequently for wearing their safety belt.

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Footnotes

This research was supported by Contract DTRS5681-C-0032 from the U.S. Department of Transportation, and by the Societal Analysis Department of General Motors Research Laboratories. The author is grateful for helpful suggestions from Dr. Bruce E. Bigelow of the National Highway Traffic Safety Administration and Drs. Walter A. Albers, Jr., and Calvin R. von Buseck of the Societal Analysis Department at General Motors Research Laboratories, and for the special cooperation of Doug Day, the RAAP Safety Manager. Also appreciated was the computer programming of Wade Thompson, and the significant data-collection assistance of Susan Collier, Liza Davis, Joe Hatcher, Leslie Heinz, Evaleen Jones, Brian May, Lisa Paterson, Kevin Spicer, Tanya Sullivan, Betsy Talbott, Scott Turnbull, and Eileen Vanwie. Reprints may be obtained from Scott Geller, Department of Psychology, Virginia Tech, Blacksburg, VA, 24061.

[2] Actually, most applications of behavioral science to community problem solving have not been able to identify individuals throughout Baseline, Treatment, and Follow Up conditions, and therefore have evaluated only behavior change of the aggregate (see reviews by Cone & Hayes, 1980; Geller, Winett, & Everett, 1982; Glenwick & Jason, 1980).

[3] Observations of lap belt usage were only possible when the vehicle was stopped (i.e., during the distribution of surveys or incentive flyers).

[4] A copy of the incentive flyer is available from the author upon request.

[5] Graphs of these data are available from the author upon request.

[6] This apparent sampling bias was evident only during the p.m. observations of the Incentive condition; and it probably occurred because several drivers waited at the gate until receiving an incentive flyer, thereby obviating the random sampling procedure that was followed during all other conditions (a.m. and p.m.).

Figure Captions

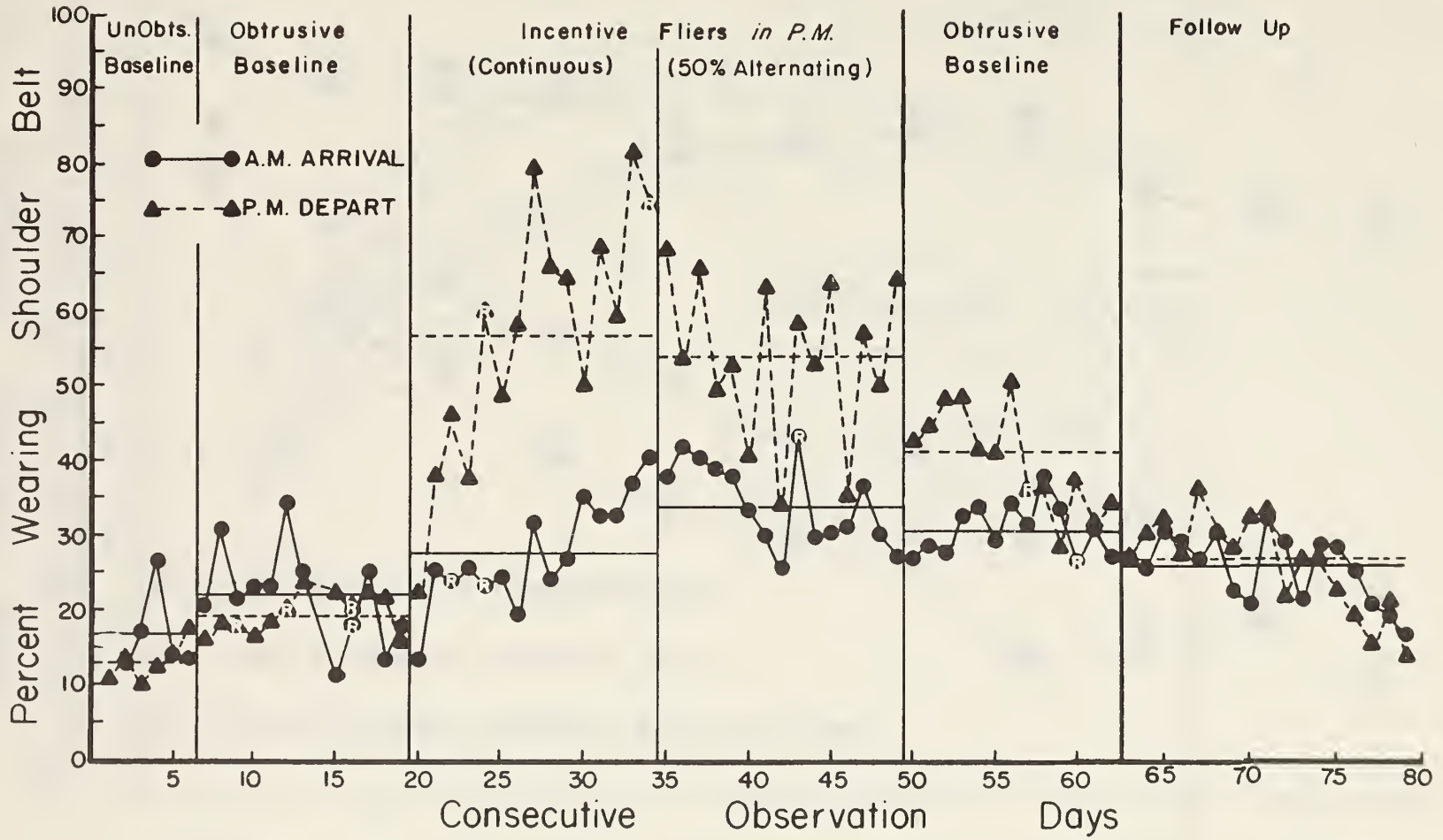
Figure 1. Percent shoulder belt usage over consecutive morning and afternoon observation sessions. Graph points containing an "R" are days when it rained and the experimental condition was Unobtrusive Baseline.

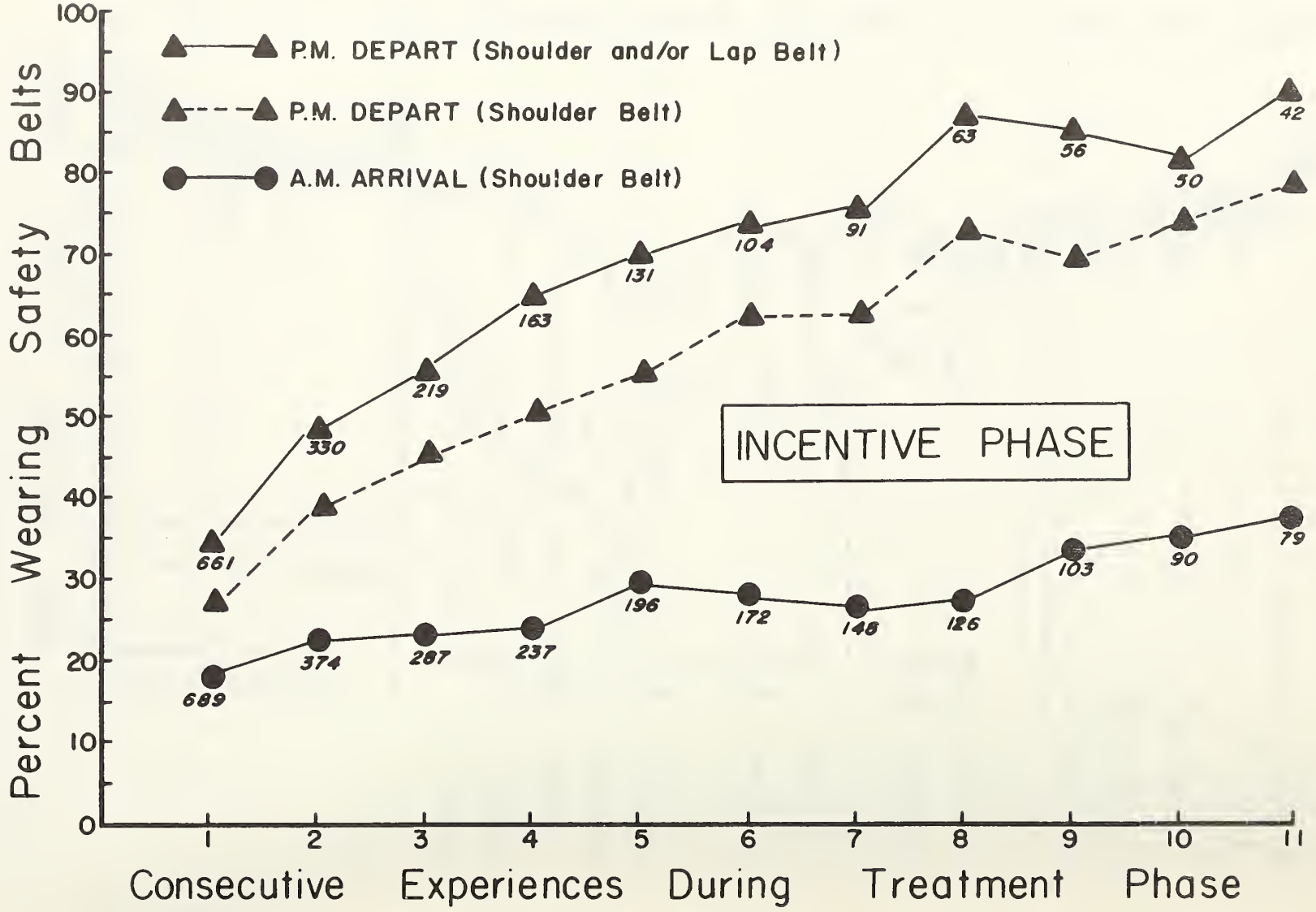
Figure 2. Percentage of seat belt wearers during a.m. arrival and p.m. departure as a function of consecutive experiences in the Incentive phase. The numbers associated with data points indicate sample size.

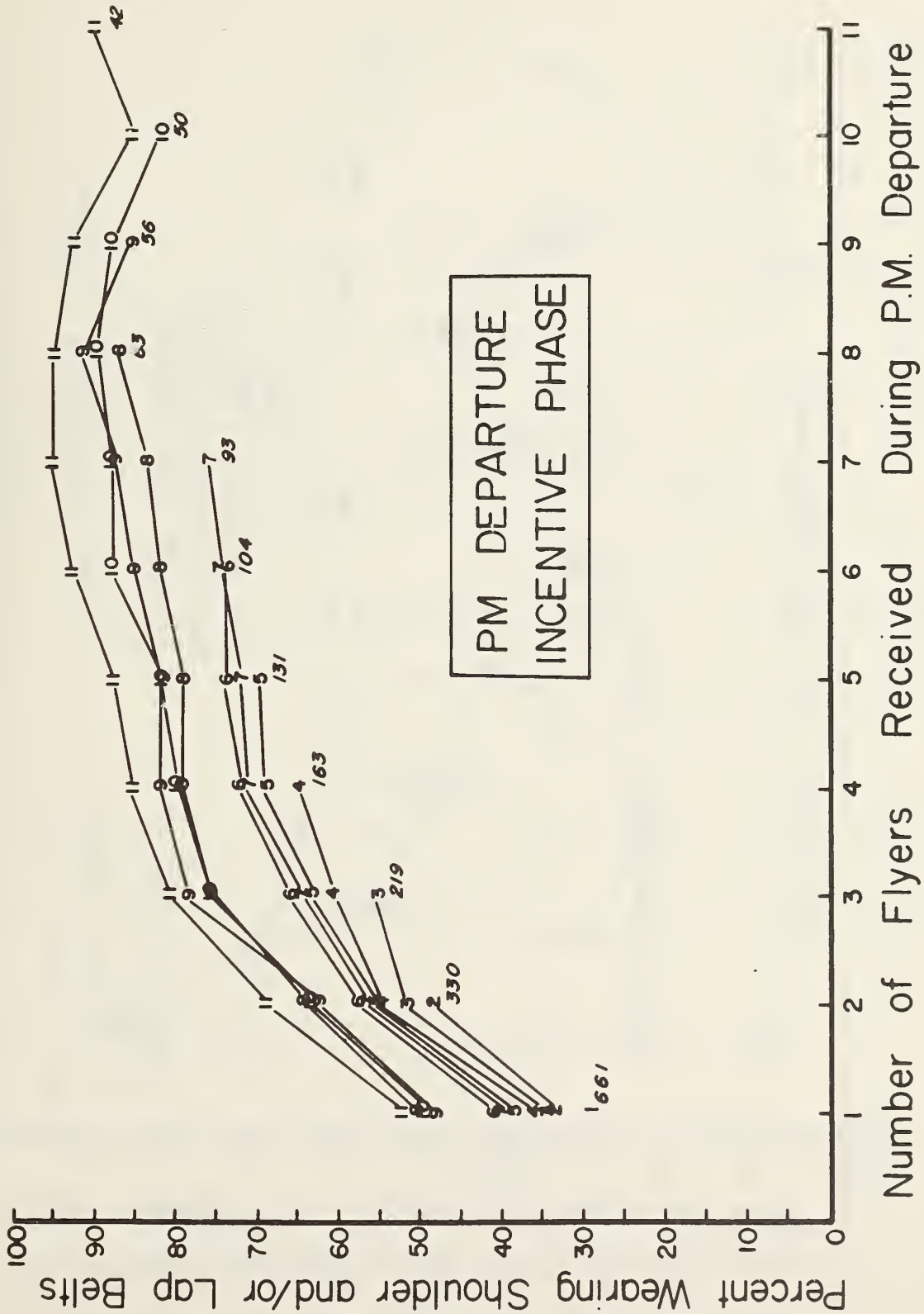
Figure 3. Percentage of shoulder and lap belt wearers for p.m. departures during the Incentive phase as a function of particular frequencies of exposures to this condition. The numbers used for data points indicate the number of total exposures for the sample, and the number at the end of each line represents the number of drivers in the particular experience category.

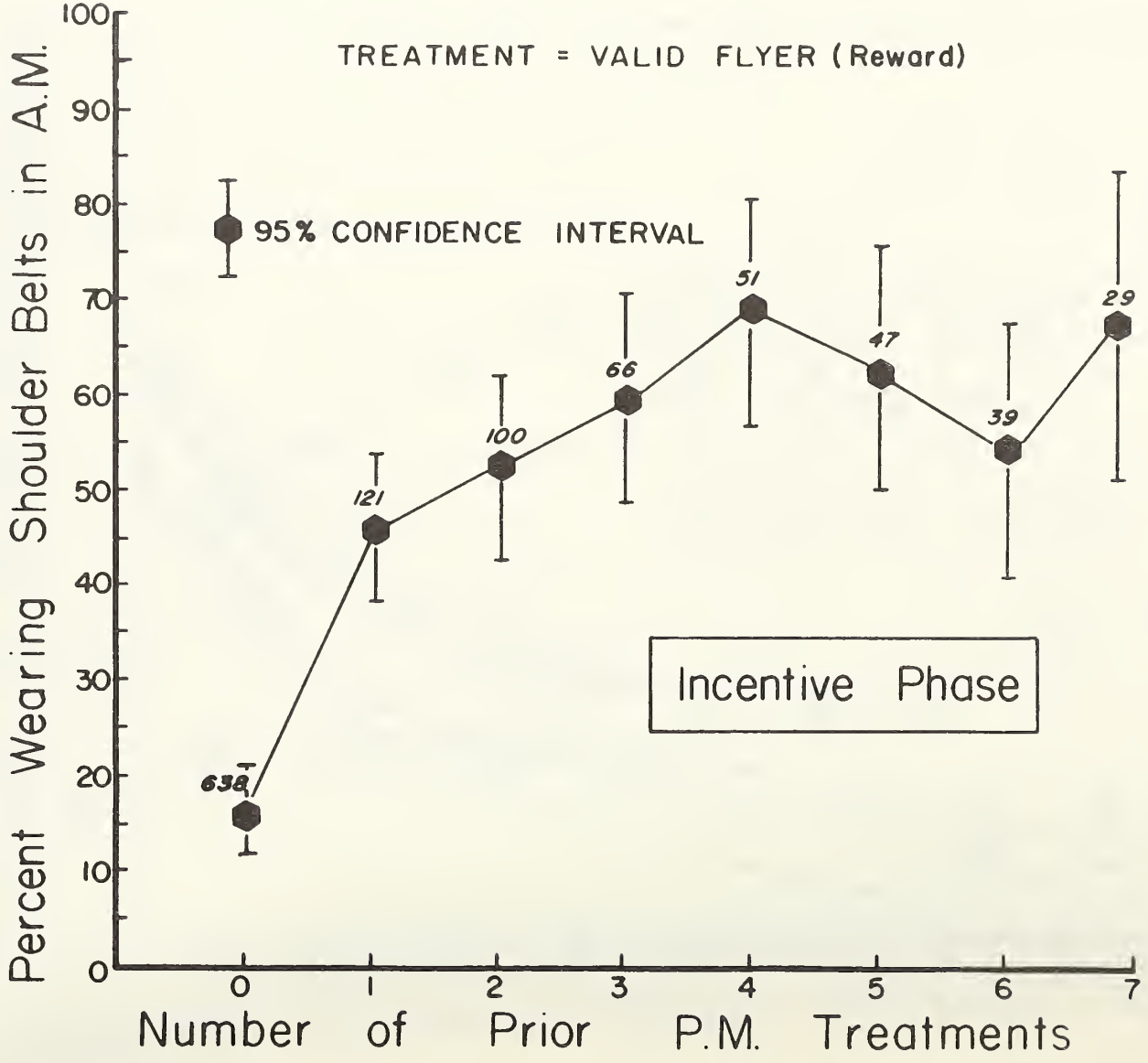
Figure 4. Percentage of shoulder belt wearers during a.m. arrival as a function of prior Treatment experiences in the p.m. The number associated with each point represents the sample size for the particular data category.

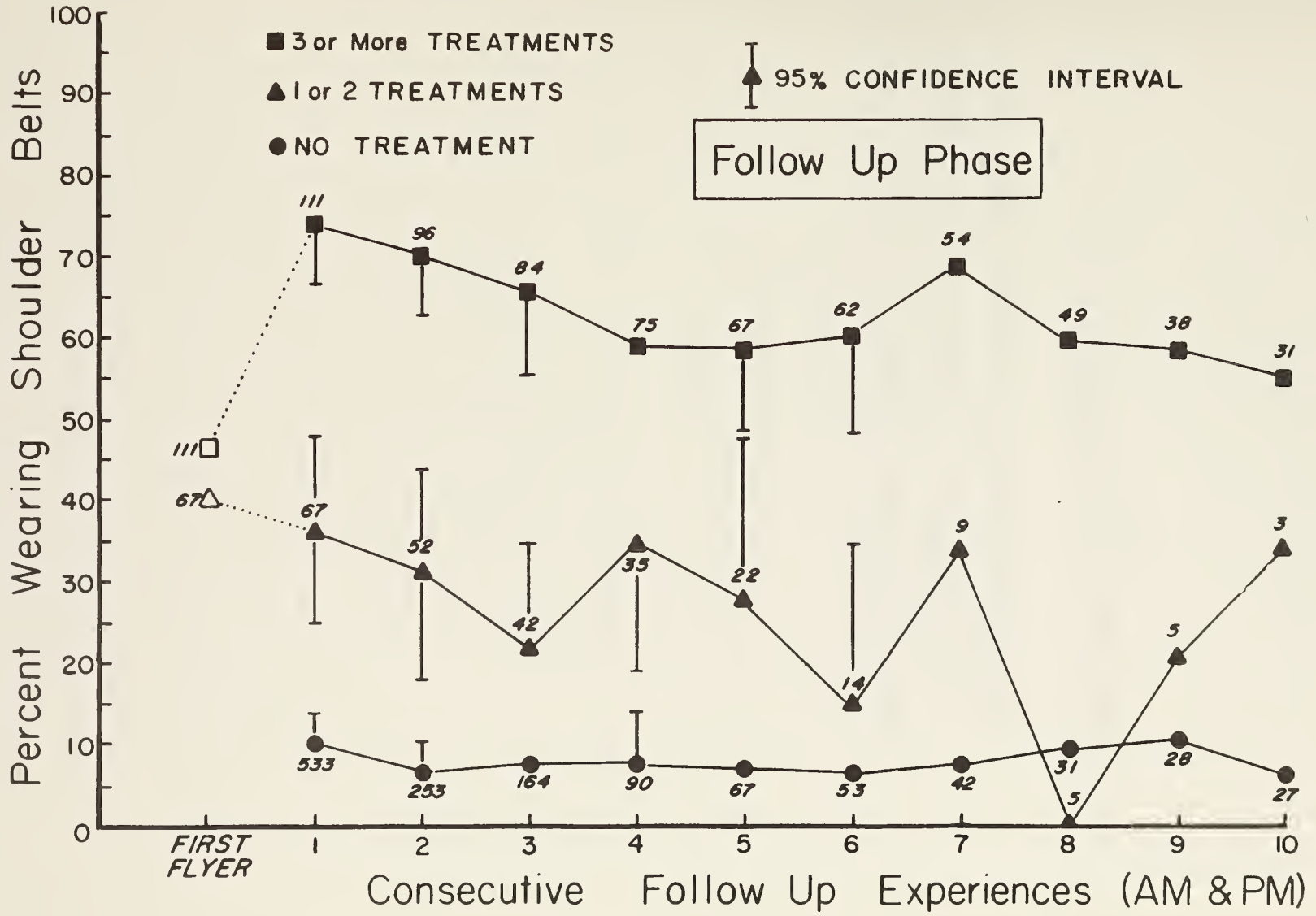
Figure 5. Percentage of shoulder belt wearers over consecutive follow-up observations as a function of number of Treatment exposures. The numbers indicate the sample size for the particular data point.


UnObts. Baseline
Obtrusive Baseline
Incentive (Continuous)
Fliers in P.M. (50% Alternating)
Obtrusive Baseline
Follow Up
A.M. ARRIVAL
P.M. DEPART
Percent Wearing Shoulder Belt
Consecutive Observation Days


P.M. DEPART (Shoulder and/or Lap Belt)
P.M. DEPART (Shoulder Belt)
A.M. ARRIVAL (Shoulder Belt)
INCENTIVE PHASE
Percent Wearing Safety Belts
Consecutive Experiences During Treatment Phase
0
10
20
30
40
50
60
70
80
90
100
1
2
3
4
5
6
7
8
9
10
11
661
330
219
163
131
104
91
63
56
50
42
689
374
287
237
196
172
148
126
103
90
79


Percent Wearing Shoulder and/or Lap Belts
100
90
80
70
60
50
40
30
20
10
0
1
2
3
4
5
6
7
8
9
10
11
Number of Flyers Received During P.M. Departure
PM DEPARTURE
INCENTIVE PHASE
1661
330
219
163
131
104
93
83
56
50
42


TREATMENT = VALID FLYER (Reward)
95% CONFIDENCE INTERVAL
Incentive Phase
Percent Wearing Shoulder Belts in A.M.
Number of Prior P.M. Treatments
100
90
80
70
60
50
40
30
20
10
0
0
1
2
3
4
5
6
7
638
121
100
66
51
47
39
29


3 or More TREATMENTS
1 or 2 TREATMENTS
NO TREATMENT
95% CONFIDENCE INTERVAL
Follow Up Phase
Percent Wearing Shoulder Belts
100
90
80
70
60
50
40
30
20
10
0
111
96
84
75
67
62
54
49
38
31
111
67
67
52
42
35
22
14
9
5
3
533
253
164
90
67
53
42
31
5
28
27
FIRST FLYER
1
2
3
4
5
6
7
8
9
10
Consecutive Follow Up Experiences (AM & PM)

Appendix B

"Industry-based incentives to promote seat belt usage:

Differential impact on salary vs. hourly employees."

[*Journal of Organizational Behavior Management*, in press]

Journal of Organizational Behavior Management, in press

December, 1982

Industry-Based Incentives for Promoting Seat Belt Use: Differential Impact on White-Collar versus Blue-Collar Employees[1]

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Running Head: Promoting Seat Belt Usage

Abstract

An incentive strategy for motivating seat belt usage was implemented at an industrial complex where it was possible to compare intervention impact on hourly (blue-collar) versus salary (white-collar) workers. When employees arrived in the morning and departed in the afternoon, seat belt usage was assessed at the plant's separate parking lots for salary and hourly workers. After several days of baseline an incentive program was implemented during only the morning observation sessions by distributing to vehicle drivers flyers that prompted seat belt usage and gave belt wearers opportunities to win prizes. Baseline belt wearing was substantially higher among salary then hourly workers (e.g., mean usage of 17.4% vs. 3.4%); and the incentives encouraged a much greater proportion of salary than hourly workers to buckle up (e.g., mean a.m. usage of 50.6% vs. 5.5% during the incentive period). Belt usage increased in the p.m. when incentives were offered in the a.m.; however after the a.m. incentives were withdrawn, belt usage returned to initial baseline levels. Interpretations and implications of the salary vs. hourly differences are discussed.

Industry-Based Incentives for Promoting Seat Belt Use: Differential Impact on Salary vs. Hourly Employees[1]

In the U.S. more than 34,000 deaths and half a million injuries occur each year to occupants of passenger cars, light trucks, and vans (Nichols, Note 1). This is certainly one of the great tragedies of our society; but even more tragic is the fact that seat belt usage could reduce the chance of death and serious injury by 50% or more, yet seat belts are seldom worn (Bigelow, Note 2). For example, the percentage of seat belt wearers was only 10.9% of 150,000 drivers observed in 19 metropolitan areas from November 1977 through November 1979 ("Two Year Study," 1980).

An interdisciplinary committee of experts in transportation was formed in May 1979 by the National Highway Traffic Safety Administration (NHTSA) to evaluate strategies for motivating seat belt usage. The final report of this committee recommended specifically that employers be encouraged to develop procedures for encouraging seat belt wearing among their employees; since industry-based programs have the potential of reaching a maximum number of U.S. drivers, and crash injuries and deaths entail significant employer costs, amounting to "a total of about $1.5 billion in 1978" (Transportation Research Board, Note 3, p. 6). The research described herein was designed to develop and evaluate an industry-based program for motivating seat belt usage.

Most industry-based programs for promoting seat belt use have emphasized an educational approach, and have not been very successful unless coupled with incentive strategies. For example, Phillips (Note 4) concluded "that Corporate Safety Directors generally are reluctant to involve employees in an educational program directed specifically at safety belt usage" (p. i). Indeed, only two out of the 23 companies that expressed an initial interest in Phillips'

educational program agreed to participate. When the nine-month educational program was implemented at two plants (including newspaper articles, posters, booklets, a film, and a demonstration), the before-after comparisons showed nonsignificant usage gains of 2.2% and 1.1% at the two plants, respectively. Similarly, Geller (Note 5) found that a 20-minute seat belt promotion film had no effect on employees' belt usage, although it did significantly increase verbal intentions to wear seat belts.

Industry-based safety belt programs have been successful when they provided incentives (i.e., rewards) for seat belt wearing. In a manual for teaching incentive strategies to corporate executives, Geller (Note 6) presented twelve case studies of industry-based programs that influenced significant increases in seat belt usage, and each of these programs was based on an incentive scheme. The most successful of these programs is currently in effect at the Berg Electronics plant in New Cumberland, Pennsylvania, and has maintained safety belt use at 90% (among the 1,200 employees) by periodically offering rewards to those vehicle occupants wearing seat belts while entering and exiting the plant. Berg management has estimated that it is cost effective to spend $10,000 annually on incentives for this program (Spoonhour, 1981; Geller, Note 6).

The present research studied the permanence and generality of a short-term incentive program implemented at an industrial site to promote safety belt use. For five weeks rewards for belt wearing were offered in the morning when employees arrived for work. Before, during, and after this incentive program, seat belt practices were observed systematically in both the morning and the afternoon. Salary (white-collar) and hourly (blue-collar) employees used different parking lots, and therefore it was possible to compare these two types of workers with regard to: 1) immediate treatment impact (i.e., seat belt usage in morning when incentives were given to belt

wearers); 2) treatment generality (i.e., seat belt usage in the afternoon on days when rewards for belt use were offered in the morning); and 3) treatment permanence (i.e., seat belt usage after the incentive phase was withdrawn).

Method

Subjects and Settings

Subjects were employees of Federal Mogul, Inc., in Blacksburg, Virginia, an industrial complex which manufactures engine bearings. Approximately 450 hourly employees are involved in production, inspection, and maintenance jobs (e.g., quality inspectors, machine operators, and electricians); whereas about 100 people are employed in salary positions, including engineers, accountants, and management and personnel staffs.

Vehicles were observed as they entered and exited the only two parking lots. One lot was used only by hourly employees, while the other was used by salary workers. Observation sessions occurred from 6:15 to 7:15 a.m. and 2:50 to 3:45 p.m. at the "hourly" lot and from 7:20 to 8:00 a.m. and 4:30 to 5:05 p.m. at the "salary" lot, Monday through Friday.

General Observation Procedure

As vehicles entered and exited a lot, two observers (wearing orange safety vests) independently recorded whether a shoulder belt was available in the driver's position and whether the driver was wearing a shoulder belt. There was no attempt to observe every vehicle that entered or exited a parking lot. After completing the data recording of a particular vehicle, the observers looked up and targeted the next available vehicle for observation.

Experimental Conditions

Unobtrusive Baseline. For a few days at the start of the study, two observers stood to the side of the entrance/exit of the lot and recorded vehicle and occupant data as inconspicuously as possible. On days when it rained field observations occurred in this unobtrusive fashion.

Obtrusive Baseline. This condition occurred immediately before and after the Incentive condition and was essentially the same as Unobtrusive Baseline, except that the observers were more conspicuous (i.e., standing in full view of oncoming vehicles and wearing orange safety vests), and large posters inside the plants informed employees of the seat belt observations. On the seventh day of the first Obtrusive Baseline (i.e., before the Incentive condition), vehicles entering and exiting the hourly lot were stopped, and a third observer handed an educational flyer to all drivers. If traffic backed up, the observer walked down the row and handed a handbill to each driver. This handbill listed advantages of wearing safety belts and encouraged their use[2].

Incentive Flyers. Following Obtrusive Baseline, drivers were stopped and handed an incentive flyer by an observer who verbalized, "Just checking to see if you're wearing your seat belt. Here's a description of how you can win prizes." The front of each flyer (as depicted in Geller, Paterson, & Talbott, 1982) described a "combination game," whereby certain combinations of the symbols printed on each flyer could be exchanged for prizes such as dinners for two at local restaurants. The flyers given to drivers wearing their seat belts contained a contest symbol, whereas the flyers given to drivers not wearing their seat belts did not contain a contest symbol, but had a slip of paper stapled across the center which read, "NEXT TIME WEAR YOUR SEAT BELT AND RECEIVE A CHANCE TO WIN A VALUABLE PRIZE!" The back of

these incentive flyers displayed the logos of local merchants who contributed contest prizes[3]. Signs inside each plant instructed the workers to place their winning flyer combinations in specially labeled boxes near the employee entrances, in order to claim their prizes.

Immediate Prize. After the first 15 days of Incentive Flyers at the hourly lot, free dinners at a local restaurant were given to those employees wearing their belts when arriving in the morning. These meals consisted of a large hamburger, an order of french fries, and a soft drink. Two working days before this intervention was initiated, a 27" x 34" sign was placed inside the plant which stated that drivers stopped in the morning during the following week would be given a certificate for a free meal if they were wearing their seat belts at the time.

Follow Up. After the final Obtrusive Baseline, all program signs were removed from the plant and no observing occurred for two weeks. Then the observers returned for 13 consecutive workdays of Follow-Up observations at the salary lot. The condition was exactly the same as Unobtrusive Baseline.

Results

Interobserver Reliability

Two researchers made independent data recordings for 60.8% of the 14,064 vehicle observations. Observer agreement was calculated by dividing the total number of observations agreed upon for a particular data category by the total number of observations, and multiplying by 100. The percent of agreement was 95.6% for the observation of shoulder belt wearing; 82.9% for shoulder belt availability; 99.9% for acceptance or rejection of a flyer; and 99.4% for the recording of vehicles that did not stop when prompted to do so.

Noncooperative Drivers

It was rare for drivers to refuse a flyer once they had stopped their

vehicle at the distribution point. Specifically, the average daily refusal rate was only .20% at the hourly lot, and at the salary lot no one ever refused a flyer. Some drivers did refuse to stop their vehicle when prompted to stop for a flyer, and such noncompliance was substantially higher among hourly than salary workers. The average percentages of daily drive-bys was 8.8% at the hourly lot and 4.6% at the salary lot. The rate of drive-bys did not show any consistent patterns over observation days.

Shoulder Belt Usage

The daily observation procedures included a recording of whether a shoulder belt was present on the driver's side of the vehicle and whether a shoulder belt was worn by the driver. Vehicles without shoulder belts for drivers were eliminated from this analysis. The mean daily percentage of vehicles with a shoulder belt for the driver was 79.8%.

Figure 1 depicts the daily percentages of belt wearing among hourly workers. The horizontal lines in each phase represent mean percentages -- solid line for a.m. observations and broken line for p.m. observations. The average number of observations per graph point was 70.5 in the a.m. (ranging from 46 to 129 vehicles) and 76.1 in the p.m. (ranging from 57 to 115 vehicles). Shoulder belt usage was extremely low throughout the entire 54-day period and did not increase appreciably as a function of the incentive flyers. The percentage of shoulder belt wearers increased slightly at both the a.m. and p.m. sessions during the week that immediate prizes (i.e., meals) were offered to belt wearers. Following the Immediate Prize condition, a few drivers began wearing their shoulder belt in order to receive incentive flyers. Mean belt usage during this second phase of a.m. flyer distribution was 9.0% during morning arrival and 4.7% during afternoon departure. As shown in Fig. 1, the educational handbill, distributed on Day 22, had

absolutely no impact on shoulder belt wearing.

Insert Fig. 1 about here

Figure 2 displays the daily shoulder belt usage of salary workers. The mean number of observations per mean was 25.2 in a.m. (ranging from 11 to 42) and 23.6 in p.m. (ranging from 14 to 35). During the distribution of incentive flyers, belt usage in the a.m. increased to a mean of 50.6%, compared to 18.6% mean usage over the twelve immediately prior days of Obtrusive Baseline. Belt usage in the p.m. increased somewhat during the Incentive phase (i.e., from a mean of 18.0% wearing during Obtrusive Baseline to 32.0% during a.m. incentives), but remained below the a.m. usage rates. After the Incentive period, belt usage remained above pre-treatment Baseline for several days; however, the 13 days of Follow-Up observations indicated a return to baseline percentages of shoulder belt wearing, with mean usage percentages of 18.7% and 20.2% for the a.m. and p.m., respectively. The slightly higher usage in p.m. Follow Up is perhaps the clearest demonstration that the behavioral impact of the incentives was transient.

Insert Fig. 2 about here

Discussion

The U.S. National Highway Traffic Safety Administration (NHTSA) has launched a nationwide campaign to increase voluntary usage of safety belts, and a significant aspect of this effort has targeted industrial settings

(Bigelow, Note 2; Nichols, Note 1). The emphasis on developing industry-based programs for promoting seat belt usage has occurred because of the clear financial advantages to industry if employees buckle up. For example, NHTSA recently collected information regarding the financial benefits to companies if workers wore their seat belts by contrasting the cost to industry of pairs of similar accidents in which seat belts were worn in one case but not in the other. The results of these comparisons were striking, with seat belt usage holding employer costs to little or nothing while costs for wage compensation, insurance, and employee substitutions amounted to thousands of dollars in analogous accidents where seat belts were not used (Bigelow, Note 2; Pabon, Sims, Smith, & Associates, Note 7). Therefore, the present demonstration that an inexpensive incentive program can influence substantial increases in seat belt wearing at an industrial site has obvious applied significance. However, the most critical outcome of the present research was the differential impact of the incentive program on white-collar versus blue-collar workers.

When incentives were distributed, the mean usage of salary workers was 50.6% compared to 5.5% for blue-collar workers. This outcome was replicated at another plant with an evaluation procedure as rigorous as that in the present study (Geller, Note 5); and was also indicated in the three case studies reported by Geller (Note 6) that implemented analogous incentive programs and conducted separate evaluations of blue-collar and white-collar workers. It is perhaps noteworthy that the immediate reward procedure of giving certificates to hourly workers wearing seat belts was twice as effective as the preceding incentive flyers, and that the impact of the incentive flyers seemed to be greater after the immediate reward period.

Geller (Note 8) conducted follow-up questionnaire surveys at Federal Mogul and at another plant which showed differential program impact on salary

versus hourly workers, and the results indicated significant differences between salary and hourly workers in perceptions of on-the-job risk and freedom. Relative to the salary workers at each plant, hourly workers reported more personal risk in their work, attributed greater importance to safety precautions, and felt they had less freedom, in terms of opportunities to make work-related decisions and to control their work pace. These findings support two possible interpretations for the salary/hourly differences, one focusing on differential acceptances of a behavior change program and the other on differential perceptions of driving risk. More specifically, it is possible that the hourly workers' greater perceptions of external control by the work environment made them less apt to accept another attempt to control their behavior at the work site. On the other hand, it is possible that the contrasting perceptions and experiences of personal risk during the work day of hourly versus salary workers influences differential judgments of risk with regard to driving. That is, the degree to which one perceives the driving environment as risky may depend upon the amount of perceived risk experienced in the proximal environmental setting, such that perceptions of driving risk vary inversely with recent (i.e., preceding) or expected (i.e., subsequent) risk perceptions (e.g., in the work environment).

These freedom and risk interpretations of the salary/hourly differences are intuitively appealing, and were in fact supported by follow-up discussions with the plants' personnel directors (Geller, Note 9). For example, the personnel manager at Federal Mogul stated that his hourly workers (as opposed to the salary workers) feel "sealed in" by the work environment, and "nothing can stand in their way when they 'punch out' at the end of the day." Also, both personnel managers expressed special concern for promoting on-the-job safety among their hourly work staffs. Indeed, incentive programs are implemented frequently at both plants in an effort to reduce

"loss-time" accidents among the blue-collar (hourly) work force.

Our follow-up meetings with the personnel directors and interviews with some employees have suggested a number of other possible reasons for the observed salary/hourly differences, including: 1) lower education and socio-economic levels of the hourly workers; 2) more identification with university students and a university-labeled research project among the salary employees; 3) a higher value placed on the back-up rewards (e.g., dinners for two and gift certificates at novelty shops) by salary workers; and 4) more identification by hourly workers with a certain "macho" image of driving a "big fast vehicle" without a seat belt, as is represented by the heros of "Dukes of Hazzard," a favorite T.V. show of the blue-collar workers.

Given the variety of possible explanations for the salary/hourly differences, it may be most appropriate to consider simply that the impact of an incentive program for promoting seat belt usage may be expected to vary directly with the baseline level of seat belt usage. This interpretation is not only the most parsimonious but also has validity with regard to a functional analysis of behavior and its controlling contingencies. More specifically, the greater impact of the present incentive program on salary workers can be accounted for by considering the following: 1) An extremely low baseline usage of seat belts (as observed among the hourly workers) implies a relatively large portion of "hard-core" nonusers (i.e., individuals who never buckle up); 2) A reasonably high level of baseline belt usage (as observed among the salary workers) suggests that a relatively large proportion of the drivers are part-time belt users; 3) Compared with intermittent belt wearers, it is much more difficult for hard-core nonusers of seat belts to remember to buckle up for rewards; 4) During the present incentive program all drivers were on partial or intermittent reinforcement schedules, since the observers did not prompt every driver on a given day to stop for an incentive flyer; 5)

Seat belt wearing was frequently not rewarded on a particular day and this was likely to be most frustrating for the hard-core nonuser who remembered to buckle up for an incentive flyer; 6) Hard-core nonusers were apt to forget to buckle up even when motivated to earn a reward, and forgetting to buckle up was particularly frustrating when they received opportunities for reinforcement (i.e., by being prompted to stop); and 7) The two types of nonreward experiences defined by the two preceding statements were more apt to discourage the program participation of individuals who rarely buckle up than the part-time seat belt wearer. The bottomline of this interpretation is that the partial reward schedules of the present incentive program were probably inappropriate for the majority of hourly workers who were hard-core nonusers of seat belts.

The partial reward program of the present study was quite inexpensive. Seventeen employees handed in winning combination flyers to receive prizes valued at $225; and of the total cost for prizes, $112 or 49.8% was donated by local merchants. An incentive strategy with such minimal costs is feasible for much longer-term applications than in the present study; and in fact the results of the present study indicate that much longer-term applications of incentives are necessary for long-term increases in safety belt use. Indeed, the special success of the incentive program at Berg Electronics, Inc. may be due to the fact that Berg employees have been rewarded periodically for seat belt wearing since April 1980 (Geller, Note 6; Spoonhour, 1981). Obviously, follow-up research is drastically needed to determine optimal scheduling techniques for initiating, fading, and re-introducing rewards for belt use. The present study also demonstrated a critical need to develop special interventions for reaching the blue-collar worker.

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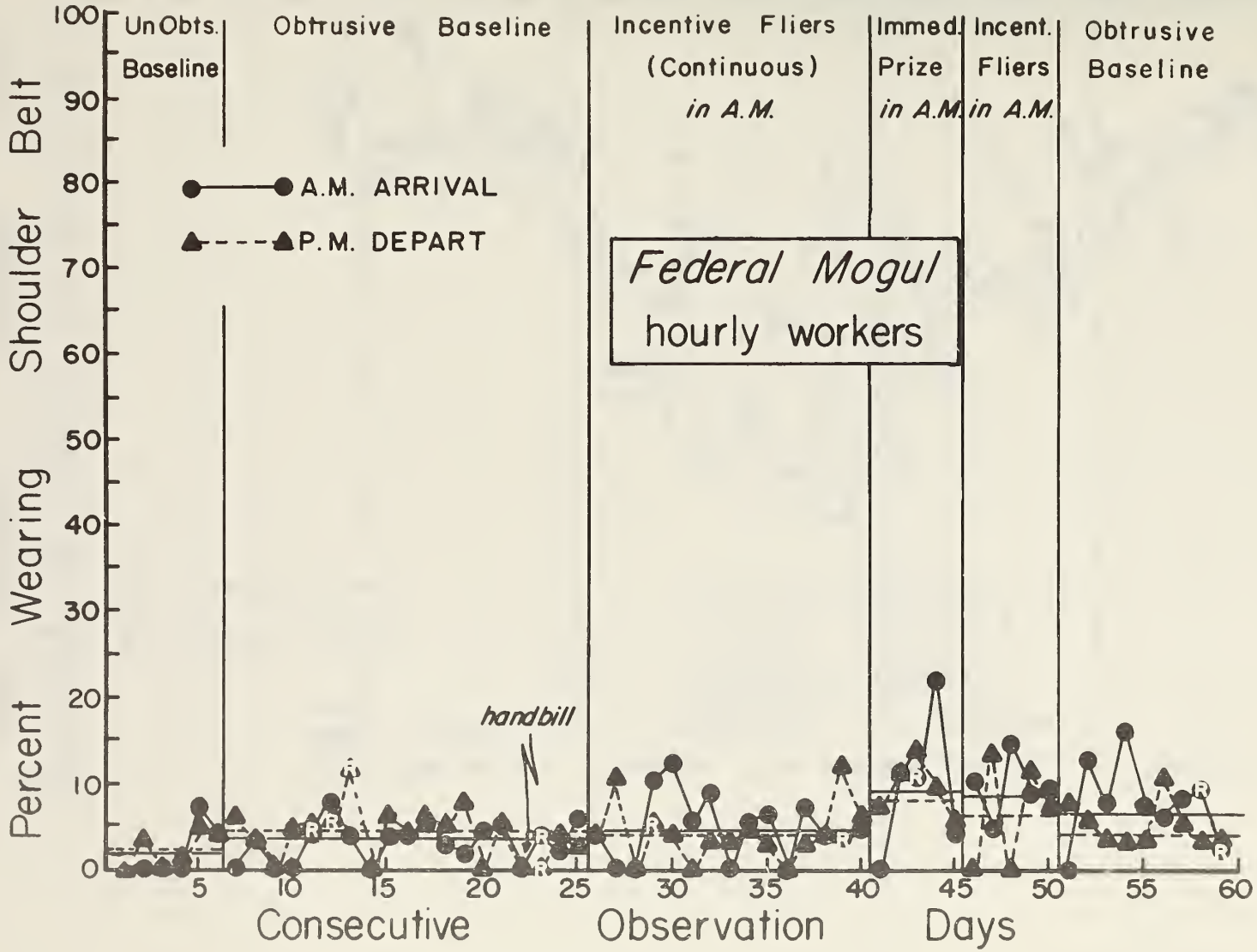
[2]A copy of this educational flyer is available from the first author upon request.

[3]One of the actual flyers will be provided upon request to the first author.

Figure Captions

Figure 1. Mean shoulder belt usage among blue-collar employees at Federal Mogul over consecutive morning and afternoon observation sessions. It rained during sessions with graph points containing an "R", and the experimental condidition was Unobtrusive Baseline.

Figure 2. Mean shoulder belt usage among white-collar employees at Federal Mogul over consecutive morning and afternoon observation sessions. Data points containing an "R" indicate sessions when it rained and the experimental condition was Unobtrusive baseline.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Obtrusive Baseline
Incentive Fliers (Continuous) in A.M.
Immed. Prize in A.M.
Incent. Fliers in A.M.
Obtrusive Baseline
A.M. ARRIVAL
P.M. DEPART
Federal Mogul
hourly workers
handbill
Percent Wearing Shoulder Belt
Consecutive Observation Days
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10
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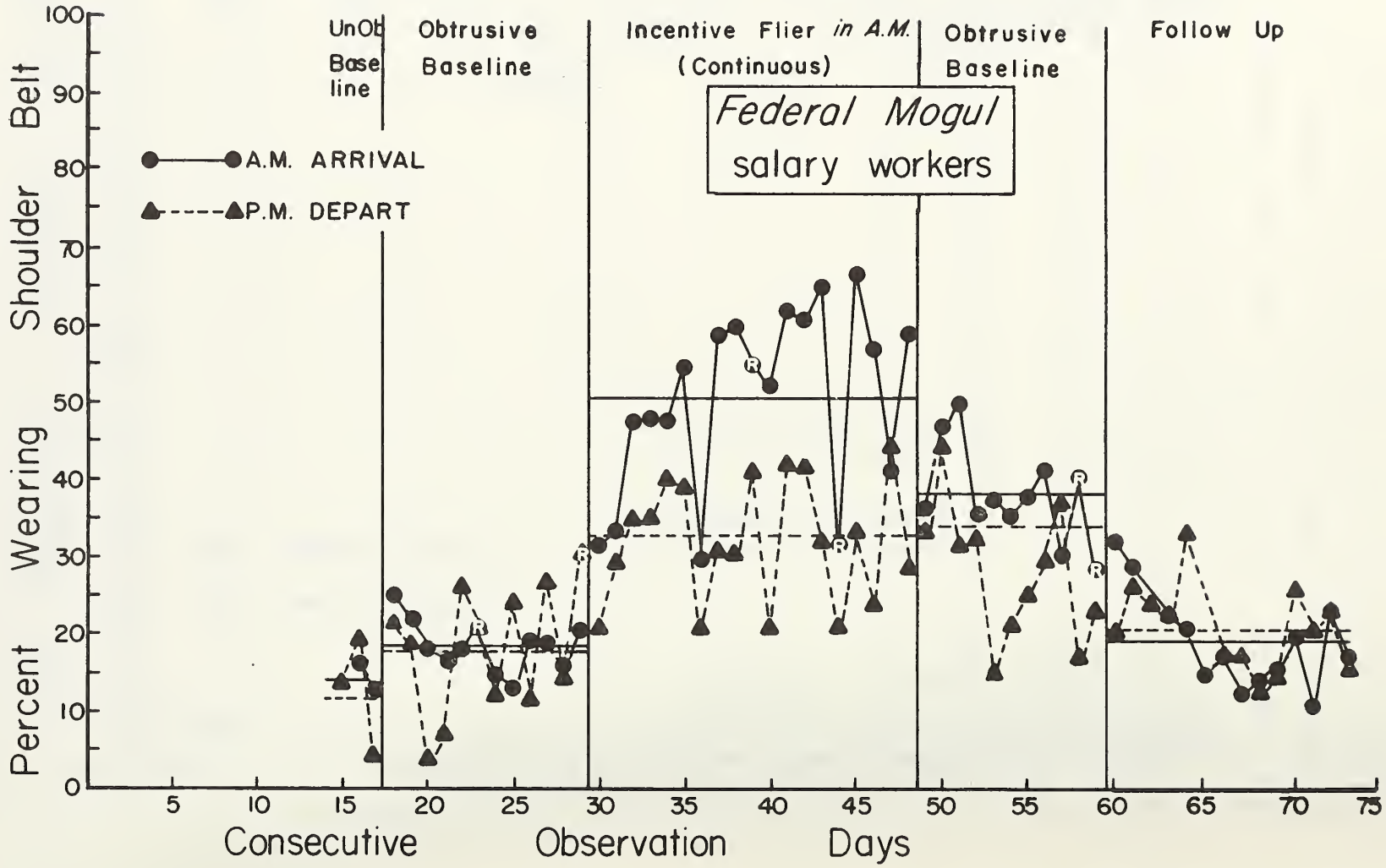
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salary workers
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P.M. DEPART
Percent Wearing Shoulder Belt
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Consecutive Observation Days

Appendix C

"A practical incentive strategy for motivating large-scale safety belt use: A test of long-term impact." [Under editorial review]

Under Editorial Review

March, 1983

A Practical Incentive Strategy for Large-Scale Motivation of Safety Belt Use: A Test of Long-Term Impact

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Running Head: Motivating Seat Belt Use

Abstract

An incentive program especially applicable for communitywide motivation of safety belt use was implemented at a large industrial complex after four weeks of daily baseline observation of drivers' shoulder belt usage at two entrance/exit gates during employees' afternoon departure. The average number of vehicles observed per day throughout the year-long study was 702.6 at one exit (Gate 1) and 141.5 at the other exit (Gate 2). The incentive intervention was implemented at only Gate 1, where it was impossible to stop vehicles and immediately reward safety belt wearing. Instead, the employees were informed via signs, posters, and newspaper articles that a winning license plate number would be randomly selected each day from among those vehicles exiting Gate 1 whose drivers were wearing shoulder belts. Winners were offered the choice of two university basketball tickets or meals for two at a local restaurant. Shoulder belt observations continued daily at both gates throughout the three-week incentive intervention, and for three long-term follow-up phases over the subsequent eleven months. The incentive intervention influenced substantial increases in shoulder-belt use (from a mean percentage of 6.3% belt usage during baseline to 23.1% during the incentive period); and affected some long-term impact (i.e., mean use = 16.3% after one month, 15.8% after three months, and 11.0% after ten months).

Descriptors: behavioral community psychology, organizational behavior management, transportation safety, incentives, seat belts, long-term impact, observer bias.

A Practical Incentive Strategy for Large-Scale Motivation of Safety Belt Use: A Test of Long-Term Impact

There is an urgent need to motivate the public to buckle their manual shoulder and lap belts; especially since the manual safety belt is the most protective restraint system currently available for front-seat vehicle occupants (i.e., more effective than automatic belts and air bags), the manual system is the only protective device available for back-seat occupants and small children, and the commitment to buckle a manual safety belt might increase safety attitudes and behaviors in related situations (e.g., see Geller, Casali, & Johnson, 1980, for a complete review of the rationale for targeting manual belt use with a behavior change program).

Recently, incentive approaches toward safety belt promotion have shown remarkable success in community and industrial settings, often tripling baseline usage. As reviewed by Geller (Note 1), most of these incentive programs can be categorized as "direct and immediate", whereby vehicle occupants are rewarded for wearing their safety belts with an immediate valuable (e.g., cash, candy, trinkets, flower), or with an opportunity to win a prize (e.g., lottery ticket, bingo number, raffle coupon). Reinforcement theory (e.g., Skinner, 1938) predicts optimal success with a direct and immediate reward strategy, and indeed practically all of the safety belt incentive programs have used this approach, i.e., at entrances to industrial complexes (Geller, in press; Geller, Davis, & Spicer, in press; Spoonhour, 1981; Campbell, Hunter, Stewart, & Stutts, Note 2); at the exchange windows of banks (Geller, Johnson, & Pelton, 1982; Johnson & Geller, in press); and in the parking lots of a high school (Campbell, *et al*. Note 2), a university (Geller, Paterson, & Talbott, 1982) and a department store (Elman &

Killebrew, 1978).

A critical disadvantage of the direct and immediate incentive approach is the need to stop vehicles in order to reward seat belt users. There are certainly many community locations where cars are already stopped, and where this incentive approach is feasible (e.g., at exchange windows of banks, fast-food restaurants, highway toll booths, and parking lots). However, contrary to the opinion of one researcher (Campbell, Note 3), a large-scale effort to promote safety belt use cannot rely entirely on a direct and immediate incentive program. There are too many settings where it is infeasible or inconvenient to stop vehicles for reward administration; and therefore alternative strategies are needed. The present research tested the long-term impact of an incentive strategy that did not stop vehicles for immediate reinforcement of safety belt use.

The milieu for the present research was a large industrial complex, where the traffic flow at the main entrance/exit gate was approximately two vehicles per second across two exit lanes. Such a high traffic flow is typical of most large industrial settings, making it impossible to stop vehicles and immediately reward safety belt wearers. Thus, a delayed "prize-a-day" incentive program was implemented, whereby one winning license plate was randomly selected each afternoon from among those vehicles with drivers buckled. This program was in effect for only three weeks, but follow-up observations were taken for almost a year after the program was terminated. Thus, the present research was the first to test long-term impact of a short-term incentive program to promote safety belt use, as well as introducing a delayed incentive strategy that is feasible for the numerous corporate and community settings where vehicles cannot be stopped safely and conveniently to reward safety belt use immediately.

Method

Participants and Setting

Participants were sampled from the employees of Radford Army Ammunition Plant (RAAP) in Radford, Virginia. The RAAP complex includes over 7,000 acres of land and more than 4,000 buildings. At the time of the study 3,023 employees worked at RAAP, of which 83% were male. The average age of these employees was 45 years. Many different types of workers are involved in the manufacturing of the dangerous propellants produced at RAAP, including construction workers, scientists, engineers, research and development personnel, maintenance workers, secretaries, and general laborers.

Vehicles were observed while exiting two of the three most frequently used gates, each manned by two uniformed security officers. One of these gates (Gate 1) was the main gate to the industrial complex, and the traffic flow here was very heavy (i.e., two vehicles per second across two lanes) when observations were taken (i.e., 4:00 to 4:45 p.m.). The flow at Gate 2 was substantially lower (i.e., one vehicle per three or four seconds). At Gate 2 exiting vehicles had been prompted to stop for seat belt rewards in an earlier incentive study (Geller, 1983), which had terminated three months before this experiment began. The three RAAP gates were more than three miles from each other, and each provided access to the most convenient travel route to a different town (i.e., Radford, Christiansburg, or Blacksburg, VA). Thus, each gate was used consistently by the same employees.

Observation Procedure

When employees were exiting work (i.e., from 4:00 to 4:45 p.m.), one or two observers in bright orange safety jackets stood outside of the guard house and recorded on special data sheets whether a shoulder belt was available for each vehicle's driver and whether or not an available shoulder

belt was worn. The observer attempted to record this data on every passing vehicle in a systematic fashion (e.g., always recording the vehicle in the closest lane first). When two observers were available at the same site they worked independently, except for checking periodically on the sequence number of particular vehicles.

Experimental Conditions

Baseline. Prior to the initial baseline observations, an article appeared in the employee newspaper which announced the seat belt observations. The observers were quite obtrusive, wearing orange safety vests and holding large clipboards. This baseline condition was in effect for five weeks before the three-week incentive intervention, and then for several months after the intervention, as detailed below.

Incentives. Ten days before the incentive intervention, the employee newspaper announced that November 30th (1981) would be the kick-off day for a special seat-belt promotion program, and ten announcement posters were distributed throughout the plant. The posters defined the incentive program, and read as follows:

WEAR YOUR SEAT BELT WHEN EXITING
THE MAIN GATE
AND
YOU MAY BE THE WINNER OF
* A DINNER FOR TWO OR
* A PAIR OF HOKIE BASKETBALL TICKETS
A WINNER IS RANDOMLY SELECTED *EVERYDAY*
FROM AMONG THOSE WEARING THEIR SEAT BELTS
CONTEST BEGINS ON MONDAY NOVEMBER 30

The license plate numbers of the daily winners were posted on a large 4' x 8' marquee located 300 yards from Gate 1 and readily visible to incoming vehicles. The heading on the marquee was, "SEAT BELT CONTEST WINNERS". These winners were also announced in the employee newspaper which is published biweekly. After the first week of the incentive

intervention the employee newspaper published an article about the program and announced the initial winners.[2]

On eight of the 15 daily observation periods of the incentive intervention the Virginia Tech mascot (i.e., a student dressed in a turkey uniform) stood at the exit gate with a sign that read "PRIZES AWARDED TO SEAT BELT WEARERS". When vehicles were stopped by the traffic control signal, the "Tech gobbler" pointed to the unused shoulder belt of the nearest vehicle and shook his finger to indicate that the shoulder belt should be worn. At other times the gobbler pointed at the large sign which he held high in his other hand.

The daily winners claimed their prize at the plant's safety office. Each winner could choose either a pair of tickets to a Virginia Tech basketball game (valued at $12) or a meal for two at a local restaurant (valued at $10). All of the basketball tickets were donated by the Virginia Tech Athletic Office; and a local restaurant donated seven of the dinners. Thus, the maximum cost of the incentives (i.e., if all winners chose dinners) was only $80. As it turned out, 12 of the fifteen winners claimed their prize, and ten of these chose the meal for two.

Design

Shoulder belt use was observed at Gates 1 and 2 before, during, and after the three-week incentive condition was implemented at Gate 1. Periods of no observation were interspersed throughout this study. Three of these breaks coincided with university vacations, and were necessitated by a lack of student researchers. The sequence of phases was as follows: (1) Initial Baseline -- 25 workdays; (2) No Observations -- 8 workdays (Thanksgiving break); (3) Incentive Intervention at Gate 1 -- 15 workdays; (4) No Observations -- 20 workdays (Christmas break); (5) Follow-Up 1 -- 38

workdays; (6) No Observations -- 9 workdays (Spring break); (7) Follow-Up 2 -- 37 workdays; (8) No Observations -- 108 workdays; (9) Follow-Up 3 -- 10 workdays.

Results

Interobserver Reliability

Two researchers made independent data recordings for 62.1% of the 85,799 vehicle observations (over 121 days) at Gate 1, and for 48.5% of the 16,680 vehicle observations (117 days) at Gate 2. Observer agreement was calculated by dividing the total number of observations agreed upon for a particular data category by the total number of observations, and multiplying by 100. The percent of agreement for the observation of shoulder belt wearing was 95.3% at Gate 1 and 94.0% at Gate 2; and for shoulder belt availability the agreement percentages were 93.5% and 94.2% for Gates 1 and 2, respectively.

Shoulder Belt Availability

The average number of vehicle observations per day was 702.6 at Gate 1 (ranging from 567 to 901) and 141.5 at Gate 2 (ranging from 123 to 167); and of these vehicles, an overall mean of 74.1% had a shoulder belt for the driver (i.e., mean belt availability was 72.6% at Gate 1 and 81.9% at Gate 2). Thus, the shoulder belt practices of 600 or more drivers was recorded daily for 125 observations sessions (averaging 510.1 vehicles at Gate 1 and 115.9 vehicles at Gate 2). Neither vehicle frequency nor shoulder-availability fluctuated systematically over days or between the experimental conditions (i.e., baseline, incentives at Gate 1, or follow-up).

Shoulder Belt Use

The daily percentage of drivers wearing shoulder belts (i.e., among those vehicles in which a shoulder belt was observed) is depicted in Fig. 1 for both exit gates. During the initial baseline recording shoulder belt use was

substantially higher at Gate 2 (mean = 20.0% for 23 days) than at Gate 1 (mean = 6.7% for 21 days). As soon as the "prize-a-day" program was implemented at Gate 1 belt usage at this gate increased more than three-fold (i.e., 23.1% mean usage over the three-week incentive program). Mean belt use at Gate 2 increased slightly during the Gate 1 incentives (i.e., to a mean of 25.2% belt use), maintaining a level slightly above the Gate 1 increase. The special prompting procedure (i.e., the "turkey" holding a sign that announced the "prize-a-day" program) did not influence systematic fluctuations in daily belt-use percentages, as illustrated by comparing the open and solid points in Fig. 1 for the Gate 1 incentive condition (Days 24-38).

Insert Fig. 1 about here

After the three-week incentive condition at Gate 1 and a 25-day break in daily observations, belt use decreased at Gate 1 (to a mean of 16.3%) and remained essentially unchanged at Gate 2 (mean = 24.9%). It is noteworthy that belt use at both gates was relatively low at the start of Follow-Up 1 and increased rather consistently as the phase continued. This was especially prominent at Gate 1, with shoulder belt use starting at the low pre-intervention baseline level (i.e., Day 39 in Fig. 1), and increasing successively on the next two days to reach the mean usage level for the entire phase. After the initial two days of Follow-Up 1, shoulder belt use at Gate 1 was consistently twice as high (or more) than pre-intervention baseline.

Throughout Follow-Up 2 shoulder belt use at Gate 1 remained at the post-intervention increase established during Follow-Up 1 (mean = 15.8%), and Gate

2 usage was also similar to that observed during Follow-Up 1 (mean = 26.2%). The long 151-day break in the observation schedule during the summer months was followed by a substantial decrease in belt use at both gates when daily observations were resumed. At Gate 2 shoulder belt wearing actually dropped below the initial baseline level observed at this gate almost one year earlier (i.e., to a mean of 16.7% usage); however, at Gate 1 shoulder belt wearing during Follow-Up 3 was still higher than it had been during the pre-intervention baseline (i.e., mean = 11.0%).

Discussion

The social validity of this research is founded in the demonstration of a practical cost-effective strategy for increasing safety belt wearing among employees of a large industrial complex. The "prize-a-day" incentive strategy did not require drivers to stop their vehicle for immediate reward administration and is therefore applicable for various industrial and community settings where vehicular stopping is inconvenient or hazardous. When this research was planned, all of the successful safety-belt programs based on incentives required vehicular stopping (e.g., Elman & Killebrew, 1978; Geller, Johnson, & Pelton, 1982; Geller, Paterson, & Talbott, 1982; Spoonhour, 1981), and in fact the present research was prompted by researchers from General Motors Research Laboratories who were interested in developing an effective safety belt program for the 6,000 employees at the General Motors Technical Center in Warren, Michigan (Geller, Note 4). In fact, the initial results of this study (i.e., before long-term intervention impact was evaluated) served as primary impetus for the development of an industry-wide incentive program at the GM Tech Center that increased the percentage of shoulder belt wearing among all Tech Center employees from a baseline of 36% wearing to a one-month average exceeding 70% usage ("Buckle and win",

1982; Horne & Terry, 1983). As reviewed by Geller (Note 1), this GM program was both "delayed" (i.e., vehicles were not stopped for immediate rewards) and "indirect" (i.e., drivers were not rewarded for safety belt wearing but for signing a "buckle up" pledge card).

The follow-up evaluation of the "prize-a-day" program was more extensive than any previously-reported safety belt study, and probably involved more post-intervention observations than any prior field study in the entire field of behavioral community psychology (e.g., Geller, Winett, & Everett, 1982; Glenwick & Jason, 1980; Martin & Osborne, 1980). Approximately one year after the three-week "prize-a-day" intervention, mean shoulder belt use at Gate 1 was almost twice as high as the initial baseline rate, implying substantial long-term impact of a simple, short-term incentive strategy. However, the removal of the "prize-a-day" program did result in an immediate decrease in safety-belt wearing, and this drop-off was especially prominent after ten months (i.e., during Follow-Up 3). These findings indicate a need to develop procedures for maintaining employees safety belt use over the long-term, and provokes the following research question: Would post-treatment belt use increase successively if short-term incentive interventions were implemented periodically for a year or more? In other words, would the follow-up usage levels at Gate 1 (shown in Figure 1) have increased successively over prior follow-up levels if each follow-up period had been preceded by a three-week incentive period?

Geller (Note 1) emphasized that a corporate incentive program should never be permanently withdrawn, but should be re-introduced intermittently in varied forms. To date, however, the impact of successive incentive strategies has not been systematically evaluated. Canadian researchers (i.e., Jonah, Dawson, MacGregor, & Wilde, 1982) recently showed that the periodic

introduction of a "selective traffic enforcement program" (STEP), whereby the Canada seat belt law was publicized and enforced in one providence, resulted in successively greater response maintenance after the STEP was terminated. From such findings, these authors suggested "that with each successive STEP, the baseline level of seat belt use can be permanently raised by 5 to 10% until a usage rate of 80-90% is achieved" (p. 10). Research is needed to test the extent to which these maintenance predictions from STEP evaluations would also occur for an incentive approach toward safety belt promotion.

The results of this study provoke additional research questions besides those related to the long-term impact of an incentive program. For example, the successive increase in safety belt use after the Christmas break (e.g., Days 39 to 42 in Fig. 1) indicates that the presence of observers influenced belt usage independently of incentives. And, the consistent increase in belt usage at Gate 2 when the incentive plan was implemented at *only* Gate 1 suggests that the observers served to remind some drivers to buckle up without incentives, (although it is possible that some drivers thought the incentive program was in effect at Gate 2). Follow-Up research should study further the special impact of data recorders, and perhaps show how this "observer bias" or so called "Hawthorne Effect" (Roethlisberger & Dickerson, 1939; Western Electric Co., 1975) could be used to enhance the effectiveness of an incentive program. An innovative observation procedure may be particularly helpful in this regard. That is, rather than collecting field data on consecutive days, observers might be available at the target location for only intermittent pairs of days (e.g., for one week observations might be taken on Mon. and Tues., and for the next week on Thur. and Fri.). After several weeks, vehicle occupants should expect to be observed on the day immediately following the first observation day in a pair, but should not be

able to anticipate the first day of a pair. Higher shoulder belt use on the second day of the paired observation days would reflect a "Hawthorne Effect" which may be influenced by a number of environmental and experimental variables, including the traffic flow, observer obtrusiveness, observer status (e.g., plant executive vs. college student), corporate safety belt policy, the setting (e.g., industrial plant vs. community), experimental phase (e.g., baseline vs. incentives), and the nature of a reward strategy (e.g., direct vs. indirect incentives; group vs. individual contingency).

Further empirical questions are suggested by the observation of considerably higher usage levels throughout the year-long study at the less used exit (Gate 2), except when incentives were offered at Gate 1. Several interpretations may account for this difference, including: 1) an enhanced "Hawthorne Effect" with less traffic and more perceived attention from observers; 2) a greater proportion of white-collar workers using Gate 2 (cf., Geller, *et al.*, in press); and 3) the fact that a year earlier Gate 2 was the target of a "direct and immediate" incentive program to motivate safety belt use (Geller, 1983). Over the 18 days of initial baseline observations for the *prior* study, the mean percentage of shoulder belt usage during afternoon departure from Gate 2 was 17.3% and rarely reached 20% on any day. The higher baseline rate at Gate 2 during the present study (i.e., mean = 20%) implies some year-long maintenance of the increase in Gate 2 belt usage produced by an incentive program (Geller, 1983). However, this maintenance was not very substantial and was completely lost after two years (i.e., Follow-Up 3). Thus, the most critical challenge remains -- the development of a behavior change program which will motivate *long-term* safety belt use.

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Footnotes

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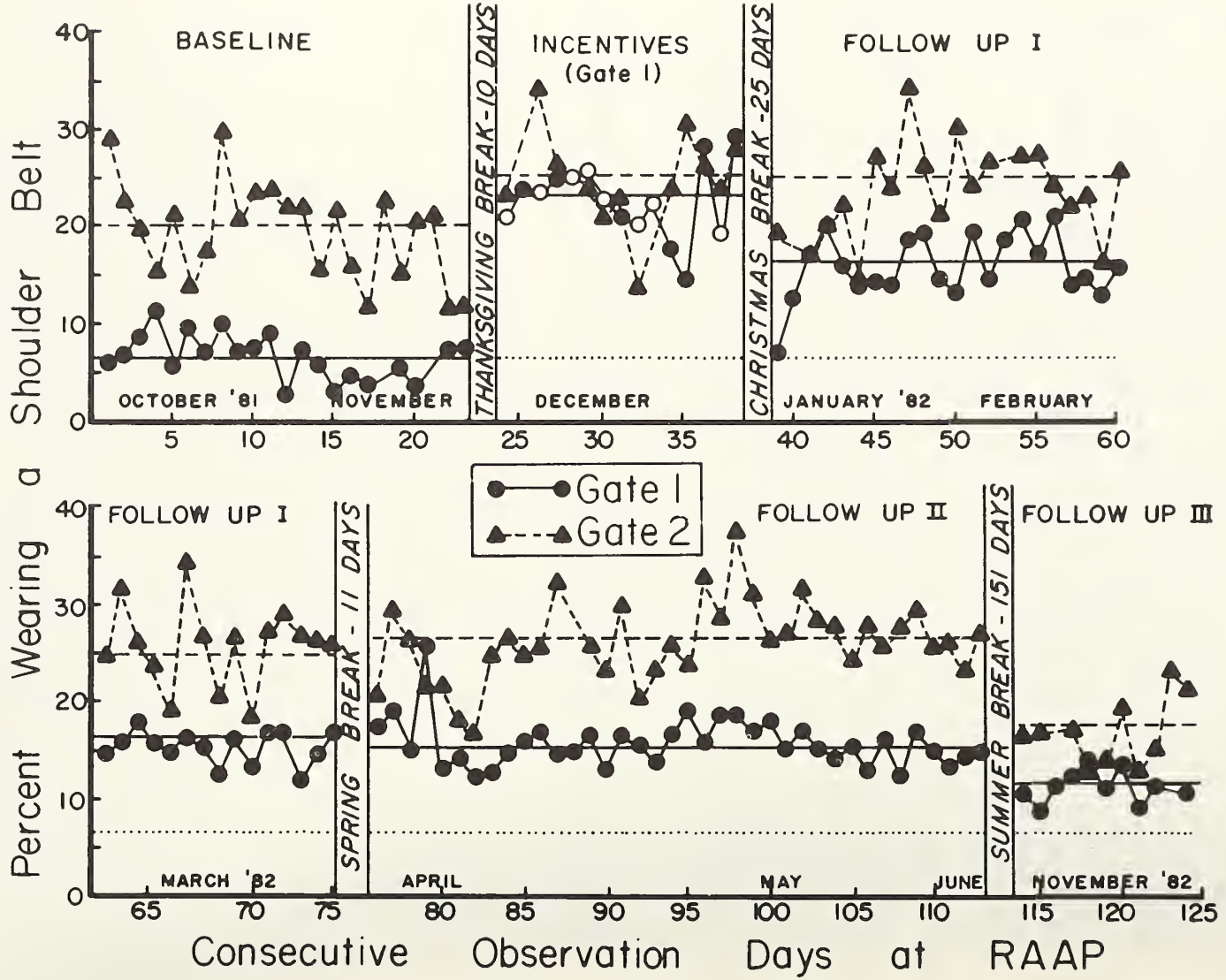
[2]A copy of these newspaper articles are available upon request to the author.

Figure Caption

Figure 1. Mean daily percentage of drivers wearing a shoulder belt while exiting Gates 1 and 2 of Radford Army Ammunition Plant during three successive experimental conditions (i.e., baseline, incentives at Gate 1, and follow-up). The open points during the Gate 1 incentive phase represent those days when a Virginia Tech student in a turkey costume stood at Gate 1 and held a sign which announced the incentive condition.


BASELINE
INCENTIVES
(Gate 1)
FOLLOW UP I
THANKSGIVING BREAK-10 DAYS
CHRISTMAS BREAK-25 DAYS
OCTOBER '81
NOVEMBER
DECEMBER
JANUARY '82
FEBRUARY
Gate 1
Gate 2
FOLLOW UP I
FOLLOW UP II
FOLLOW UP III
SPRING BREAK - 11 DAYS
SUMMER BREAK - 151 DAYS
MARCH '82
APRIL
MAY
JUNE
NOVEMBER '82
Percent Wearing a Shoulder Belt
Consecutive Observation Days at RAAP

Appendix D

Details of the first set of awareness sessions at Hubbell Lighting, Inc.

First Awareness Sessions at Hubbell Lighting

PROJECT: Hourly/Salary Seat Belt Usage Study

MEETING: Awareness Sessions with Hourly Workers.

PLACE & DATE: Hubbell Lighting- Thurs. (7/15) 9:50 a.m. - 4:40 p.m. (5 sessions)

Fri. (7/16) 7:30 a.m. - 8:55 p.m. (2 sessions)

PERSONS PRESENT: Project Personnel: Scott Geller (Project Director), Andrea, Mark, Abby, Steve, Heidi, Martha, Sue, Rosemary.

Hubbell Personnel: Joe Stanger (Personnel Manager); Mike Foutz (Quality Control Director); 257 hourly employees (See Table 1 for attendance at each session).

I. GOALS OF THE AWARENESS SESSIONS:

A. To inform hourly workers of our intention to provide incentives for seat belt usage.

B. To deliver information to the hourly workers about the benefits of belt usage.

C. To obtain information from the hourly employees about factors which influence their decision not to wear seat belts.

D. To distribute the Prize Preference Survey to the hourly workers.

II. GENERAL DESCRIPTION OF THE AWARENESS SESSIONS:

The awareness sessions were comprised of a three minute film and 12-16 minutes of presentation/discussion about the potential positive and negative effects of using seat belts. The sessions were conducted by Scott Geller (Project Director) and attended by project personnel who kept written records of attendance, the information presented by Dr. Geller and questions or comments from the audience. A detailed description of the content of the sessions is presented on the attached sheet entitled "A Description of the Awareness Sessions." The specific dates, times and attendance figures for each awareness session are presented in Table 1 on the following page. The information obtained from the questions and comments of the workers is presented in a later section of the present report.

Table 1

Dates, Times and Attendance Totals for the First Awareness Sessions at Hubbell Lighting

Session	Date	Time	Departments Attending	Males Attending	Females Attending	Total Attendance
1	7/15	9:50 a.m. - 10:30 p.m.	Heavy Assembly, RGA, Spinning	4	28	32
2	7/15	1:15 p.m. - 1:55 p.m.	Light Assembly, Central Stores	4	35	39
3	7/15	2:40 p.m. - 3:20 p.m.	Punch Press, Receiving, Maintenance	22	13	35
4	7/15	3:25 p.m. - 4:00 p.m.	Misc. Assembly, Ballast	14	31	45
5	7/15	4:00 p.m. - 4:40 p.m.	Second Shift	23	26	49
6	7/16	7:30 a.m. - 8:10 a.m.	Finishing, Buffing, Shipping, Anodizing	13	20	33
7	7/16	8:15 a.m. - 8:55 a.m.	Pole Shop, Machine Shop, Tool & Die	17	7	24
Attendance Totals				97	160	257

III. EMPLOYEES REACTIONS TO THE SESSIONS:

The majority of the comments made by the employees concerned their reasons for not wearing seat belts. The reasons they provided are summarized in the quotes provided below (which are representative samples).

A. "You get too much on your mind, you know -- you get in a hurry." (male employee)

B. "They're too uncomfortable when you are small." (female employee)

C. "Being thrown out -- isn't it safer, you know, in a wreck?" (female employee)

D. "My seat belts are too complicated!" (female employee)

E. "I mean, what can you do if there are no belts in your car?" (male employee)

F. "We're creatures of habit -- if we ever start we'll keep wearing them." (male employee)

G. "It's the way we were raised -- our parents never buckled up." (female employee) "We're just too sorry to buckle ... I mean we're always in a rush." (female employee)

IV. DESCRIPTION OF THE AWARENESS SESSION

A. Meeting Place: All sessions were conducted in a room adjacent to the plant cafeteria at Hubbell Lighting. The room had approximately 50 folding chairs arranged in rows facing the front of the room. During the sessions, the room was crowded but not uncomfortable. Food and beverage were available from the cafeteria and vending machines.

B. Scheduling: The awareness sessions were conducted during the last 15 to 20 minutes of the monthly departmental meetings of the hourly employees. The sessions were preceded by a 20 to 25 minute film and discussion of quality control issues presented by the company Quality Control Director. The departments which attended each session, the dates and time of each session are presented in Table 1. The two sessions held Friday were initially rescheduled for Thursday but were cancelled when the

company's projector malfunctioned.

C. Film: The three-minute film was produced by NHTSA. It contained three different "spot messages" for television which demonstrated the potential effects of being unrestrained during an auto accident. The theme of each segment was "What's holding you back?" (from wearing your seat belts).

D. Presentation/Discussion:

1. Introduction: The presenter introduced himself as "Scott" and stated that we were present to find what "held them back" from using seat belts. he mentioned the 5% baseline rate of usage at the plant, and said this was the normal low rate found nationwide.

2. Content: The factual information presented during the session was contained in personal anecdotes and responses to the questions and comments of the participants. The following is a listing of the information presented.

a. Seat belt usage at Hubbell Lighting is about 5% among hourly employees.

b. Reasons for wearing seat belts include:

i. Lessened chance of being injured in an accident.

ii. Modeling appropriate behavior for one's children.

iii. The relatively large number of unskilled and drunk drivers on the road who can involve others in accidents.

iv. The threat of some form of nonvoluntary and expensive restraints (e.g. air bags) being mandated by the government.

v. Reduction in expense to Hubbell Lighting through savings of work compensation and insurance payments.

c. Concerns about wearing seat belts were raised by both the presenter and the participants. These concerns included:

i. The discomfort of shoulder belts, particularly for women.

ii. The possibility of the belt jamming during an accident.

iii. The possibility that one might be more seriously injured when restrained in the car rather than thrown clear of the accident.

Each concern was addressed by providing information about the relative risk of injury when restrained versus not restrained.

d. Questions asked of the participants: The presenter asked several questions designed to promote comments from the participants. The questions included:

i. How may of you have been in a serious accident? What happened?

ii. How many of you feel that seat belts really aren't useful? Why do you feel that way?

iii. What keeps us from wearing seat belts?

E. Preference Survey: At the close of the meeting, the presenter told the participants that we wanted to know what prizes they would like us to give away as part of the project. Participants were given a Prize Preference Survey and told that a completed survey would be picked at random from our collection box the following Wednesday to determine the winner of a $50 cash award.

Appendix E

Details of the second set of awareness sessions at Hubbell Lighting, Inc.

Second Awareness Sessions at Hubbell Lighting

PROJECT: Hourly/Salary Seat Belt Usage Study

MEETING: Second Awareness Sessions With Hourly Workers.

PLACE & DATE: Hubbell Lighting- Thurs. (7/15) 9:50 a.m. - 4:40 p.m. (5 sessions).

Fri. (7/16) 7:30 a.m. - 8:55 p.m. (2 sessions).

PERSONS PRESENT: Project Personnel: Scott Geller (Project Director), Martha Wilhelm, Sue Collier, Dan Mock, Andrea Dunn, Jenny Paparella, Heidi Hahn.

Hubbell Personnel: Joe Stanger (Personnel Manager); Jerry Shumaker (Manager of Manufacturing); 264 hourly employees (See Table 1 for attendance at each session)

I. GOALS OF THE AWARENESS SESSIONS:

A. To explain the specifics of the seat belt incentive program to hourly workers.

B. To obtain information from the hourly workers regarding their concerns about the incentive program.

C. To distribute a written explanation of the incentive program to hourly workers.

D. To distribute the "Awareness Session Follow-Up Survey" to hourly workers.

II. GENERAL DESCRIPTION OF THE AWARENESS SESSIONS:

The awareness sessions were comprised of a 10 to 15 minute presentation/discussion about the incentive program which was to begin the following Monday. Each session was conducted by Scott Geller (Project Director) and attended by project personnel who kept written records of attendance, the information presented by Dr. Geller, and questions or comments from the audience. A detailed description of the content of the sessions is presented in a later section of this report. The specific times and attendance figures for each awareness session are presented in Table 1 on the following page. The information obtained from the questions and comments of the workers is presented in the following section of the present report.

Table 1

Dates, Times and Attendance Totals for the Second Awareness Sessions at Hubbell Lighting

Session	Date	Time	Departments Attending	Males Attending	Females Attending	Total Attendance
1	8/11	7:30 a.m. - 8:10 a.m.	Finishing, Buffing, Shipping, Anodizing	12	21	33
2	8/11	8:15 a.m. - 8:55 a.m.	Pole Shop, Machine Shop, Tool & Die	19	10	29
3	8/11	9:50 a.m. - 10:30 p.m.	Heavy Assembly, RGA, Spinning	5	25	30
4	8/11	1:15 p.m. - 1:55 p.m.	Light Assembly, Central Stores	5	28	33
5	8/11	2:40 p.m. - 3:20 p.m.	Punch Press, Receiving, Maintenance	24	11	35
6	8/11	3:25 p.m. - 4:00 p.m.	Misc. Assembly, Ballast	16	35	51
7	8/11	4:00 p.m. - 4:40 p.m.	Late Shift	25	28	53
Attendance Totals				106	158	264

III. EMPLOYEES' REACTIONS TO THE SESSIONS:

The majority of the comments made by the employees concerned their reasons for not wearing seat belts. The reasons they provided are summarized in the quotes provided below (which are representative samples).

A. "How long does this program last?" (male employee)

B. "How do you know the lap belts are buckled?" (male employee)

C. "What about motorcycles?" (male employee)

D. "Will they see me if I work overtime?" (male employee)

E. "What if I don't go past the observers when I leave?" (female employee)

F. "What if your driver won't split the prize with you... I'm not a driver." (female employee)

G. "What if my car doesn't have a belt?" (female employee)

IV. SPECIFIC DESCRIPTION OF THE AWARENESS SESSIONS

A. Meeting Place: All sessions were conducted in a room adjacent to the plant cafeteria at Hubbell Lighting. The room had approximately 50 folding chairs arranged in rows facing the front of the room. During the sessions, the room was crowded but not uncomfortable. Food and beverages were available from the cafeteria and vending machines.

B. Scheduling: The awareness sessions were conducted during the last 10 to 15 minutes of the monthly departmental meetings of the hourly employees. The sessions were preceded by a 20 to 30 minute film and discussion of quality control issues. The departments which attended each session and time of each session are presented in Table 1.

C. Format and Content of Sessions: The general format of each session was identical. Dr. Geller addressed the audience, leading a presentation/discussion on the upcoming incentive program. The discussion was the upcoming incentive program. The discussion was followed by a description and distribution of the

"First Awareness Session Follow-Up Surveys" as well as the distribution of a written summary of the incentive program (See Appendix E). Only minor variations in content and format occurred between sessions. Thus, the following outline of a typical awareness session is representative of all seven conducted.

D. Presentation/Discussion:

1. Introduction: Dr. Geller introduced himself as "Scott" and reminded the employees that he had been at the previous month's meeting. He said he was not going "preach" again about why they should wear their seat belt, and indicated that seat belt usage was up to 20% (from a 5% baseline) among hourly workers. He expressed hopes that belt usage would increase even more when the incentive program began. He indicated that he has been bragging about the excellent progress which Hubbell workers have made regarding seat belt usage.

2. Content: The information presented during the session was concerned with the specific details of the incentive program. The following is a listing of the information presented.

   a. "Rules" of the program include:

      i. Every time the employee is observed wearing a seat belt, the vehicle's license plate number will be entered in a raffle.

      ii. Passenger wearing will also be recorded and additional raffle tickets will be given; one ticket per buckled passenger.

      iii. Wearing lap belts also earns raffle tickets, but employees must alert observers to their lap belt usage.

      iv. A raffle will be held every Monday and the prize will be cash in the amount of the group's average usage over the previous week.

   b. A poster showing the previous week's average belt usage, each day's average belt usage, each day's average, and the current week's average for both hourly and salary workers will be posted at the plant. [A sample poster was shown and explained with regard to the daily feedback of average seat

belt use.]

c. Concerns about the incentive program were raised by both Dr. Geller and the participants. These concerns included:

i. The division of prize money among carpoolers.

ii. The fact that those whose vehicles have no seat belts and motorcyclists are excluded from the program.

iii. The notion that since evening shift workers are observed only upon entering the plant, they will be given two raffle tickets if they are observed wearing a seat belt to make their chances of winning equal to those of day shift workers. [This problem was noted by Mr. Stanger, the Personnel Director.]

iv. The possibility that some wearers sould not be entered in the raffle because their route did not take them past the observers.

d. Post Awareness Session Follow-Up Survey:

At the close of the meeting, Dr. Geller told the participants that he wanted to know their reactions to the seat belt safety discussion at the previous month's safety meeting. Participants were given a questionnaire (see Appendix G) and told that a completed survey would be picked at random from the collection box the following Wednesday in order to determine the winner of a $50 cash award.

Appendix F

Flier used to announce the cash raffle at Hubbell Lighting.

SEAT BELT SWEEPSTAKES

WHEN: Starting next Monday (August 16).

WHERE: In the parking lots of this plant.

HOW DOES IT WORK?

- Researchers from Virginia Tech will be observing seat belt usage in the hourly and salary parking lots.

- Every time you are observed wearing a seat belt, the license number of the car in which you're riding will be entered in a raffle -- the more you wear your seat belt, the more chances you have to win!

- Daily usage and average usage over the work week will be calculated for hourly and salary workers and posted at the plant.

- On the Monday following the week of observation, we'll draw a winning license plate -- that person will receive $1 for every 1% usage (based on the weekly average) in his/her work group so, for example, if an hourly person wins, and the hourly average was 30%, that person will win $30. The cash would be $90, of course, if average seat belt usage were 90% for the prior week.

- The more people in your group who wear seat belts, the bigger the prize so please START BUCKLING TODAY!!

If not for yourself
for someone you

BUCKLE UP

Appendix G

Prize Preference Survey Distributed at Hubbell Lighting and Federal Mogul. [This aspect of the research was supported by General Motors Research Laboratories.]

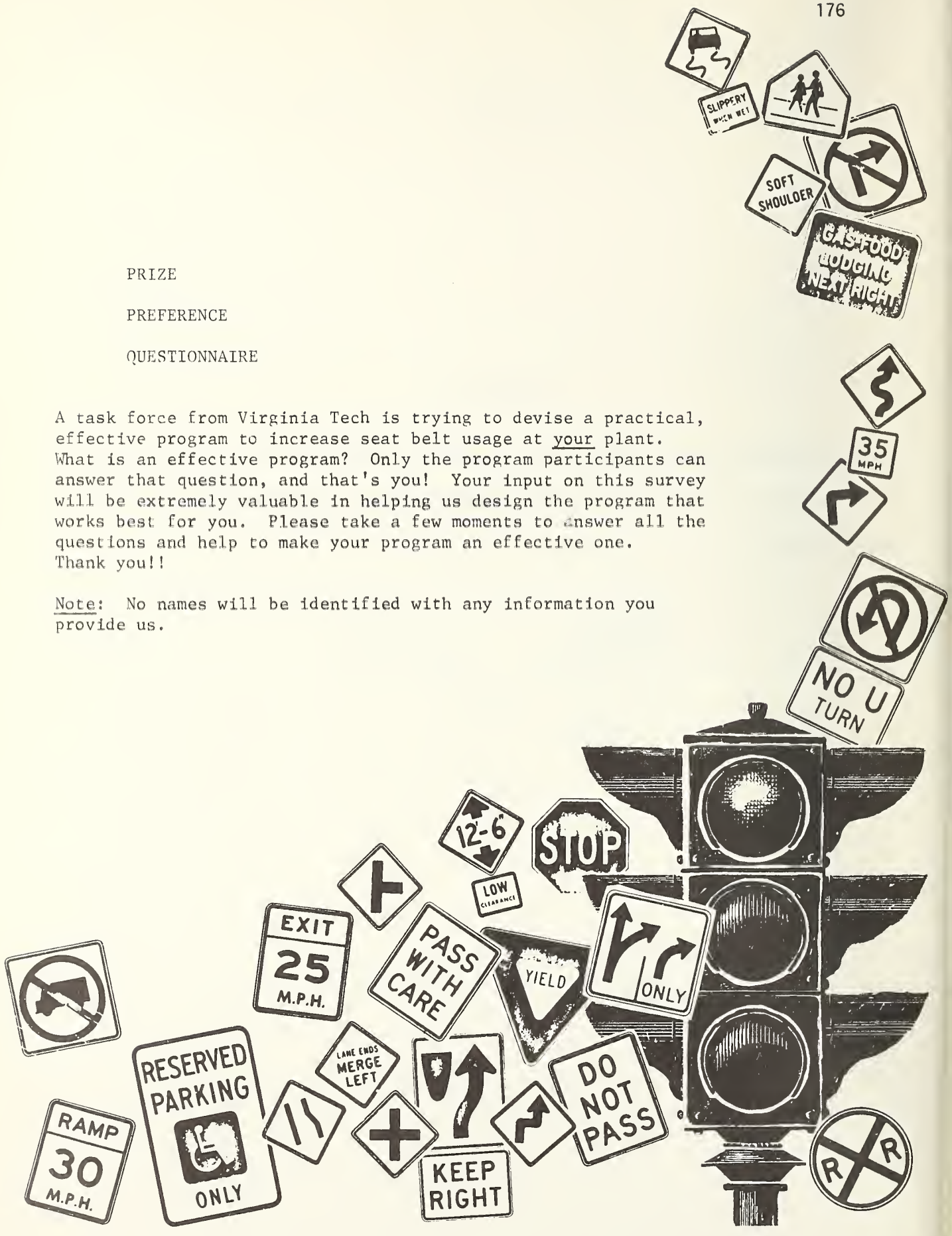
PRIZE

PREFERENCE

QUESTIONNAIRE

A task force from Virginia Tech is trying to devise a practical, effective program to increase seat belt usage at <u>your</u> plant. What is an effective program? Only the program participants can answer that question, and that's you! Your input on this survey will be extremely valuable in helping us design the program that works best for you. Please take a few moments to answer all the questions and help to make your program an effective one. Thank you!!

<u>Note</u>: No names will be identified with any information you provide us.



Prize Preference Questionnaire

1. What is your sex? (circle one)

   1) Male
   2) Female

2. What is your age? (circle one)

   1) 18 to 25
   2) 26 to 40
   3) 41 to 55
   4) over 55

3. How would you describe your position? (circle one)

   1) an hourly worker position
   2) a salaried worker position

4. Where do you live? (circle one)

   1) Blacksburg
   2) Christiansburg
   3) Radford
   4) Roanoke/Salem
   5) Other; Please specify _____

5. How often do you wear your seat belt? (circle one)

   1) Almost always
   2) Often
   3) Sometimes
   4) Rarely
   5) Never

The following questions ask for your opinion. Please circle the appropriate number for each question.

6. Would you wear your seat belt more often if there were an opportunity to receive a prize (or gift) for using it?

   1) Yes
   2) No

7. How useful do you think it is to give prizes for seat belt usage?

   1) Extremely useful
   2) Moderately useful
   3) Somewhat useful
   4) Slightly useful
   5) Not at all useful

8. Would you prefer to see everyone receive a small prize for increased seat belt usage at the plant, or a smaller group of people receive a bigger prize for increased seat belt usage?

   1) I would prefer that everyone receive a small prize.
   2) I would prefer that a smaller group of people have a chance of winning a bigger prize.
   3) Both would be equally preferred by me.

9. Would you prefer that everyone receive a small prize for increased seat belt belt usage at the plant, or would you rather see a contest for bigger prizes? (For example, one shift competing against another).

   1) I prefer that everyone receive a small prize.
   2) I prefer to have a contest among groups within the plant for bigger prizes.
   3) Both would be equally acceptable to me.

Below are listed some possible prizes that might be used in a seat belt program at your plant. Please rate how desirable each prize is to you by circling the one appropriate number on the scale below each prize.

How desirable are the following:

10. Beverage and donuts during break?

Not at all desirable	Slightly desirable	Somewhat desirable	Moderately desirable	Extremely Desirable
1	2	3	4	5

11. Ice cream and cake during break?

Not at all desirable	Slightly desirable	Somewhat desirable	Moderately desirable	Extremely desirable
1	2	3	4	5

12. Coupons or tokens for use in the plant cafeteria or plant vending machines?

Not at all desirable	Slightly desirable	Somewhat desirable	Moderately desirable	Extremely desirable
1	2	3	4	5

13. Gift certificates from local restaurants?

Not at all desirable	Slightly desirable	Somewhat desirable	Moderately desirable	Extremely desirable
1	2	3	4	5

* I would prefer that the restaurant be located in (please specify town or locale) _____.

* The type of restaurants I would prefer include (check all that apply):

Steak house _____
Ice cream shops _____
Fast food restaurant _____
Higher-priced restaurant (e.g., The Cuckoo's Nest in Blacksburg) _____

14. Gift certificates for groceries?

Not at all desirable	Slightly desirable	Somewhat desirable	Moderately desirable	Extremely desirable
1	2	3	4	5

15. Tickets to sporting events?

Not at all desirable	Slightly desirable	Somewhat desirable	Moderately desirable	Extremely desirable
1	2	3	4	5

* What sporting events would you like to see? Please specify _____.

16. Coupons or discounts for local recreational places (examples: bowling, movies, roller skating, miniature golf)?

Not at all desirable	Slightly desirable	Somewhat desirable	Moderately desirable	Extremely desirable
1	2	3	4	5

* Check all that you would like: bowling ____; roller skating ____; miniature golf ____; drive-in movies ____; indoor movies ____; video arcades ____.

17. Passes to amusement parks?

Not at all desirable	Slightly desirable	Somewhat desirable	Moderately desirable	Extremely desirable
1	2	3	4	5

* The amusement park(s) I would prefer include (Specify) _____.

18. Discounts for automobile maintenance (example: oil change)?

Not at all desirable	Slightly desirable	Somewhat desirable	Moderately desirable	Extremely desirable
1	2	3	4	5

19. Lawn or garden tools?

Not at all desirable	Slightly desirable	Somewhat desirable	Moderately desirable	Extremely desirable
1	2	3	4	5

20. Coupons good for hair styling?

Not at all desirable	Slightly desirable	Somewhat desirable	Moderately desirable	Extremely desirable
1	2	3	4	5

21. Certificates for sporting goods? (examples: fishing gear, tennis balls, baseballs)

Not at all desirable	Slightly desirable	Somewhat desirable	Moderately desirable	Extremely desirable
1	2	3	4	5

22. Emergency car care kits?

Not at all desirable	Slightly desirable	Somewhat desirable	Moderately desirable	Extremely desirable
1	2	3	4	5

23. Certificates or discounts from book stores?

Not at all desirable	Slightly desirable	Somewhat desirable	Moderately desirable	Extremely desirable
1	2	3	4	5

24. Certificates for records or tapes?

Not at all desirable	Slightly desirable	Somewhat desirable	Moderately desirable	Extremely desirable
1	2	3	4	5

25. Small household appliances?

Not at all desirable	Slightly desirable	Somewhat desirable	Moderately desirable	Extremely desirable
1	2	3	4	5

26. Jewelry?

Not at all desirable	Slightly desirable	Somewhat desirable	Moderately desirable	Extremely desirable
1	2	3	4	5

27. Toys or games?

Not at all desirable	Slightly desirable	Somewhat desirable	Moderately desirable	Extremely desirable
1	2	3	4	5

* I would prefer games for: adults ____, children ____, both ____.

28. Which of the following prize situations would you most prefer:

1) 500 people receive a chance to win $1?
2) 50 people receive a chance to win $10?
3) 10 people receive a chance to win $50?
4) 1 person receives a chance to win $500?

29. Which of the following prize situations would you most prefer:

1) 500 people receive a chance to win $20?
2) 200 people receive a chance to win $50?
3) 50 people receive a chance to win $200?
4) 1 person receives a chance to win $10,000?

Please list any other types of prizes that you might like that have not been listed and are realistic for a seat-belt promotion program at your plant. (Use the space below.)

INSTRUCTIONS FOR SPECIAL PRIZE DRAWING

To be eligible to win $50 cash in the special drawing you must return a completed questionnaire. This drawing will be made from returned questionnaires each of which is identified by the license plate number of the person who completed the survey. At the bottom of this page you should indicate your license plate number. Next Wednesday, we will randomly draw a winner from the questionnaires returned and post the license plate number on the employee bulletin board. The winner should contact the personnel manager to claim the cash. --

_____

License plate number (This information will be used to identify a winner).

Appendix H

Driver Questionnaire distributed at the second set of awareness sessions at Hubbell Lighting, Inc. [This aspect of the research was supported by General Motors Research Laboratories.]

A TASK FORCE FROM VIRGINIA TECH IS TRYING TO DEVISE A PRACTICAL AND EFFECTIVE PROGRAM TO INCREASE SEAT BELT USAGE AT YOUR PLANT. YOUR INPUT ON THIS SURVEY WILL BE EXTREMELY VALUABLE IN HELPING US EVALUATE THE PROGRAM SO FAR. PLEASE TAKE A FEW MOMENTS TO ANSWER ALL THE QUESTIONS AND HELP TO MAKE YOUR PROGRAM AN EFFECTIVE ONE.

THANK YOU!

NOTE: *NO NAMES WILL BE IDENTIFIED WITH ANY INFORMATION YOU PROVIDE US.*

DRIVER QUESTIONNAIRE

EVERY PERSON WHO SUBMITS A COMPLETED QUESTIONNAIRE BECOMES ELIGIBLE TO WIN A CASH PRIZE IN A SPECIAL RANDOM DRAWING. SEE LAST PAGE OF QUESTIONNAIRE FOR ADDITIONAL DETAILS AND INTRUCTIONS.

Please supply the following information about the vehicle you currently drive to and from work. If you drive more than one vehicle, refer only to the vehicle you drive most often. If you do not drive a vehicle to work, skip to Question 3.

(Please circle your answer to each question)

1. What type and size of vehicle do you drive to and from work?

Vehicle Type	Vehicle Size
(1) Car	(1) small
(2) Station wagon	(2) medium
(3) Truck or van	(3) large
(4) Other (describe type _____)	

Were you driving this same vehicle one month ago?

(1) yes

(2) no (If no, indicate type _____ and size _____ of previous vehicle.)

2. What kind of usable seat belt equipment does your vehicle contain for the driver?

(1) Lap belt only	(3) Lap and shoulder belt
(2) Shoulder belt only	(4) no usable seat belt

The following questions concern your use of seat belts, your regular driving habits, and your opinions about using seat belts.

---

3. Think about what your driving habits were like a month ago and longer. Compared to then, on trips to and from work do you now tend to...

A) Wear your seat belt more or less often?

(1) more often now

(2) same

(3) less often now

B) Feel safer or less safe while driving?

(1) safer now

(2) same

(3) less safe now

C) Drive faster or slower?

(1) faster now

(2) same

(3) slower now

D) Take more or fewer chances?

(1) more chances now

(2) same

(3) fewer chances now

E) Feel more or less comfortable behind the wheel (i.e., seating comfort)?

(1) more comfortable now

(2) same

(3) less comfortable now

4. What degree of injury do you think you would receive behind the wheel of your vehicle in a head-on crash with a solid brick wall at the following speeds?

A) If you were wearing your seat belt

at 15 mph	at 40 mph
(0) no injury	(0) no injury
(1) slight injury	(1) slight injury
(2) very mild injury	(2) very mild injury
(3) mild injury	(3) mild injury
(4) fairly mild injury	(4) fairly mild injury
(5) moderate injury	(5) moderate injury
(6) fairly serious injury	(6) fairly serious injury
(7) serious injury	(7) serious injury
(8) very serious injury	(8) very serious injury
(9) critical injury	(9) critical injury
(10) fatal injury	(10) fatal injury

b) If you were not wearing your seat belt

at 15 mph	at 40 mph
(0) no injury	(0) no injury
(1) slight injury	(1) slight injury
(2) very mild injury	(2) very mild injury
(3) mild injury	(3) mild injury
(4) fairly mild injury	(4) fairly mild injury
(5) moderate injury	(5) moderate injury
(6) fairly serious injury	(6) fairly serious injury
(7) serious injury	(7) serious injury
(8) very serious injury	(8) very serious injury
(9) critical injury	(9) critical injury
(10) fatal injury	(10) fatal injury

The following questions concern your opinions of our seat belt discussions at the last safety belt meeting in July.

---

5. Before the seat belt discussion, I wore my seat belt: (circle one)

a) Almost Always

b) Often

c) Sometimes

d) Rarely

e) Never

6. Since the seat belt discussion, I have been wearing by seat belt:

   a) Almost Always

   b) Often

   c) Sometimes

   d) Rarely

   e) Never

7. If you <u>are</u> currently wearing your seat belt more often than you were wearing it before the seat belt discussion, please rate how important each of the following were in influencing your seat belt wearing. If you are <u>not</u> wearing your seat belt more often, please skip to the last question.

A) I have a better chance of staying alive and suffering fewer injuries if I wear a seat belt.

NOT IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
1	2	3

B) I want to be a good model for my children.

NOT IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
1	2	3

C) I might receive a prize if I wear my seat belt.

NOT IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
1	2	3

D) I am concerned about the consequences for my family if I were killed or injured in a car accident.

NOT IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
1	2	3

E) I know that my belt wearing is being watched here at the plant.

NOT IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
1	2	3

F) It is risky not to wear my seat belt.

NOT IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
1	2	3

G) It is not uncomfortable to wear seat belts.

NOT IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
1	2	3

H) It is convenient to wear seat belts.

NOT IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
1	2	3

I) I want to avoid laws that require seat belt usage.

NOT IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
1	2	3

J) I am concerned about the presence of poor drivers on the road.

NOT IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
1	2	3

8. If you <u>are</u> <u>not</u> wearing your seat belt more often that you were before the discussions last month, please rate the influence of the following factors on your decision to <u>not</u> buckle up more often:

A) Seat belts are uncomfortable.

NOT IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
1	2	3

B) Seat belts are inconvenient

NOT IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
1	2	3

C) I'm not convinced that seat belts are effective.

NOT IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
1	2	3

D) I don't want anyone telling me to wear a seat belt.

NOT IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
1	2	3

E) I don't like participating in experiments.

NOT IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
1	2	3

F) Seat belts can be dangerous.

NOT IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
1	2	3

G) Good drivers don't need seat belts.

NOT IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
1	2	3

H) I've never tried my seat belt.

NOT IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
1	2	3

I) I already buckle as often as I remember to.

NOT IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
1	2	3

J) The chance of having an accident is very low.

NOT IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
1	2	3

INSTRUCTIONS FOR A SPECIAL DRAWING

To be eligible to win $50 cash in the special drawing you must return a completed questionnaire. This drawing will be made from returned questionnaires each of which is identified by the license plate number of the person who completed the survey. At the bottom of this page you should indicate your license plate number. Next Wednesday we will randomly draw a winner from the questionnaires returned and post the license plate number on the employee bulletin board. The winner should contact Joe Stanger to claim the cash.

_____

License plate number (This information will be used to identify a winner.)

Appendix I

Executive summary of the manual, "Corporate Incentives for Promoting Safety Belt Use: Rationale, Guidelines, and Examples", which was prepared and disseminated during Phase V of the project.

Executive Summary

This manual was designed to teach the corporate executive successful strategies for implementing and evaluating a successful industry-based program to motivate employee safety belt use. A rationale is given for the general approach, which is based on theory and methodology of behavior modification; and specific guidelines are offered for varieties of corporate settings. The use of incentives rather than disincentives is emphasized, and three basic application procedures are specified, depending upon the milieu: 1) direct and immediate rewards, 2) direct and delayed rewards, and 3) indirect rewards. Prior research has demonstrated special motivational advantages of peer pressure, and therefore the manual outlines tactics for directing peer pressure toward safety belt promotion. Also emphasized are strategies for maximizing cost effectiveness, including the procurement of donations from community merchants, the use of contests and games which require few costly rewards, and the application of schemes which take advantage of naturally occurring motivators. All procedures and interventions are highlighted with actual examples of materials from prior industry programs that were particularly successful.

Twelve case studies of industry-based safety belt programs are presented which successfully applied the principles and procedures suggested in this manual. Each case study includes a specification of the intervention program, the evaluation procedure, the program expense, and the outcome of the program with regard to changes in safety belt wearing. Personal testimonials are offered with each case. These testimonials support the central theme of this manual, namely that an appropriate application of behavior modification principles can affect remarkable increases in safety belt use and immeasurable benefits to individuals involved in traffic accidents and to the industry as a whole.

Appendix J

"Psychologist: Buckling up should be rewarding" by Pam Chesser, *Roanoke Times & World News*, January 18, 1982.

New River Valley/State

Montgomery County Pulaski County Giles County Radford City

Roanoke Times & World-News

Psychologist: Buckling up should be rewarding

By PAM CHESSER
New River Valley bureau

BLACKSBURG — If behavioral psychologist Scott Geller's theories are correct, drivers should be rewarded for wearing a seat belt, not punished when they don't.

He also thinks rewards are more effective than radio and television campaigns to persuade drivers to buckle up.

"We've got to do more than play films and shout slogans and sing our little seat-belt jingles," he says.

Geller, a Virginia Tech professor, has examined patterns of seat-belt and shoulder-belt use at the university and four New River Valley industries for a National Highway Traffic Safety Adminstration study.

As part of the two-year study, industry and university employees were offered prizes — free dinners, basketball game tickets, T-shirts, plants — for wearing their seat belts.

In one study at the Radford Army Ammunition Plant, the number of drivers using shoulder belts increased from about 12 percent to almost 60 percent when the prizes were offered to all drivers.

In another study, the percentage of drivers wearing shoulder seat belts increased from about 6.9 percent to almost 25 percent when prizes were offered to randomly selected drivers.

Once the studies ended, the percentages dropped.

Geller also studied the effects of seat belt campaigns on workers at the Corning Glass Works plant in Blacksburg.

Although workers viewing safety films said they were convinced they should buckle up, the number of workers actually using shoulder belts did not change, Geller said.

Geller's studies have been used among the highway safety administration, other federal agencies and the automobile industry in discussing the feasibility of requiring air bags or passive restraints in all automobiles.

And General Motors executives also have looked at Geller's incentive program for use with workers in their own factories.

"Both General Motors and the government are looking to us for answers to the question 'How are we going to get people to buckle up?'"

Geller thinks an incentive program would be more effective than either mandatory seat-belt programs or passive restraints such as air bags or belts that automatically strap a passenger in a car.

Some studies, he says, have shown that there is not a lower incidence of fatal accidents in countries that have mandatory seat-belt programs.

"The theory behind that is that when you are forced to wear your seat belts you compensate by driving with more risk.

"If we make you wear your seat belt (through passive restraints or mandatory rules) will you now drive faster? Will you drive closer to the car in front of you? Will you take more risks?"

In a voluntary program, Geller thinks drivers would not necessarily compensate by taking more risks.

The problem with incentive programs, Geller says, is funding.

During Geller's study, the prizes were [illegible] merchants, and he believes the community might be willing to support such a program. Industries also might be willing to provide the prizes if they were convinced that the money spent on an incentive program would be less than the cost of injured employees.

"There is a good deal of data to show that industry should care because they will save money," Geller says.

"Industry could support such a program, and they have reasons for supporting such a program. (If) you get killed, we lose you as a productive individual in society. The more people who get killed, the higher insurance rates society must pay."

Geller also thinks the ideal incentive program would be one that would help drivers develop the habit of buckling up and would reward all drivers wearing automobile safety belts.

"We want to keep it as a game, as fun. We don't want to give people too big an incentive for wearing their seat belt, because they might wear the seat belt just for the

Appendix K

"Environmental psychologist studies seat-belt use and nonuse", *Behavior Today*, April 26, 1982, p. 37.

ENVIRONMENTAL PSYCHOLOGIST STUDIES SEAT-BELT USE—AND NON-USE

The application of behavioral modification "to improve the quality of life" is a major interest of environmental psychologist E. Scott Geller and his assistants at Virginia Polytechnic Institute and State University. A current project of Geller—he has researched such QOL areas as litter control and resource recovery—is to develop a workable, cost-effective strategy to encourage people to wear seat belts when driving or riding.

In a discussion with *BT*, Dr. Geller referred to research showing that over 60% of Americans disconnect their seat-belt buzzers, or in some way circumvent them—such as connecting the belts and then sitting on them.

Why do some people voluntarily use seat belts without added incentive, while others make an effort not to use them? "Some people have the misperception that it's safer to get thrown around, despite whatever they're told to the contrary," Geller said. "They're afraid, for instance, of getting trapped in their seat belts." Another variable is the risk factor: different people have different perceptions of the risk of driving, and these perceptions may influence their decisions about wearing seat belts. "Some people don't wear seat belts simply because putting them on is an inconvenience. Others don't because they find the belts uncomfortable."

Locus of control, or perception of control, also is a possible influence, said Geller. "Internals, who believe that control comes from within the individual, probably are more likely to be seat-belt users. Externals, who believe that much in life is chance, are probably less likely to be seat-belt users and tend to think, 'If my time has come, my time has come, and why should I try to do something about it?' "

Geller has conducted experiments on how games influence the levels of seat-belt usage as incentives for rewards or as reminders. One experiment involved a bingo-type game. An attendant checked faculty and staff at Virginia Polytech as they entered the parking lot. Only seat-belt wearers were entitled to play. After the game was instituted, the rate of usage rose from 15 or 20% to 60%. While the increase may reflect some degree of last-minute buckling up before entering the lot, institution of the game appears to have increased usage significantly, according to Geller. The same game played at a local plant resulted in an even higher increase. The beginning rate, however, was lower.

Geller also conducted a "symbols" game at a local plant. Certain sets of symbols acquired over time entitled the holder to prizes, such as dinner at a nearby restaurant. Salary workers started the game at a base rate of 15% and rose to over 60%. The results were much less dramatic among time-clock workers: they began at less than 5% and rose to 10%. "One theory we have to explain these results is that salary workers don't feel as restricted on the job, so they find it easier to deal with the control procedures of an experiment," said Geller. "Also, salary workers are better educated. There are various reasons why a better-educated person is more likely to buckle up. For instance, data show that drivers of small cars are more apt to buckle, probably because of the greater vulnerability of small cars, and better-educated people are more likely to buy small cars." (Nationally, the rate of car selt-belt usage is 10%.)

Reward programs appear to have long-term effects on seat-belt usage, said the VPI/VSU psychologist. He admitted, however, that some behavior researchers advise caution in relying too much on the results of reward programs. "They speculate that people may have a feeling of security from being buckled that causes them to be riskier drivers."

Observation of voluntary belt users revealed that they are no less cautious than other drivers. But—they may be generally more cautious drivers whose belt wearing is just one measure of caution they take, along with careful driving. "How drivers will behave, given reward incentives or mandatory usage, is not known."

Canada has a mandatory national buckle-up law—"though it is very loosely followed," said Geller—and would be an area for future research.

Contact: E. Scott Geller, Ph.D., Department of Psychology, Virginia Polytechnic Institute and State University, 5088 Derring Hall, Blacksburg, VA 24061, (703) 961-6223.

Appendix L

"Seatbelt safety wins prizes" by Margaret LeRoux, *Business Insurance*, July 12, 1982.

Seat belt safety wins prizes

By MARGARET LeROUX

CHAPEL HILL, N.C.—Employees at the headquarters of Blue Cross & Blue Shield of North Carolina are winning cash awards for wearing safety belts when driving or riding in an automobile.

In Warren, Mich., members of the staff at General Motors' technical center have a chance to win a new car for pledging to buckle up.

At the E.I. du Pont de Nemours & Co. plant in Fishing Creek, Pa., and the utility company Minnegasco in Minneapolis, Minn., employees can win savings bonds for wearing seat belts.

Employers throughout the country, with the support of programs developed by the National Highway Traffic Safety Administration and the National Safety Council, are trying to cut down on one the leading causes of employee deaths and injuries: motor vehicle accidents.

They reason that the programs not only save lives but also benefit dollars in reducing medical and disability costs.

For people from one to 38 years old, auto accidents are the leading cause of death; for people of all ages, motor vehicle accidents rate fourth only after heart disease, cancer and strokes, according to the NHTSA.

The National Safety Council estimates the cost of each motor-vehicle death last year at $170,000, including lost wages, insurance administration, medical expenses and property damages. Not included in that estimate are the costs of public agencies, courts, indirect losses to employers of off-the-job accidents to employees, the value of cargo losses in commercial vehicles and damages awarded in excess of direct loss.

The NHTSA and the National Safety Council are encouraging programs such as those at Blue Cross & Blue Shield of North Carolina and GM because the safety experts consider safety belts to be the first line of defense against death or injuries in a car accident.

Seat belt safety wins prizes

"The single most important life-or-death factor on the highways is the use of the safety belt," said William V. Hunter, engineering studies program manager at the Highway Safety Research Center in Chapel Hill. The center is conducting the safety-belt program for Blue Cross & Blue Shield funded by a grant from the NHTSA.

"People do not die because their cars are in accidents," Mr. Hunter said. "They die when their cars are in accidents and they are not wearing safety belts."

A human fatality, he adds, "happens a fraction of a second after the car collision and occurs because the person is not wearing a safety belt."

Mr. Hunter and the highway safety research staff monitored employee traffic at Blue Cross & Blue Shield headquarters last December and found the number of the 1,100 employees using seat belts was below the national average of 10%. Only about 4% of the health plan employees were using their belts.

An incentive program was begun in late May with a series of seminars on safety-belt use that included a film of car crashes and an explanation of the cash-bonus system.

Highway safety research personnel monitor the company parking lot and randomly stop cars to check if occupants are wearing safety belts.

Those who are receive a coupon redeemable for $5 from the manager of safety and security. At the end of the program, the names of all employees who were awarded coupons will be entered in a drawing for three $100 gift certificates from a local shopping center.

The incentive program immediately increased safety-belt use among Blue Cross & Blue Shield employees to 40% and by the middle of June, 62% of employees were wearing their safety belts when arriving and departing work.

"The whole building was buzzing with talk about the program," said Frank Williams, manager of safety and security. "Some employees have won two or three times."

The goal of the program is to make buckling up a habit, Mr. Hunter explains. "For now, employees are using the safety belts to get a reward: we're hoping the usage won't fall back to its former low level."

A follow-up study will be done next fall to see how well the safety-belt habit took hold.

The stakes are even higher in the at GM because the auto manufacturer typically has 1,000 employees out of work every day because of injuries from car accidents.

The GM Technical Center was selected as the site for a pilot incentive program to be available to other locations if successful.

Safety-belt use among the center's research and design engineering staff, at 36%, was already far above the national average when the program began in May. Even so, employees were told a drawing for merchandise, including a new car, would be held at the end of the month if half of them used safety belts.

To be eligible for the drawing, employees had to sign a pledge card promising to wear safety belts for the next 12 months. Five thousand of the center's 6,000 employees signed a card.

As employees entered and exited the center's parking lots, they were monitored for safety-belt use, which topped 50% by the end of May.

"Employees would call out, 'I hope I win that car!' as they drove in wearing their belts," said Terry Horne, senior project engineer in charge of the safety-belt program.

Now in a second phase of the project, GM will try to reach 65% safety-belt use through mid-July. If the goal is reached, another drawing will be held for a car and other prizes.

At Du Pont, where safety belt use in company cars has been required since 1957, a study is being conducted from Memorial Day to Labor Day to track employee injuries resulting from auto accidents off the job, whether or not a safety belt was worn, and how much work time was lost as a result.

The value of an incentive program has not been overlooked. An elaborate campaign with prizes for employees who wore safety belts while driving or riding in their cars in 1980 cost the company $25,000 but the savings in disability and employee benefits payments were estimated at a minimum of $27,000, according to Stan Williams, promotion engineer at Du Pont headquarters in Wilmington, Del.

During the program, safety-belt use among employees increased to 90% from 11% and six employees who were involved in auto accidents escaped serious injuries.

"We're convinced wearing safety belts saved the life of one of the employees and prevented the others from being seriously injured," Mr. Williams said. "Not only did we save on disability benefits, but we didn't lose several weeks of work because employees weren't off the job recovering from serious injuries from the accidents."

Because of this strong emphasis on safety-belt use, supported by directives from the corporate vice chairman and management of individual plants, the company boasts an enviable motor vehicle safety record. Last year, Du Pont had only three lost-time injuries due to car accidents on the job among 140,000 employees and a fleet of 3,000 cars and trucks, according to Mr. Williams.

As at Du Pont, Minnegasgo employees can win savings bonds for wearing their safety belts.

At Minnegasco, Richard Wunderlich, safety director, says insurance premiums for the fleet of service vehicles have gone down since a safety-belt incentive program

Employer incentives encourage safety

began in January 1981, "but I can't tie it directly to the belts; there were other factors in the market," he said.

Minnegasco's program includes a U.S. savings bond prize drawing among employees nominated by supervisors who had observed them wearing a safety belt while driving or riding.

The utility also stresses seat-belt use with training films and videotapes made at the scene of accidents involving company vehicles.

"On one tape we have a police officer at the scene of an accident saying that the employee would have been killed if he hadn't been wearing a safety belt," Mr. Wunderlich said. "That really makes an impact on employees."

Before the incentive program, safety-belt use among Minnegasco employees was about 40%, according to the safety director. "Now it's pretty close to 100% on the job," he said. "I've stood at the gate and counted; out of 25 cars going out, at most I've caught one not wearing a safety belt."

In the forefront of research and development of safety-belt incentive programs is Scott Geller, a behavioral psychologist at Virginia Polytechnic Institute in Blacksburg, Va.

Mr. Geller helped Du Pont, GM and several other companies establish and evaluate incentive programs and he's convinced they're cost-effective.

"There's no question that incentive programs work; our studies show dramatic incrases in safety-belt use," he said.

Mr. Geller's studies also show that employees continue to use safety belts when they're not winning prizes for doing so.

Though improvement recorded in follow-up studies was not as high as during the incentive part of safety-belt promotions, workers continued to wear safety belts more often than they did before the incentives were offered.

Incentives don't have to be expensive, Mr. Geller pointed out. At the Radford Army Ammunitions Plant in Radford, Va., a three-week incentive program for employees observed wearing their safety belts as they drove in or out of the parking lot featured a daily drawing for tickets to a local college basketball game and two meals at a local restaurant.

The program cost just $150 because the basketball game tickets were donated by the college and the restaurant shared in the cost of the meals.

During the program, safety-belt use among 3,000 employees at the ammunition plant increased to 18% from 6.3%. Mr. Geller and his staff have continued to monitor the plant since the incentive program ended and have found the usage rate for safety belts has remained at 15% for more than six months.

For maximum effect, the psychologist says, the incentives should be continued.

Employers can turn for help to the National Safety Council's "Make It Click" program to promote use of safety belts, which Du Pont helped develop.

The council provides employers with a kit containing the basics of a safety-belt promotion program, including suggested activity ideas, letters and proclamations for public officials, a speech encouraging use of safety belts during summer holidays, examples of press releases and a list of resources agencies.

The kit also includes sample pledge forms for employees to sign, booklets, posters and bumper stickers promoting safety-belt use that can be ordered from the council. ●

For more information on safety belt programs contact: Joan Christopher, National Safety Council, 444 North Michigan Ave., Chicago, Ill. 606ll.

Facts dispel safety-belt complaints

Here are some common reasons employees give for not using safety belts and what you can say to convince them otherwise, courtesy of the National Highway Traffic Safety Administration:

Objection: "I don't need a safety belt when I'm traveling at low speeds or going on a short trip."

Facts: More than eight out of every 10 accidents happen at speeds of less than 40 mph; people not wearing safety belts have been killed in crashes at speeds as low as 12 mph. About 70% of all accidents occur within 25 miles of home.

Objection: "If I wear a safety belt, I might be trapped in a burning or submerged car."

Facts: Fewer than one out of every 200 injury-producing crashes involve fire or submersion in water. Even in such an accident, a safety belt can save your life by keeping you unhurt, alert and able to escape quickly. Without a safety belt, you could be stunned or unconscious from even a minor crash. Drivers wearing lap and shoulder belts also have more control over the car in emergency situations.

Objection: "I might be saved if I'm thrown clear of the car."

Facts: Your chances of being fatally injured are 25 times greater if you're thrown from the car.

Objection: "It takes too much time and trouble to fasten my safety belt."

Facts: With the safety-belt systems on recent-model cars, it takes two or three seconds to buckle up, a few seconds longer for older-model cars with more complicated belt systems.

Objection: "If I don't wear a safety belt, I'm the only one who will get hurt, so it's my problem."

Facts: If you're not wearing a safety belt, a sudden stop, swerve or crash could throw you onto other pasengers, hurting them and hurting you. If you're driving, you could be stunnned or knocked away from the wheel in a minor crash. The car would be out of control, increasing the likelihood it would hit something or someone else. If you are seriously injured or killed in an accident, it becomes your family's, relatives' or friends' problem, too.

Objection: "I'm uncomfortable when I wear a safety belt; in an accident, it might hurt me."

Facts: The safety-belt systems in most recent-model cars are much better-fitting and more comfortable than ones in older cars. People bruised by their safety belt when it kept them from being thrown into the dashboard or out of the car have "felt very lucky." ■

Worker tells a seat belt safety story

This is the kind of story every employer encouraging seat-belt use loves to hear.

In mid-June, after the first week of a safety-belt incentive program at Teletype Inc. in Little Rock, Ark., an employee was persuaded to begin wearing her safety belt. She had seen a crash simulated in the company parking lot by the Arkansas Highway Safety Department.

The employee was driving home after completing the third shift at midnight and fell asleep at the wheel. The car veered off the road to the right, then back across the road to the left and hit an embankment. The impact threw both front doors open and pushed the car's engine into the passenger seat. The car was demolished.

The driver reached over, unsnapped her safety belt and got out of the car. Except for a few bruises, she was uninjured and would not have missed a single day off the job if she had not taken time off to fill out insurance forms and buy a new car.

The incident will be featured throughout the year-long safety-belt incentive program at Teletype, according to Sandy Richardson, assistant programing manager at the Arkansas Highway Safety Department.

"I talked recently with the employee and asked if she is wearing the safety belt when she drives her new car," Ms. Richardson said. "She told me she would always wear a safety belt in the car." ■

Appendix M

"The benefits of behavior modification" by Claudia Smith, *News Messenger*, Blacksburg-Christiansburg, VA, August 1, 1982.

Sunday Spectrum

News Messenger

Sunday, August 1, 1982, Page 7

Scott Geller

The benefits of behavior modification

By CLAUDIA SMITH

At Gates 1 and 4 of the Radford Arsenal Virginia Tech psychology students have been monitoring seat-belt usage by the Arsenal employees for the last year.

And it's no wonder that seat-belt wearers have tripled in the last two months, since the Arsenal started the Seat Belt Pledge Contest with cash prizes of $50, $30 and $20 awarded every other week.

But no more than 150 of the 3,000 Arsenal employees pledged to wear their seat belts (and be eligible for the drawings.)

This particular scheme to get people to wear seat belts is only part of the work done by Dr. Scott Geller, a psychology professor at Virginia Tech. His area of research in Applied Behavioral Science is making a better environment for everyone by finding ways to change people's behavior.

"My colleagues, my students and I have developed numerous programs for changing behavior on a large scale," Geller said. "But who's using these programs?" That's "the sad part of this research."

The programs Geller referred to have been aimed at litter control (designing more attractive trash depositories and even installing a taped voice to thank people when they throw something in), how to get people to recycle, set back thermostats, save energy and water.

But the techniques the psychologists have designed to get people to buckle up with seat belts have gotten attention and money.

General Motors was "so impressed," Geller said, with the study at the Radford Arsenal, Doug Day, as well as support the Tech research with $10,000 a year.

Based on the Tech research the GM plant in Warren, Michigan, has had incentive programs for their employees to wear seat belts. A car is raffled off if enough employees are observed buckling up. The percentage of the plant must be 70 percent using seat belts for the next, and third, raffle there this August.

Also, the Tech research at the Arsenal drew the attention of the government. The National Highway Traffic Safety Administration awarded a $100,000 grant for Geller and his colleagues' work.

Many reasons are behind the success of this research. First, government surveys and research show that about 50 percent of the people who died in automobile and small truck accidents could have been saved if they had been wearing seat belts. Geller believes 30,000 lives could be saved a year if everyone used their seat belts.

"Industry will save money if their employees buckle up," he said, in the amount of thousands of dollars saved in lower insurance rates and reduced Workmen's Compensation payments. Also, productivity doesn't hurt because of people off with injuries.

Despite all the educational advertising about the increased safety of wearing safety belts and future government regulations requiring that children be buckled up, in this country most people prefer the right to wear, or not wear, their seat belts.

In other countries such as Australia, Canada, England, France, Germany and Sweden, seat-belt laws exist requiring usage with fines for those who don't do so, Geller pointed out.

Incentive programs such as the one at the Radford Arsenal appear more attractive, the psychologist said, since positive reinforcements, like receiving prizes for wearing seat belts are more pleasant and may have lasting effects.

Out of the 500 cars that go through the Main Gate at the Arsenal every day, Geller "bets 15 percent will keep on" wearing their seat belts after the research there stops this month. Only six percent of the employees used their belts when the Tech research started there.

General Motors, a supporter of "voluntary" seat belts (versus required air bags or "passive" seat belts which automatically fit around a person--both of which would cost the car industry a lot of money), became interested in a particular research angle.

"GM wanted to know if seat-belt wearers start the car

or buckle up first," Geller said.

After the Tech researchers observed about 1,000 people in local parking lots, "just to get enough seat belt wearers," (a government survey shows only 10 percent of the U.S. population buckle up), the Tech psychologists found only half of the wearers buckling up after starting their cars.

More people might buckle up, Geller said, if the buzzer systems in cars were altered to remind a driver five seconds after the car starts, instead of coming on right when the car starts.

"You get in your car and things are quiet and you're on some stimulus level," the psychologist said. "All of a sudden you start your car. That's a big stimulus change."

"The added buzzer is hardly noticed on top of the engine noise just starting. The radio could be blasting. You're into backing out of the driveway, doing other kinds of behaviors related to starting your trip.

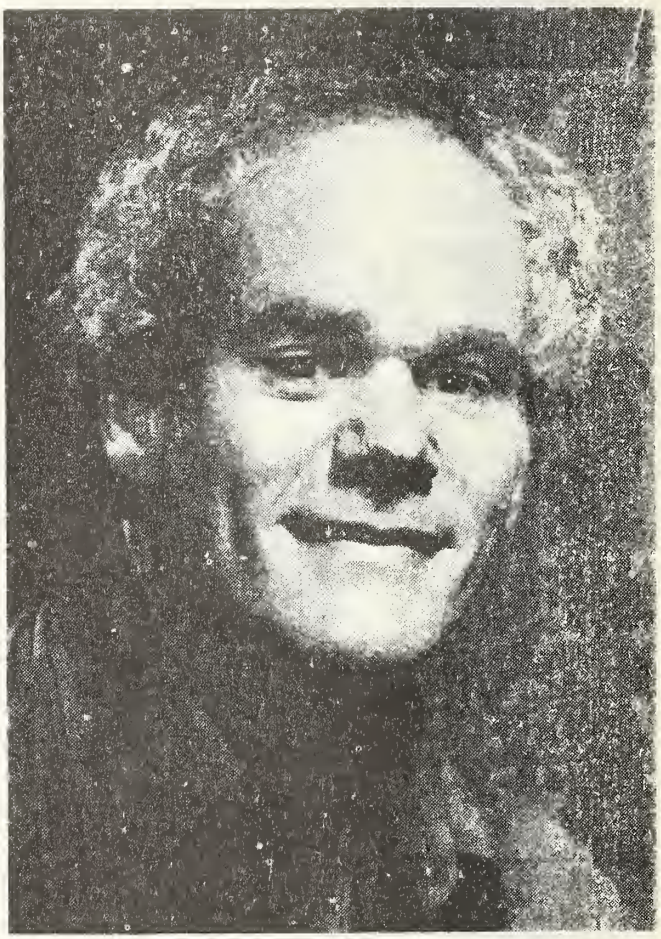
"The buzzer's hardly noticed."

Another aspect of the Tech research on seat belts has been comparing seat-belt usage between salary and hourly employees.

At Hubbell Lighting in Christiansburg and Federal Mogul the Tech researchers observe the separate parking lots for salary and hourly employees. They find that hourly employees buckle up five percent of the time or less and salary employees fasten their seat belts about 10 to 15 percent of the time.

"None of those figures are impressive," Geller said, because "80 to 85 percent of those people are driving at risk."

As the Tech psychologists continue the seat-belt research, they will study how to "take incentives away or fade them away," the most effective incentive programs to use, the difference in seat-belt usage in salary and hourly employees and the motivation of group involvement with programs like the car raffles at the GM Warren, Michigan plant.



Scott Geller

Appendix N

"Employees buckle-up for a free breakfast" by Claudia Smith, *News Messenger*, Blacksburg-Christiansburg, VA, October 28, 1982.

At Hubbell Lighting

Employees buckle-up for a free breakfast

By CLAUDIA SMITH

If Hubbell Lighting employees want to win a free breakfast, they better buckle up their seat belts.

Sound like a gimmick?

Well, it is. But more accurately, as the Virginia Tech psychology students who will be monitoring Hubbell's parking lots would say, it is an "incentive."

For two weeks beginning Nov. 4, Hubbell employees, who drive their cars to and from work, will pass over an electric counter.

Tech psychology students will stand about 150 feet away, looking at a calculator connected to the counter. They will be waiting for the winning numbers (already chosen at random by a computer) to flash on.

Three times a day, a driver will be stopped and awarded a certificate for breakfast at the Western Sizzlin restaurant in Christiansburg, *if* the seat belt is in use.

The program at Hubbell Lighting Division is only a part of the research being done by Tech psychology professor Scott Geller and his students. Recently, they received a $100,000 grant from the National Highway Traffic Safety Administration for funding the research.

Although the behavior scientists have been monitoring seat belt usage all over the area, the upcoming project at Hubbell will focus specifically on increasing hourly employees' seatbelt usage.

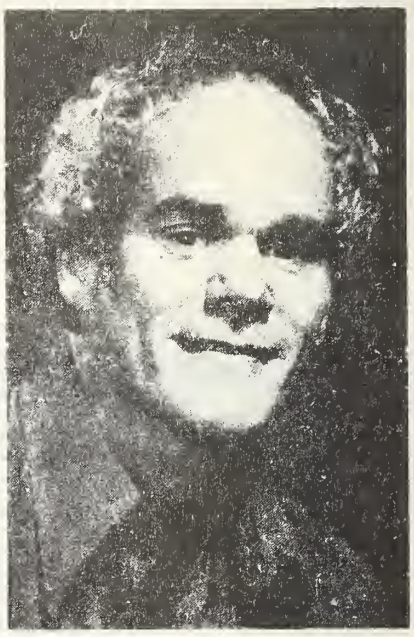
When Geller's students monitored Hubbell's two parking lots, (one for salary, one for hourly) last August, the results were so encouraging that they believe more people will buckle up after this program.

Graduate students James Rudd, 22, and Heidi Hahn, 23, said they visited the Hubbell plant over the summer to ask the hourly employees what kind of prize programs they would want.

In August, cash prizes were awarded to the seat-belt wearer with the lucky license plate. About 41 percent of Hubbell's approximate 350 hourly employees buckled up then.

About 38 percent of the approximate 110 salary employees buckled up, also.

When the prizes stopped, employees began to stop wearing their seatbelts. The number of wearers dropped to about 28 percent for hourly employees and to about 25 percent of the salaried employees.



Scott Geller

"If you take the prizes away, they'll trickle off," Rudd said.

"But if you put in another incentive program, there will be larger increases," he said.

Before any incentive programs started at Hubbell, the psychology students checked to see how many employees already buckled up.

About 5 percent of the hourly used seat belts and between 5 to 10 percent of the salary did, Geller said.

In an August interview, the psychologist pointed out the reasons

★Employees

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behind the success of this research. First, government surveys and research show that about 50 percent of the people who died in automobile and small truck accidents could have been saved if they had been wearing seat belts. Geller believes 30,000 lives could be saved a year, if everyone used their seat belts.

"Industry will save money if their employees buckle up," Geller said. He said savings would amount to thousands of dollars in lower insurance rates and reduced Workmen's Compensation payments.

Productivity probably would increase because there would be fewer employees missing work to do injuries suffered in auto accidents.

Despite all the educational advertising about the increased safety of wearing seat belts, in this country most people prefer the right to wear, or not wear, their seat belts.

In other countries such as Australia, Canada, England, France, Germany, Sweden, seat-belt laws exist requiring usage with fines for those who don't do so, Geller said.

Incentive programs like the one at Hubbell Lighting Division may be an answer to getting people in this country to buckle up.

As a bonus, psychology student Jim Rudd said the program is "cost effective." Western Sizzlin will receive a lot of advertising at the Hubbell plant for the cost of about $105 for the winners' breakfasts, he said.

News Messenger
Blacksburg - Christiansburg, Va.
Thursday, October 28th, 1982

Appendix O

"Child restraint law doesn't go far enough" by Terry Driver, *News Messenger*, Blacksburg-Christiansburg, VA, November 21, 1982.

News Messenger

Sunday, November 21, 1982

Professor says

Child restraint law doesn't go far enough

By TERRY DRIVER

A pyschologist--who has studied child safety devices--does not believe Virginia's new child restraint law for children riding in automobiles goes far enough.

While he believes the law is needed, E. Scott Geller, a Virginia Tech professor of behavioral psychology, believes the the state should have gone a step further and provided training to teach adults why the seats are necessary and how they are used.

The law --which was signed into law this year and will go into effect Jan. 1--requires parents or legal guardians driving Virginia-registered motor vehicles to secure child passengers under four years old in a device which would protect the child during a sudden stop.

There will be a $25 fine for those convicted of violating the law.

Geller agrees the child restraints are needed.

He said 80 percent of automobile deaths and injuries occur in cars traveling under 40 miles per hour, and 75 percent occur less than 25 miles from home.

[illegible] a serious accident is 50-50, Geller said.

He added "if you have two children, the probability will be 100 percent that one of them will be in an accident."

Child restraints are necessary, he said, because "it is absolute nonsense for any parent to believe that he can protect his child while holding him in his lap."

In a "phantom crash," those which might occur as the result of sudden braking, an unrestrained child even if it is sitting in a parent's lap may be thrown forward and strike the dashboard or windshield.

A child may suffer serious head injuries in an accident which occurs at speeds as low as five miles per hour, Geller said.

In addition, Geller said if the child is sitting in a parent's lap the chances of injuries may increase.

The parent's body acts as an additional force, hurling itself forward and thrusting the child into serious danger, Geller explained.

Still, Geller doesn't believe mandating the seats for children will significantly reduce the number of children injured in automobile accidents.

He feels community education must be made an intergral part of the law for it to be truly effective.

Police officers who will be enforcing the law should be trained to teach parents how to use a child safety seat, to give advice on where to purchase seats approved by the Department of State Police, and finally, to justify the law, Geller said.

The Tech professor pointed out that in Tennessee, which has a similar law, police officers carry child safety seats in their patrol cars.

When an individual is stopped for violating the child restraint law, the officer is able to demonstrate the use of the safety seat.

Lt. C.R. Compton, in response to Geller's comments, said that he was not in total disagreement with Geller.

Compton agreed the law will not be effective without public education.

However, he said "the Virginia Department of Transportation Safety is doing a lot of pub-

★ Restraint

(continued from pg. 1)

licity to educate the public."

"We have had interviews with the TV media and had representatives attending seminars discussing the law," Compton said.

The Virginia State Police have been encouraging all parents to buckle up their children as well as themselves.

"Parents have a responsibility as role models to their children," Compton said.

The child restraint law is applicable to parents and legal guardians.

Compton explained that once the law is in effect, the police hope there will be voluntary compliance from those indiviuals who do not fall under the limitations.

In addition, Compton explained that state troopers are given training and have a responsibility to enforce the law.

Geller said it will take more than just police enforcement to make the law work.

He said hospitals, churches and other organizations concerned with the quality of life need to do their part as well.

"If a hospital really wants to be a state-of the-art health facility, they need to have an infant car restraint loaner program," Geller said.

He suggested that parents with new born infants be given an infant safety seat to be used on the trip home.

The seat could be returned after the parents had purchased their own.

Geller said an alternative would be for hospitals to include infant safety seats as part of the hospitalization costs.

Parents would purchase the seat as they do other services.

Hospitals could then begin a recycling program in which parents could sell back their infant seat after the the child had outgrown it.

The less expensive used seat could then be sold to other families.

Virginia law does contain a provision where parents or legal guardians who cannot afford to purchase an approved child restraint device can borrow the device from a local Department of Motor Vehicles office.

Compton said he anticipates a number of inquires about the new law.

He said persons may contact their local state police office for further information and may pick up applications for the loaner program at the DMV office on State Route 114.

Appendix P

"Seat belts: Behavioral research is joined with efforts to shape policy" by Joan Wolinsky, *APA Monitor*, American Psychological Association, Washington, D.C., Vol. *13*, December 1982.

American Psychological Association

monitor

Washington, D.C. December 1982 Vol. 13, No. 12

Seat belts

Behavioral research is joined with efforts to shape policy

By Joan Wolinsky
Staff Writer

Doctors and safety officials are making room in the front seat for community psychologists in their drive to promote auto passenger safety, according to panelists at two convention symposia this summer who discussed their involvement in the campaign.

Meanwhile, the regulation mandating automatically closing seat belts and air bags in new cars by 1983 remains unresolved. In November, the Supreme Court agreed to review a decision of the Circuit Court of Appeals in Washington, D.C., which had ordered the reinstatement of the passive restraint requirement. President Reagan earlier had ordered the rescission of that regulation.

While this litigation continues, however, some psychologists are working under the aegis of the National Highway Traffic Safety Administration (NHTSA), testing the effectiveness of such behavioral approaches as positive reinforcement and altered risk perceptions to encourage seat belt use. Even if passive restraints are installed in new cars, say officials at NHTSA, this campaign will still be needed to urge the millions of motorists who drive older cars to buckle up.

Other psychologists, meanwhile, are working independently at the state level to shape public policy concerning child passenger safety. Some are conducting telephone surveys and observation studies of the adoption and use of child restraint devices (car seats), and exhibiting their data to state legislators to lobby for child restraint laws. In addition, psychologists at the University of Kansas are training parents to improve their children's behavior when they are seated in child restraints.

The American Psychological Association is also having a hand in the support for child passenger safety. A resolution on the "Prevention of Motor Vehicle Trauma and its Psychological Sequela" was proposed at the 1981 annual convention by Logan Wright. Stating that psychologists have "special expertise" in the prevention of car accidents, it called for support of a project sponsored by the American Academy of Pediatrics (AAP) to promote the use of child restraints for newborns.

Since the proposal was first issued, the resolution has been circulated among the various APA boards for comment. Although the full text of the resolution has yet to be approved, the Board of Directors at its August session voted to work informally with the pediatricians on their project. A meeting with AAP, involving APA staff, is planned for the near future.

NHTSA currently is coordinating a national campaign with the cooperation of voluntary associations, private industry, and government organizations, using those influential groups "to build a social norm" of seat belt use, said Bruce Bigelow, who heads the motivation research office at NHTSA.

Underlying those efforts are research activities to learn what motivates individuals to use or ignore seat belts and child restraints. The percentage of seat-belt wearers in the United States is relatively low, estimated in recent observation studies at about 11 percent, said Bigelow.

Under NHSTA's sponsorship, psychologists at Virginia Polytechnic and State University are developing experimental incentive programs with industry to discover if positive reinforcement motivates drivers to wear a seat belt.

Industry is an ideal sponsor of seat belt incentive programs "because it has much to gain if its employees buckle up," said psychologist E. Scott Geller of Virginia Tech, who has been creating these projects for the past several years. Companies can save thousands of dollars in worker's compensation and employee training costs resulting from auto accidents if their workers wear seat belts, he added.

Free dinners

In one experiment, seat-belt wearers leaving the parking lot at a Blacksburg, Va., plant received a handbill with a combination of symbols. Employees who collected a specific number of flyers with matching symbol combinations won a certificate for a free dinner donated by a local restaurant, Geller explained.

The result of this incentive program, said Geller, was a "nice increase" in the number of seat-belt wearers when the flyers were distributed at the end of the work day. There was a smaller but still significant increase in seat-belt use in the morning, Geller believes, when flyers weren't passed out but observations made among arriving employees.

"It looks as if there is some generalization," Geller reasoned, adding that "some people were starting to buckle up in the morning, knowing there are no incentives . . . That's a nice learning curve."

"We have the most solid and promising data from that study" concerning seat belt strategies, Bigelow said. Because NHTSA considers those prototype studies at Virginia Tech so successful, it has been encouraging other companies to adopt similar programs. So far, several facilities at General Motors, Ford and AT&T are using the positive reinforcement strategy and have been selling their programs to other employers.

Another NHTSA effort using psychological expertise is in the research of risk perception. It is believed that motorists will be more inclined to buckle up if their perceptions of the risks of driving are increased.

Most motorists have a "single-trip" mentality when it comes to

assessing the dangers of driving, believing the probability of dying or being seriously injured in a single trip is very low. At the same time, they feel they "are punished for using seat belts because it supposedly involves effort, inconvenience and discomfort," said Norman Schwalm, of Perceptronics, Inc. of Woodland Hills, Calif.

Schwalm and his colleague, Paul Slovic of Decision Research in Eugene, Ore., have been attempting to alter subjects' perceptions of risk from the "single-trip mentality" to one that emphasizes a lifetime of driving. From that perspective, the chances of dying from an auto accident are about one in 100 and the probability of at least one serious auto injury is about 1 in 3. By stressing those grim statistics, they hope motorists will conclude the risk outweighs the perceived "cost" of inconvenience.

In the NHSTA-funded study, 285 young adults were exposed to a variety of radio and television spot announcements; some stressed the lifetime driving perspective, while others discussed drunk driving or other related issues. Findings showed a dramatic increase in observed use for all groups and significant changes in attitudes and in self-reported frequency of seat belt use.

Schwalm said the increase could be partly attributed to the questionnaire accompanying the study, which had a "risk perception theme throughout." However, NHTSA is impressed enough with those findings to further test the effectiveness of a variety of risk perception messages, according to Bigelow.

Restraint laws

As these government-funded programs continue, other concerned psychologists are using their skills to promote the adoption of child restraint use laws at the state level.

In the last five years 36 states have introduced child passenger protection legislation to reduce the death and injury rates of children less than five years old, according to the National Safety Council. The nature of the legislation varies from state to state, with 18 states requiring children to wear an appropriate restraining device of some kind. The penalty for non-compliance is usually a fine or warning.

The most visible and active proponents of child restraint legislation have been pediatricians, but psychologists in Kansas and Illinois, for example, two states with such laws, have successfully influenced public policy by presenting the results of telephone surveys and observation studies to state legislators.

Stephen B. Fawcett, a psychologist at the University of Kansas, polled residents throughout his state to assess public opinion of child restraint legislation. The telephone survey was conducted during a period after the bill was made public and before public testimony was to be held.

About 75 percent of those polled indicated they supported or were willing to support a child restraint use law, Fawcett said. That "critical bit of data," submitted during committee debates, helped get the bill onto the floor, he said. In January 1982 Kansas passed what Fawcett called "a watered-down version of the original bill," penalizing violators with an oral warning instead of the intended $25 fine. But proponents still claim the passage as a minor victory, he said.

A similar project was initiated in Illinois by psychologist Leonard Jason and graduate student Tom Rose of DePaul University. Results of that telephone survey — almost identical to those of the Kansas poll — were reported in a letter to half of Illinois' state senators two days before they were to vote on the issue,

said Jason. The letter also cited the bleak findings of an eight-month observation study of child restraint use, which found that only 8 percent of observed cars with young children used these devices.

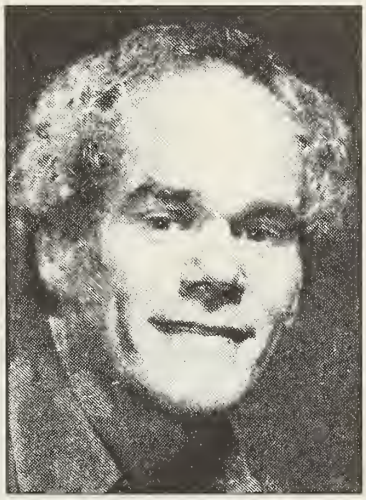
The bill's passage surprised many of its proponents, said Jason. Twenty-three of the 29 legislators who received letters voted in favor of the bill, he reported, compared with 16 of the 30 senators who didn't receive a letter.

Some psychologists, however, were concerned about the effectiveness of child passenger safety legislation, and joined together last year to track its implementation for 12 months in seven states, said Fawcett, one of the project's organizers. These states — Rhode Island, Tennessee, West Virginia, Kansas, Virginia, Massachusetts and Illinois — either already have a child restraint use law or have one pending passage.

Volunteer observers in each state were stationed at various urban and rural sites where children were likely to be located, such as near fast food restaurants, shopping malls, and day care centers. They also positioned themselves at major intersections where many accidents were reported, and on downtown main streets.

When a young child was spotted riding in a car, the observer noted whether the child was appropriately restrained, the type of restraint used, the location of the child and which age group he or she belonged.

Results showed that the use of child restraints remains relatively low and enforcement usually is weak even in states where such laws are on the books, according to the project's coordinators. In West Virginia, for example, no citations were issued during the year-long study, and in Rhode Island only 12 drivers were cited for violations.



E. Scott Geller

"We saw 12 violations in 10 minutes during our observation," said John Elder, of the Pawtucket (R.I.) Heart Health Program.

Observers noted some increase, however, during the winter months, when a bill was undergoing public debate, or when the subject received media attention. Most also found an increase in use for children less than one year old.

Family strategies

Those involved in the study cited several strategies which could complement child restraint use laws or aet alone to encourage the adoption of the devices. These include training police officers to deal with violators, community involvement, and heavier marketing of child restraint devices.

At the family level, psychologists at the University of Kansas are training parents to overcome some of the child behavior problems associated with child restraint use. These behavior protocols, pioneered by psychologist Edward Christophersen at the University of Kansas, have been successful in improving the child's behavior in the car, reported psychologist Dennis D. Embry, who is also with that university.

The use of child restraints for newborns is about 50 percent, "but that figure falls rapidly after the first birthday," he said, often because the toddlers object to being restrained by throwing temper tantrums and exhibiting other disruptive behaviors.

In one experiment, Embry instructed a mother with two behavior-problem children to award them each a star when either remained properly seated in the car. When a child earned two or more stars in a day, he or she could receive a treat at home. Each week, the amount of stars needed to earn a prize increased. The mother was also told to praise the child frequently and descriptively for appropriate behavior and to stop the car each time the child rose from his or her seat.

The second protocol was tested on a family with four children, whose parents complained of behavior problems when the children were in the car, Embry explained. The children underwent a "behavioral rehearsal" at home, practicing car safety and receiving "Big Bird" safety badges, which were to be relinquished when they exhibited negative behavior. (Cartoon characters and other television personalities, such as "Big Bird", are powerful symbolic models of safe behavior, Embry said.)

During actual rides in the car, the children received warm praise for positive behavior and a round of applause if they were still wearing their safety badges at the end of the trip.

As a result of this protocol, Embry found that the children were "virtually 100 percent cooperative after the intervention." ■