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REWARDING SAFETY BELT USAGE AT AN INDUSTRIAL SETTING: TESTS OF TREATMENT GENERALITY AND RESPONSE MAINTENANCE

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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 fliers, 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were not distributed (i.e., treatment generalization) and during a follow-up period after the incentives were withdrawn (i.e., response maintenance).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: behavioral community psychology, organizational behavior management, transportation safety, incentives, seat belts, cost-effectiveness

In Fall 1981 the U.S. National Highway Traffic Safety Administration (NHTSA) launched a nationwide effort to increase safety belt usage, which has included media programming, 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

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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. 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). 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 posttreatment 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 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., 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 fliers 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 yr. 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 3 miles from each other, and each provided access to the most convenient travel route to a different town (i.e., Radford, Christianburg, 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 on 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, shoulder belt available but not used, no shoulder belt available). Observations of lap belt usage were only possible when the vehicle was stopped, i.e., during the distribution of surveys or incentive fliers.

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 6 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 6 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, i.e., vehicle and driver data were recorded daily as vehicles entered the complex in the morning and exited in the afternoon.

Incentive fliers. 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 flier 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 flier, the observer gave one as quickly as possible. The flier 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 flier could be exchanged for prizes. The employee newspaper also described the combination game, specifying that workers should deliver their winning flier 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 flier. (A copy of the incentive flier is available from the author on request.)

The fliers given to drivers wearing a seat belt contained a contest symbol; whereas the fliers 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 fliers, the observers changed their verbal statement to nonwearers 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 flier which explained the combination game. This flier condition was in effect each afternoon for 15 consecutive workdays, and then for 15 additional workdays the fliers were distributed on alternate afternoons. On days when fliers were not distributed, the obtrusive baseline condition was in effect. If drivers stopped and asked for a flier, the observers responded with the statement, "We weren't given any fliers 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 morning and afternoon for 13 workdays in accordance with the obtrusive baseline condition. Then the observers left the industrial site for 2 wk before returning for 17 consecutive workdays of morning and afternoon 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 morning (range = 38-103) and 76.3 in the afternoon (range = 44-102 vehicles).

During unobtrusive baseline, shoulder belt wearing at RAAP was slightly higher in the morning than in the afternoon (means of 16.8% and 12.9%, respectively). Mean belt usage in-

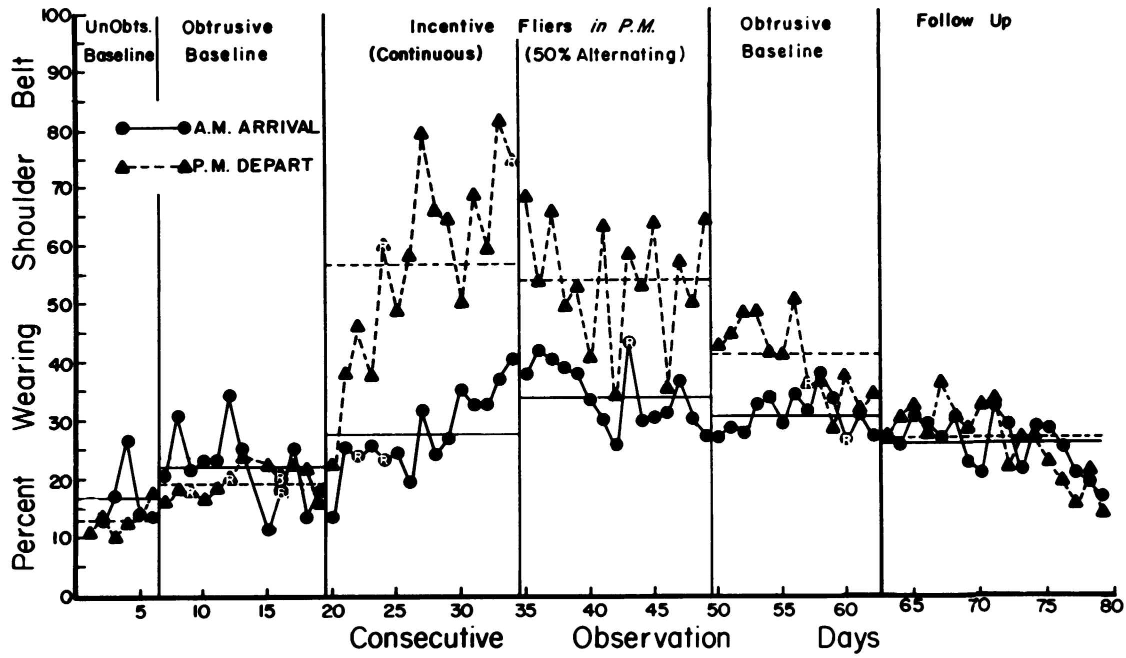

Fig. 1. Percent shoulder belt usage over consecutive morning and afternoon sessions. Graph points containing an "R" are days when it rained; the experimental condition was unobtrusive baseline.

creased 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 Figure 1, shoulder belt use during afternoon departure increased noticeably from the first to the fifteenth session of distributing incentive fliers daily (i.e., the continuous schedule). During this 15-day phase, afternoon 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 morning arrival, when incentive fliers were not distributed. Belt usage in the morning ranged from 11.8% (on the first day of afternoon treatment) to 39.7% (on the last day of afternoon treatment). Mean morning usage during continuous incentives in the afternoon was 28.0%, compared with the 22.1% mean morning usage observed during the preceding phase of obtrusive baseline.

When incentive fliers were distributed on alternative afternoons, daily usage declined somewhat during both the morning and afternoon. The daily afternoon percentages show an alternating pattern that corresponds with the alternating reward schedule. That is, the first day of this phase (Day 35) was a nonreward 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 afternoon and 34.2% in the morning.

When the incentive fliers were discontinued completely, shoulder belt wearing decreased during both morning and afternoon sessions, but still remained higher than the pretreatment rates. More specifically, during the posttreatment obtrusive baseline, belt usage averaged 31.2% (morning) and 41.7% (afternoon), in contrast with the mean usage during pretreatment obtrusive baseline of 22.1% (morning) and 18.5% (afternoon).

Figure 1 also depicts the 17 follow-up days, and shows similar low levels of shoulder belt usage during both morning arrival and afternoon 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 preintervention, baseline levels. The mean percentages of shoulder belt wearing during follow-up were 25.1% and 26.1% for the morning and afternoon observation sessions, respectively.

Sequential Analyses

The data in Figure 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 pretreatment baseline showed only minimal increases in individual belt usage as a function of repeated exposures to the observation procedure. Graphs of these data are available from the author on request. However, the sequential analysis for the incentive phase demonstrated that the marked increases in belt wearing shown in Figure 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 afternoon departure,

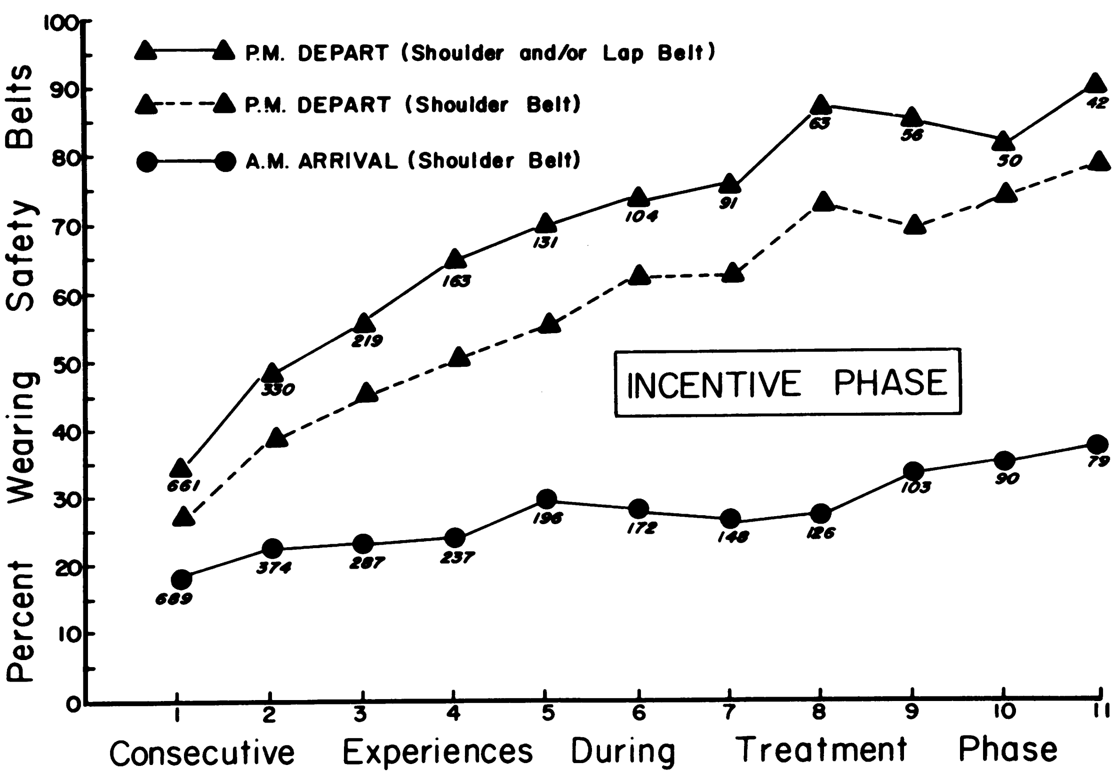

Fig. 2. Percentage of seat belt wearers during morning arrival and afternoon departure as a function of consecutive experiences in the incentive phase. The numbers associated with data points indicate sample size.

the vehicles observed were stopped in order to distribute incentive fliers; therefore, it was possible to determine usage of lap belts for these observations. Figure 2 shows two functions for afternoon 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.

Shoulder belt wearing was less frequent in the morning (when incentive fliers were not distributed) than during the afternoon. However, Figure 2 does show a direct increasing relationship between percentage of shoulder belt users in the morning and number of exposures to the morning observations. To determine whether this function (as well as that shown for afternoon 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 afternoon departure during the incentive phase. These drivers had stopped their vehicles to receive an incentive flier 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), each exposure group showed a consistent increase in seat belt wearing as a function of treatment experiences (i.e., number of incentive fliers received). This apparent sampling bias was evident only during the afternoon observations of the incentive condition; and it probably occurred because several drivers waited at the gate until receiving an incentive

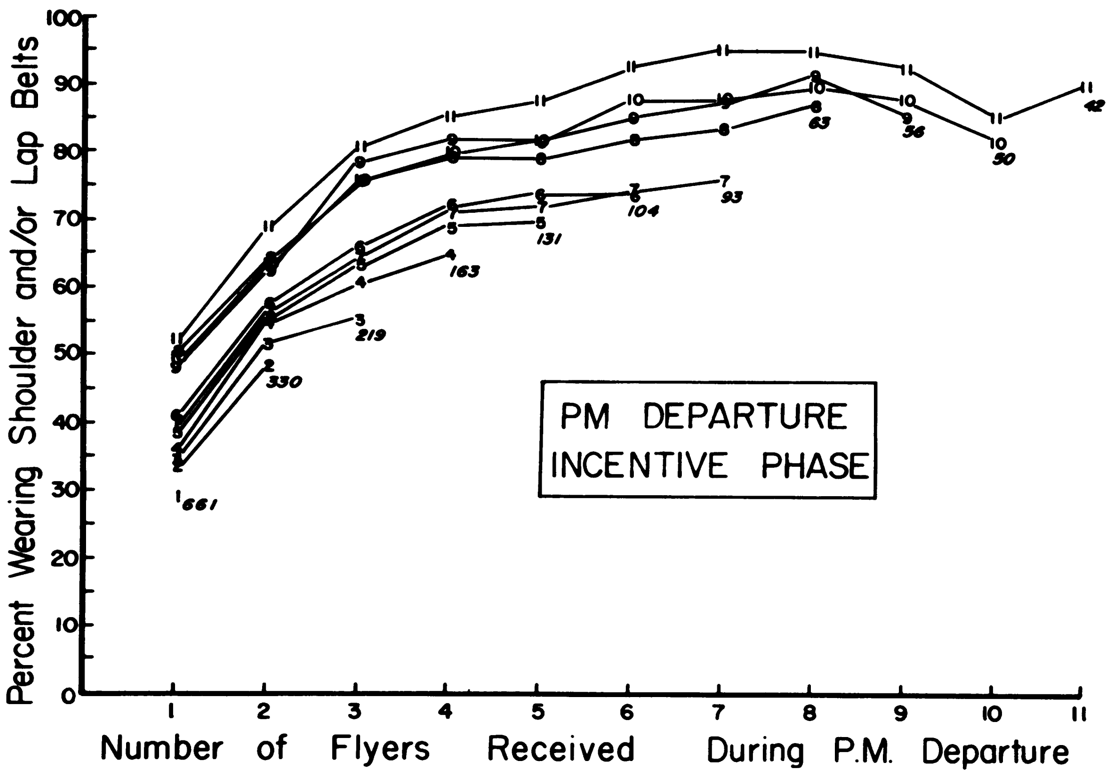

Fig. 3. Percentage of shoulder and lap belt wearers for afternoon departures during the incentive phase as a function of particular frequencies of exposures to this condition. The numbers used for data points indicate the number of total exposures for the sample, and the number at the end of each line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

flier, thereby obviating the random sampling procedure that was followed during all other conditions (morning and afternoon). 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 flier 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 flier. Belt wearing had essentially reached peak levels at the point when the fourth flier was distributed. In other words, if drivers had not been motivated to buckle up (and receive fliers with valid reward symbols) after receiving their third invalid incentive flier, additional fliers had minimal influence. The experience traceback analysis for morning arrivals during the incentive phase (when fliers were handed out in the afternoon) 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 Figure 2 was not due to sampling bias. Graphs of these data are available from the author on request.

A Generalization Measure

Figure 4 depicts the percentage of shoulder belt users during morning arrivals in the incentive phase as a function of the number of prior incentive fliers received in the afternoon (i.e., afternoon treatments). An afternoon treatment was defined as receiving an incentive flier with a valid reward symbol (i.e., the recipient was wearing a lap or shoulder belt). The function shows a consistent increase in morning belt usage as a function of the first four afternoon treatment exposures; although the 95% confidence intervals indicate that the only significant difference ($p < .05$) was between drivers receiving no afternoon 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 afternoon rewards.

It is noteworthy that the negatively accelerating function in Figure 4 reached asymptote after four consecutive reward fliers. The relationship between afternoon belt usage and number of reward fliers received also leveled off after the fourth exposure to the intervention (see Figure 3). Taken together, these data suggest that some drivers who were motivated to wear their safety belt during the afternoon distribution of incentive fliers, continued to buckle their shoulder belt at a time when fliers 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 morning and afternoon 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 fliers for belt wearing.

Figure 5 depicts percentage of shoulder belt users over consecutive follow-up observations for three data groupings: (a) drivers who received three or more reward fliers, (b) drivers who received one or two rewards, and (c) drivers who received no valid reward fliers. 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 re-

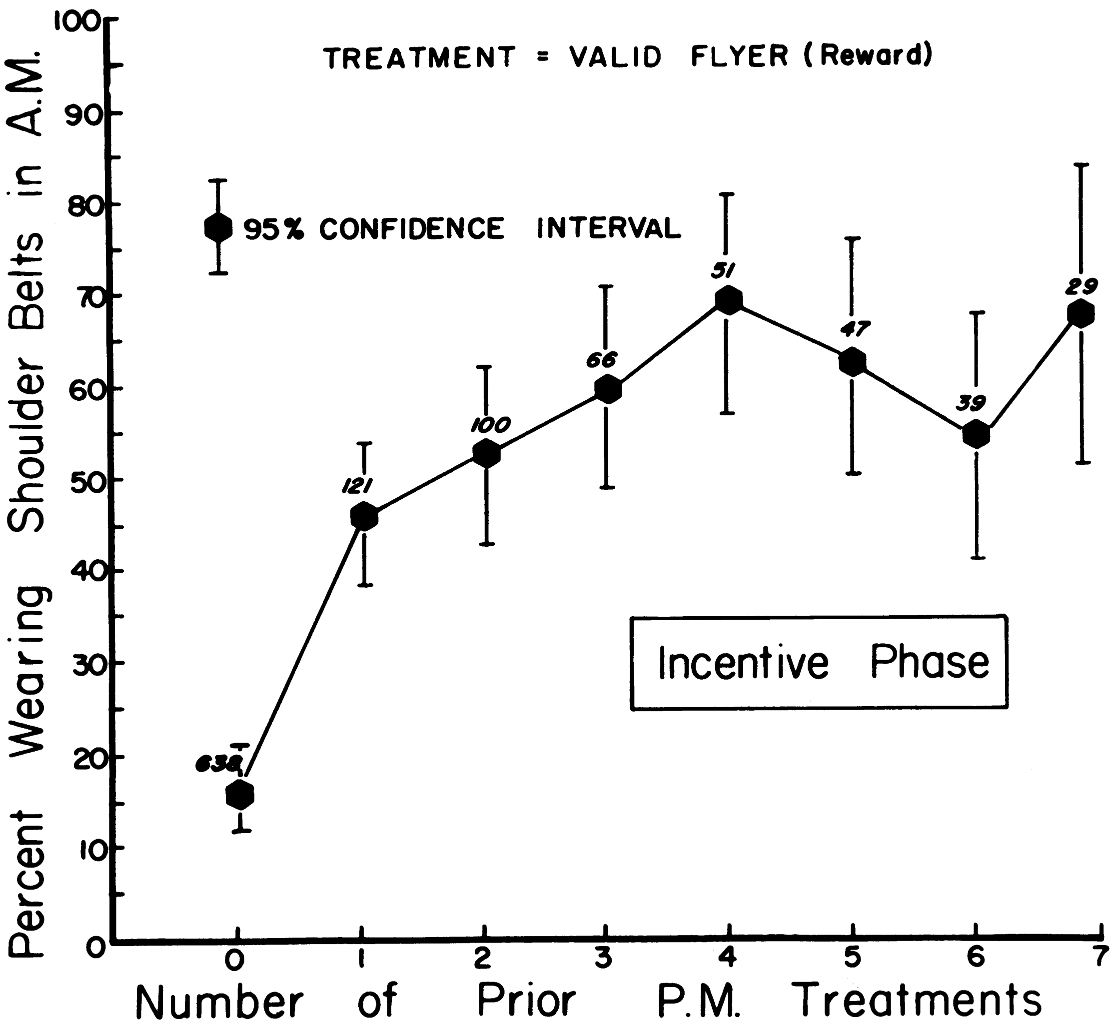

Fig. 4. Percentage of shoulder belt wearers during morning arrival as a function of prior treatment experiences in the afternoon. The number associated with each point represents the sample size for the particular data category.

ceived their first incentive flier, and serves as a control point for examining treatment durability. The 95% confidence interval is shown for those percentages that 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 flier 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.

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

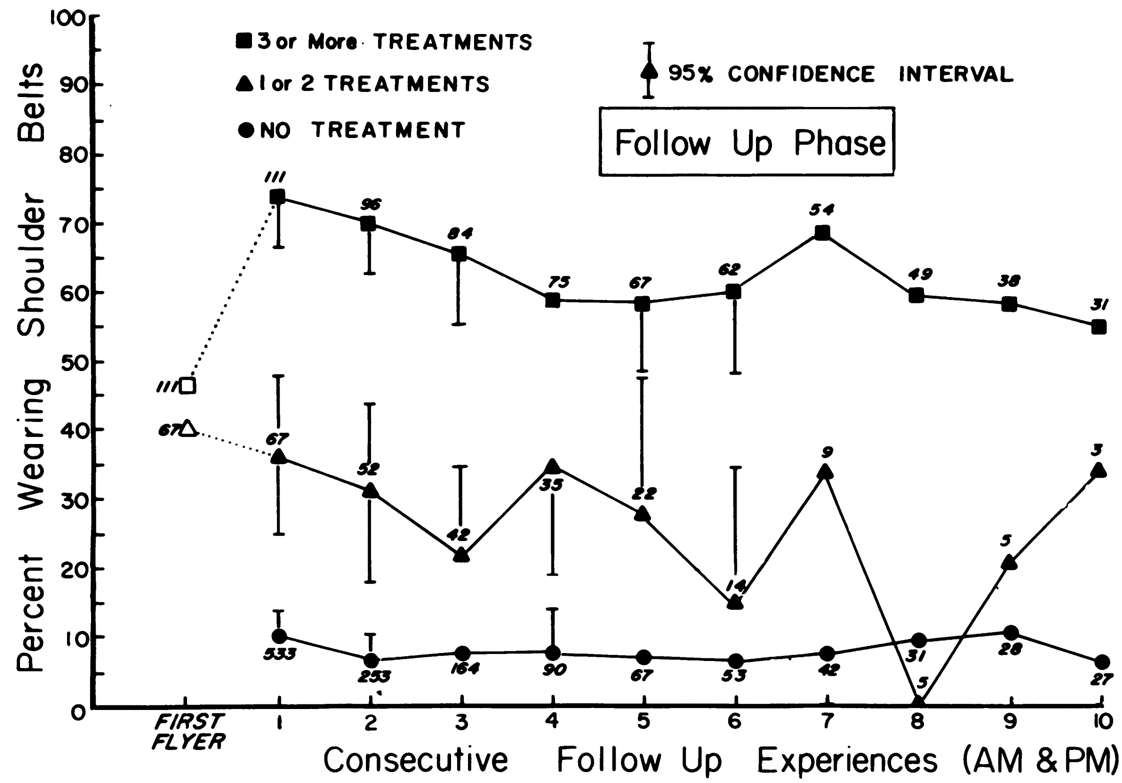

Fig. 5. Percentage of shoulder belt wearers over consecutive follow-up observations as a function of number of treatment exposures. The numbers indicate the sample size for the particular data point.

the fourth observation). More specifically, of the 111 drivers who had received three or more incentive fliers and at least one follow-up observation, 45.9% had been wearing a shoulder belt when receiving their first incentive flier; and of these same drivers, 74.8% were wearing their shoulder belt at the time of their first follow-up observation. Over 10 follow-up observations, the belt usage percentage for this treatment group never dropped as low as it had been when the first incentive flier 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 fliers. Belt usage for this treatment group was not higher at the time of the first follow-up observation than when the first incentive flier 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 did show higher shoulder belt usage than drivers who had not received any incentive fliers. 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: (a) the markedly greater increase in belt usage during the afternoon (when belt wearing was rewarded) than during the morning (when rewards were not available); (b) the alternating fluctuations in daily belt usage during only the afternoon session when afternoon rewards were available on an alternating schedule, and (c) the fading of differential morning and afternoon 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 (morning arrival and afternoon departure) while consistently implementing the treatment intervention during only one of these sessions (i.e., afternoon departure). The analysis of daily shoulder belt wearers showed marked increases in morning belt use while belt wearing was reinforced in the afternoon. Sampling bias in this demonstration of treatment generalization was apparently minimal, as shown by the analysis of individuals' morning belt wearing as a function of afternoon 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 posttreatment 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 on 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 10 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 flier. 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 flier) 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 nonuser who intermittently remembered to buckle up for a reward (perhaps on days when he or she was not prompted to stop for an incentive flier). 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 fliers were distributed in each project, yet in the university study 81 faculty and staff claimed prizes amounting to a total value of $1,008. 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 possibility that more trading of fliers occurred in the university setting in order to obtain winning flier combinations), but the critical point is that the impact on belt wearing of the response-contingent incentive fliers 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 1,200 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 belts.

REFERENCE NOTES

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