63
107

SAFETY BELT PROMOTION AT COMMUNITY SWIMMING POOLS: EFFECTS OF POLICY, REWARDS, PROMPTS, AND EDUCATION.

by

Michael Richard Gilmore

Thesis submitted to the Faculty of the
Virginia Polytechnic Institute and State University
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

in

Applied Experimental Psychology

APPROVED:

E.S. Geller, Chairman

D. K. Axsom

R. A. Winett

May, 1990

Blacksburg, Virginia

Abstract

Data on safety belt use were collected at two swimming pools over three consecutive summers. The impact of several variables upon safety belt use was examined. First, an Intervention Program (IP) was designed, comprised of Promotional, Reward, and Feedback components. Second, an Awareness/Education (AE) strategy was introduced to children enrolled in swim lessons. Third, belt use was examined before and after a mandatory safety belt use law (BUL) was enacted in Virginia. The moderating effects of the BUL were studied by implementing both the IP and the AE interventions during the pre- and post-BUL environments. Finally, some aspects of a behavioral prompt (i.e., a 'Personal' vs. an 'Impersonal' delivery method), and their relationship to safety belt use were examined. Major findings include, those individuals most influenced by the IP in the pre-BUL environment were those same individuals who were influenced by the BUL. Thus, while the IP did have an impact upon mean safety belt use levels in the post-BUL context, belt use increases over Baseline were not as dramatic as those observed in the pre-BUL environment.

Acknowledgements

While the title page indicates a single author, namely me, I would be remiss if I failed to point out that this thesis was a collaborative effort by many competent and inspiring persons.

I would like to thank the numerous data observers who helped collect the massive database discussed in this thesis.

I would like to thank my 'family' in the lab and my friends in the Department for making the three years it took to finish this thesis extremely enjoyable and stimulating.

I would like to thank my committee for providing me with new insights into the data, challenging me with conceptual issues during the defense, and supporting my application into the Ph. D. program at Virginia Tech.

I would like to thank Bob Evans for his expertise in database management, and his unselfish willingness to perform seeming miracles in number crunching on typically short notice.

I would like to thank Tom Berry for his sincere interest in my intellectual and emotional growth, his gentle persistence that I continue work on my thesis despite my excuses, and for all the wacko conversations we've had over the last three years. *¡Glöçk!*

I would like to thank Scott Geller for all the trust and support he furnishes not only to me, but to all his students. I also wish to thank him for his time spent enlightening me, as his time is probably the most valuable commodity in our lab. I would also like to thank him for his corrective feedback, which, while tough to swallow sometimes, was always presented with the purpose of

helping me to become a better researcher, communicator, or whatever. I look forward to working on my dissertation under his able guidance.

I would like to extend a special thanks to Melanie Bonner, without whose help and patient support, I might not have succeeded in pulling this all together. What a wonderful partner to have-- I hope there are many rewarding experiences ahead of us.

And finally, I wish to thank my family for providing me with the environment that helped to shape me: Kathy and Laura, the two most wonderful sisters a brother could have, and Dick and Sue, the two most warm and loving parents a son could have. I love you all.

Table of Contents

Introduction

The Problem

Vehicle crashes are the leading cause of death for individuals between the ages of 5 and 34 years (McGinnis, 1984). It is estimated that at least 50% of fatalities and injuries from vehicle crashes could be reduced through the consistent use of safety belts (Federal Register, 1983). Furthermore, it is estimated that with only a 10% increase in belt use at the national level 1500 lives could be saved, 300,000 injuries prevented, and $800 million in direct costs could be avoided (Sleet, 1987).

Past Strategies & Their Effectiveness

Recognizing that the lack of safety belt use is a major threat to public health, a variety of different interventions have been used to promote safety belt use, including: 1) incentive/reward programs (e.g., see reviews by Geller, 1984; Geller, Kalsher, Rudd, & Lehman, 1989; Geller, Rudd, Kalsher, Streff, & Lehman, 1987); 2) educational and awareness programs (e.g., Geller & Hahn, 1984; Kello et al., 1988; Ludwig & Geller, 1990); 3) feedback strategies (e.g., Jonah, 1989); and 4) legislation/policy interventions mandating belt use at the institutional and/or statewide level (e.g., Burnley, 1988; Campbell, Stewart, & Campbell, 1987; Kalsher, Geller, Clarke, & Lehman 1989).

Mandatory safety belt use laws

Currently, 35 states and the District of Columbia have mandatory safety belt laws (BULs); and in virtually every state, a substantial increase in belt use has been observed following the effective date of the law. For the latter half of 1985, Zeigler (1986) reported a mean belt use rate of 21.6% for front seat occupants in 17 states without BULs; while Campbell et al., (1987) reported a

mean rate of 48% for 27 states which had enacted a BUL. While it is clear that the introduction of BULs is enough to bring about dramatic increases in safety belt use, the public reaction in three states (i.e., Massachusetts, Nebraska & Oregon) was so strong that they repealed their BULs (Spilman, 1988).

Obviously, BULs are not the panacea to this perplexing traffic safety and health problem. First, the net national benefits are diminished by the fact that current belt laws exempt a sizable portion of those individuals exposed to harm (i.e., those occupants in the rear seat who are not required to buckle up). Second, even among states covered by BULs, most belt-use is below 50% (Campbell et al., 1987). Third, there is evidence that persons at higher risk for a vehicle crash are, at the same time, less likely to use safety belts even when it is mandated (Campbell et al., 1987; Waller, 1987). Finally, belt use often declines notably after initial media blitzes which kept the policy salient in the public's attention (Campbell et al., 1987; Geller, 1989). Thus, additional strategies, drawn from the applied behavior analytic domain, are needed to increase safety belt use further.

Incentives

Incentive strategies look very attractive to the behavior change researcher, because as Geller et al. (1989) pointed out, they are a positive approach to changing behavior (as opposed to punitive strategies), are easily accepted by the behavior change targets (in this case, vehicle occupants), and are capable of generating immediate and dramatic increases in the target behavior. These incentive or reward strategies can be categorized according to the *proximity* of the reward to the target behavior, and the *temporal aspects* of the reward occasion. A more proximal reward is *direct* (i.e., the individual is rewarded

for emitting the target behavior) while a more distal reward is *indirect* (i.e., the individual is rewarded for emitting a closely related behavior). A reward can be either *immediate* (i.e., the individual receives the reward as soon as he or she emits the desired behavior) or the reward can be *delayed* (i.e., the individual receives the reward at some later time).

Most incentive programs have applied direct rewards (e.g., see review by Geller, 1984). Less research has focused on the distribution and impact of indirect (both immediate and delayed) rewards on safety belt use, although a few programs have successfully increased safety belt use with these types of rewards (e.g., Geller et al., 1989; Geller, 1989). The present research compared direct and an indirect reward strategies for motivating safety belt use in a community setting.

Several theoretical conceptualizations (e.g., "intrinsic motivation" (Deci, 1975; Deci & Ryan, 1980), "cognitive dissonance and attribution" (Aronson, 1966; Wilson & Lassiter, 1982) predict that strong external motivators will prevent or retard an individual from gaining an internal justification for emitting the target behavior subsequent to the withdrawal of the external incentive. Lehman and Geller (in press) offer some evidence to support this notion. In a summer recreation program at three elementary schools, safety belt use was compared following three different reward strategies. Children at one school received a reward contingent upon belt use; children at the second school received a reward contingent upon participation in that day's activity related to safety belt use; and children at the third school received noncontingent rewards while participating in the safety belt activities. No differences in the amount of significant behavior change that occurred among

the three groups were found, and the group receiving rewards contingent upon belt use demonstrated somewhat less response maintenance than the other two groups.

Feedback

As a behavior change strategy, feedback has been used with substantial effectiveness. For example, Hayes & Cone (1981) and Winett, Neale, & Grier (1979) demonstrated the beneficial impact of feedback in reducing levels of home energy consumption. Nasanen and Saari (1987) observed significant reductions in accident rates (e.g., 70%-90%) as a result of implementing a feedback protocol designed to improve housekeeping practices in a Finnish shipyard. In the field of traffic safety, Van Houten and colleagues (e.g., Van Houten & Nau, 1981; Van Houten & Nau, 1983; Van Houten et al., 1985) demonstrated that vehicle speed and accidents can be reduced by the posting of the previous days' percentages of drivers obeying the speed limit. They demonstrated that feedback combined with an enforcement program reduced speeding behaviors further. More recently, the use of safety belts was significantly increased on a roadway in Canada (when a BUL was in effect) as a function of the posting of daily belt use percentages (Jonah, 1989).

Awareness/Education

Certain educational strategies (i.e., lecture) to increase safety belt use, by themselves, have usually been ineffective at increasing and maintaining belt use. When implemented in conjunction with other behavior change strategies however, they have been effective at increasing safety belt use. For example, in studies combining educational awareness and commitment, safety belt use in corporate settings was increased dramatically after a brief

(i.e., 20 min) and interactive session on the importance of the consistent use of safety belts (e.g., Cope, Grossnickle, & Geller, 1986; Geller & Hahn, 1984; and Kello, Geller, Rice, & Bryant, 1989). Safety belt use was increased in a primary school context after educational and participative interventions were jointly implemented (Geller, 1989; Lehman & Geller, in press; in press).

When education was combined with an incentive strategy, results have been dramatic as well. Roberts and colleagues implemented various reward strategies to increase the safety belt use of both parents and children (Roberts & Turner, 1986; Roberts & Layfield, 1987; Roberts, Fanurick, & Wilson, 1988). Unfortunately, when the rewards were withdrawn, belt use fell substantially, but remained above baseline levels.

Prompts

Behavioral prompting is a simple, often effective technique for obtaining behavior change. In the field of traffic safety, reminder strategies to increase safety belt use have been consistently successful. Geller, Bruff, and Nimmer (1985) were effective in prompting 22% of their sample to buckle up on the spot. A researcher in the passenger seat (i.e., the "Flasher") held up an 11"x14" "Flash-for-Life" placard to occupants in vehicles adjacent to the research vehicle. If the occupant was unbuckled, the researcher displayed the side printed with, "Please buckle up-I care." If the unbuckled occupant then buckled up, the researcher displayed the reverse side of the placard, which read, "Thank you for buckling up."

In a modified replication of this study, (Thyer, Geller, Williams, & Purcell; 1987) the "Flasher", a female college student, was stationed at the exit of one of two university faculty/staff parking lots. At one lot, belt use was increased

177% over Baseline during the second application of the prompt in an ABAB design. Mean belt use at the second lot was increased 147% over Baseline during the second application.

Rationale for Current Study

It is believed by the author that single strategies are generally not as effective in promoting behavior change as are multiple strategies, sometimes referred to as "Treatment Packages" (Azrin, 1977). Armed with this perspective, an Intervention Program was designed, comprised of several component behavioral strategies. Having adopting the research philosophy that states the dependent variable is more important than the independent variable of which that behavior is a function, the current study was initiated. Following this rationale, the Program(s) is implemented in a thoughtful and logical manner. If found to be successful in promoting the desired behavior (in this case, safety belt use), then the Program's components can be analyzed for the most effective variable(s) or tactic(s).

The current field study allowed for the examination of four hypotheses with respect to safety belt use. The first was to determine if those individuals who comply with the BUL are the same individuals who would be most susceptible to strategies such as incentives, education or feedback. If individuals uninfluenced by a BUL do not buckle up, then it would be a waste of time, money and effort to implement behavior change strategies such as these. The introduction of a statewide mandatory safety belt law between two data collection periods of the study (i.e., 1987 and 1988) allowed for an examination of the effectiveness of the BUL.

The traffic safety studies involving incentives reviewed up to this point have all been conducted without the context of a newly enacted BUL. Implementing an incentive program before and after the law will provide the opportunity to study the effects of such a program on highly similar, if not the same population(s). It is hypothesized that those individuals responding to the pre-BUL incentive program will be the same individuals who will respond to the law. Thus, it is expected that the intervention program will not produce as dramatic gains in belt use in the post-BUL summers. Systematic replication of the intervention program in the summer of 1989 (18 months after the BUL), will allow for further assessment of the variables surrounding the relationship between belt use and incentive programs.

Second, an assessment of the possible differential impact upon belt use of direct vs. indirect rewards was studied. It was hypothesized that individuals in the Indirect Reward condition would demonstrate greater response maintenance than individuals in the Direct Reward condition. In the Direct Reward condition, the behavior is justified because of the external reward received for emitting the behavior. During Withdrawal, when the reward is removed, the behavior is no longer justified, and hence might not be maintained. In the Indirect Reward condition, there is no apparent external source for justifying the behavior, and therefore the client may attribute the new buckle-up response to internal sources. When the intervention is removed, the response should not decay as quickly.

Third, characteristics of the method of delivery for a behavioral prompt were compared. One pool's patrons received a "Personal" prompt (i.e., a small flyer) from a researcher, while the other pool received the same

prompt, but in an "Impersonal" manner: the flyer was placed under the parked vehicle's windshield wipers, as the occupants enjoyed the pool. It was hypothesized that "Personal" flyers would be more a intrusive intervention, thus promoting greater belt use.

Fourth, the utility of an educational component (in the form of a lifeguard safety belt message) was assessed. Children in the swim lesson groups experienced a brief safety message delivered by the lifeguard at the end of each day's lesson. The goal was to increase childrens' awareness of the importance of safety belts. It was hypothesized that children who experience the awareness/educational component, will demonstrate higher belt use as well as greater maintenance of the response, than children who do not experience the lifeguard's safety message.

Methods

Participants & Setting

Data were collected at two regional public swimming pools (i.e., the Montgomery County and Radford City pools) located in the southwest of Virginia. Montgomery County (MC) pool is situated between two towns containing a large state university, some light industry, and a good deal of rural farmland. Radford City (RC) pool is located 15 miles from the MC pool, in the town of Radford, and serves a region with similar characteristics as MC, including a state university. Data were collected for three consecutive summers during 1987, 1988, and 1989; from Memorial Day when the pools opened for the summer season, until Labor Day when the pools closed for the summer season. The pools were in operation typically from mid-morning to early evening on weekdays and from early afternoon to early evening on weekends. Swim lessons for youths ages 3-12 years began a few weeks into the season and were held each weekday morning before the pools opened for general use.

Procedure

Undergraduate researchers unobtrusively collected safety belt data at the entrance/exit of each pool's parking lot. As a vehicle entered or exited, the following variables were recorded: vehicle license plate number, gender and belt use of the driver and the front-seat outboard passenger, gender of the middle-front seat and rear-seat passengers, the date and time of each observation, and whether the vehicle had a pledge card displayed from the rearview mirror. On random data collection days, reliability observers accompanied primary data collectors and recorded observations

independently. Attempts were made to record the necessary information for every vehicle as it entered or exited, but during periods of high traffic volume, data were usually recorded for every other vehicle.

Experimental Design

Essentially the same Intervention Program was evaluated each summer, although some design variations did occur and are discussed below. Rather than conducting an exact replication of the same research design each year, a systematic replication was used. The principle difference between years was when the Feedback component was presented, relative to the Promotion and Reward phases (see Figure 1). Each summer began with a Baseline phase, followed by the Intervention Program, and a Withdrawal phase. Within the Intervention Program, the Promotion phase always preceded the Reward phase.

Insert Figure 1 about here.

The first year's Program (i.e., 1987) included a Feedback phase concurrent with the Promotion and Reward phases, whereas the second year's Program (i.e., 1988) positioned the Feedback phase after the Reward at the end of the Program. The third and final year's Program (i.e., 1989) included a Feedback phase between the Promotion and Reward phases. The third year also included a separate phase between the Baseline and Intervention Program, in which safety belt prompts, in the form of small flyers, were distributed to pool patrons.

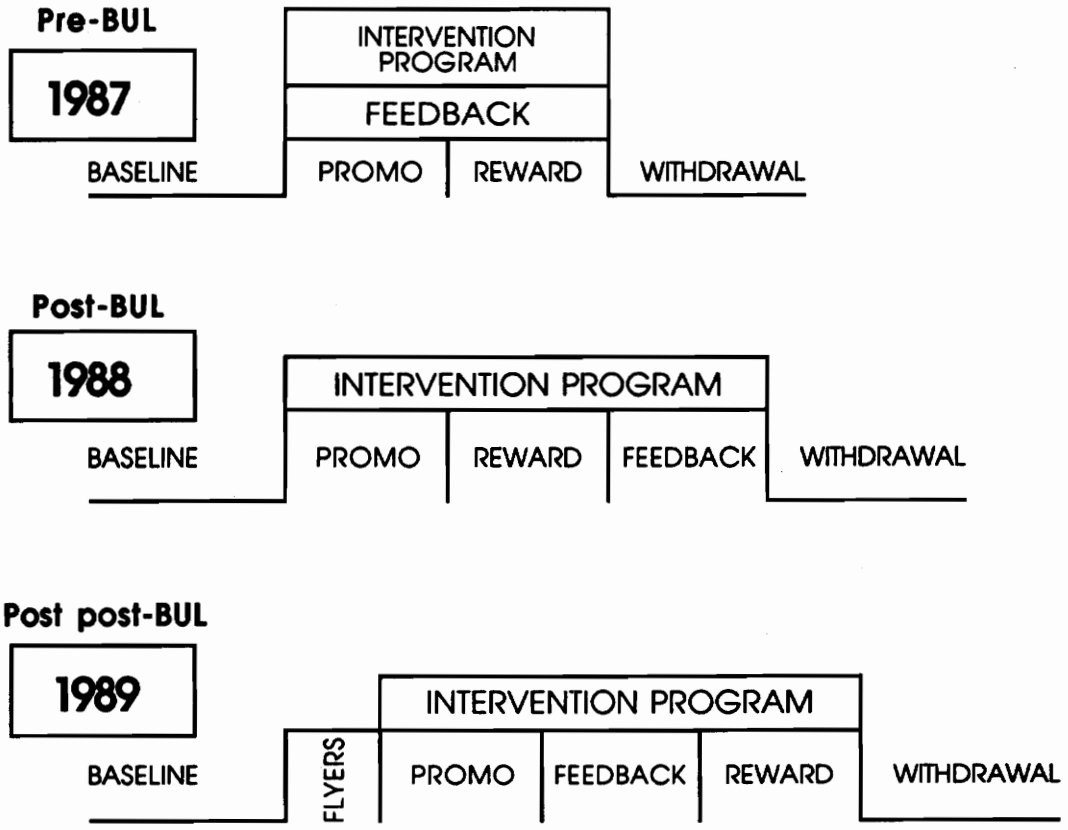


Figure 1: Experiemental Design Combining the Intervention Program with Systematic Replication Across Three Consecutive Years.

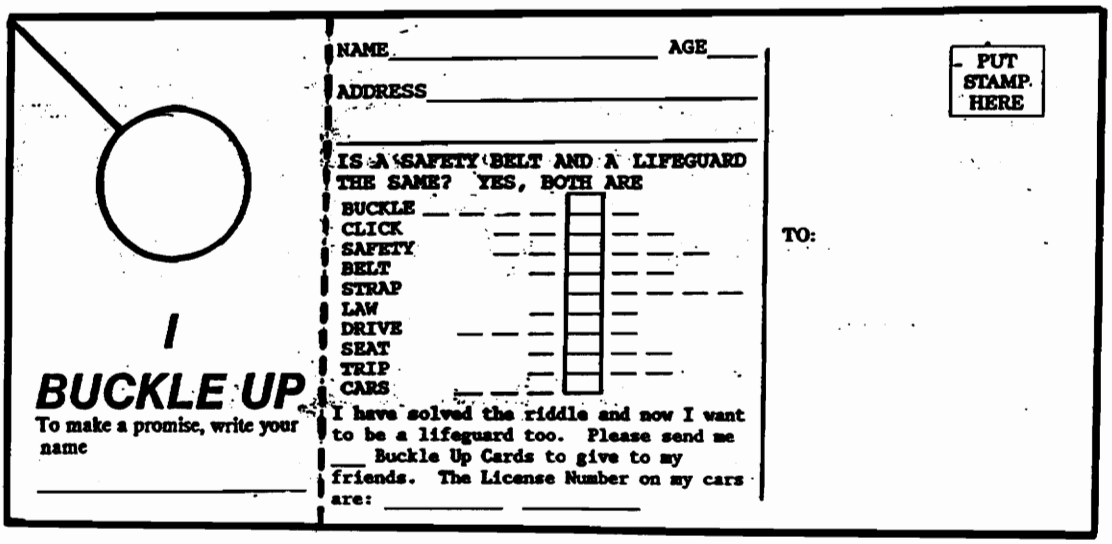
In the current paradigm, the target behavior was compared across settings and subjects. The Intervention Program was implemented in a temporally staggered fashion at each pool. That is, while the Program was in effect at the first pool, the second pool was still in Baseline or the previous phase, and then acted as a control for the first pool.

Baseline. During baseline periods, safety belt use of pool patrons was recorded in the absence of any intervention program.

Insert Figure 2 about here.

Intervention Program

Promotion. Buckle-up pledge cards and posters explaining the pledge cards and the incentive program were conspicuously displayed at the front entrance of each pool. The pledge card (see Fig. 2) was composed of two sections. One section (comprising two-thirds of the total area of the card) contained some current statistics on the quantity and severity of fatalities and injuries resulting from vehicle crashes in the U.S., and requested that the reader "make a buckle up promise." The reverse side of this section was primarily aimed at children and contained a simple word puzzle. Below the puzzle was space in which the child could request additional pledge cards for his/her friends. To the right of the puzzle was our lab's return address which allowed this section to be used as a postcard once the display section of the pledge card was detached. The display section contained space for an adult to sign the "Buckle Up Pledge" on one side and space for a child to sign on the



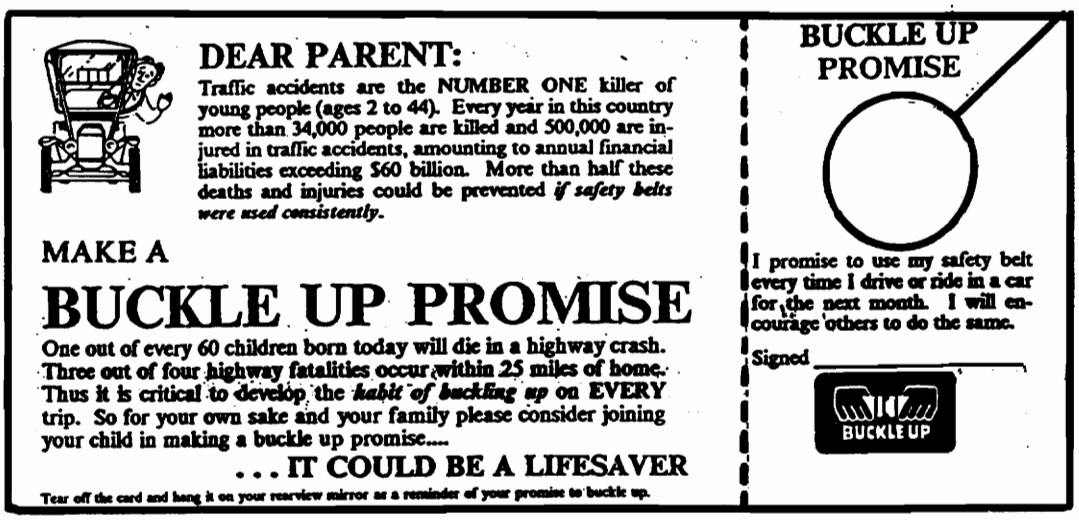


Figure 2: The Buckle Up Pledge Card.

other side. This display section of the "pledge card" was designed to be detached and hung from the vehicle's interior rearview mirror.

The promotional posters (see Figures 3 & 4), one per pool, contained information regarding the pledge cards and listed the conditions under which individuals would be eligible for rewards. In 1987 and 1988, the Direct Reward condition stipulated that vehicle occupants would be eligible for rewards if they only used their safety belt. For the Indirect Reward condition, the poster stated that occupants had to be buckled up as well as display a "pledge card" from their vehicle's rearview mirror in order to be eligible for a reward. In 1989, Direct Rewards were only distributed to vehicle occupants who used their safety belt, whereas Indirect Rewards were only given to those occupants who displayed a "pledge card." The MC pool received Indirect Rewards in 1987 and 1988, and received Direct Rewards in 1989. The RC pool received Direct Rewards in 1987 and 1988 and Indirect Rewards in 1989.

Insert Figures 3 & 4 about here.

Rewards. Vehicles were stopped as they exited the pool parking lot(s), and the occupants who met certain reward criteria were given a small reward. Several varieties of rewards were used for children and for adults. Specifically, the children's rewards included: a roll of Lifesavers candy, an educational safety belt coloring book, a poster of Vince & Larry-- the TV "crash test dummies", or a safety belt "clicker" noise maker. Adults received a coupon for free food at a local fast food restaurant or a Virginia roadmap. If occupants did not meet the requirements, they were given a small (i.e., 3"x4")

MAKE A BUCKLE UP PROMISE

→ Get your **Promise Card** here.

→ Get a free pack of **LIFESAVERS.**

→ Hang the **Promise Card** in your car and buckle-up to win free prizes in the parking lot.

→ You can be a **"LIFEGUARD"** too by sending in the postcard to get copies for your friends.

→ See a Lifeguard for more details.

Now, imagine if you save 2 friends by getting them to buckle up, and they save 2 friends, and they save 2 freinds ....soon everyone could be a **LIFESAVER.**

Figure 3: Promotional Poster for Direct Reward.

MAKE A
BUCKLE UP PROMISE

→ Get your **Promise Card** here.

→ Get a free pack of **LIFESAVERS.**

→ Hang the **Promise Card** in your car to win free prizes in the parking lot.

→ You can be a **"LIFEGUARD"** too by sending in the postcard to get copies for your friends.

→ See a Lifeguard for more details.

Now, imagine if you save 2 friends by getting them to buckle up, and they save 2 friends, and they save 2 freinds ....soon everyone could be a **LIFESAVER.**

Figure 4: Promotional Poster for Indirect Reward.

flyer stating: "Had you (*the necessary criteria were included*), you would have received a small reward."

Feedback. During the 1987 and 1988 seasons, competitions were fostered between the two pools to see which pool could attain the highest level of belt use among its patrons. A feedback poster displaying the belt use at both pools was displayed adjacent to a poster describing the competition, and was entitled, "Help Your Pool Win the Safety Trophy by Buckling Up! See a Lifeguard for Details. Daily belt use at each pool is:." Below this statement were two large empty rectangles adjacent to each other. In these rectangles, the previous days belt use were written in felt tip marker on construction paper cutouts, and taped to the poster. Belt use percentages were updated every one to two days.

The poster specified that the winning pool would receive a 3 and 1/2 foot high trophy (which had been donated by a local sporting goods store). The trophy was displayed alternately between the two pools during the Promotion and Reward phases in 1987, and during the Baseline, Promotion, Reward and Feedback phases in 1988. The trophy competition was not used in the summer of 1989 due to a lack of interest on the part of the lifeguards at both pools.

In 1989, group competition between pools was not a component of the intervention package. The feedback chart, entitled "*Daily Percentage of Safety Belt Use at Radford (or Montgomery) Pool*", merely displayed patrons' belt use percentages for each of the previous days at that particular pool. There was no mention of the other pool. During the first two days of this phase, the drivers of exiting vehicles were given flyers which announced:

"For the next few weeks, safety belt use will be observed in this parking lot. Each days' percentage of safety belt use will be posted on the Feedback Chart by the front gate of the pool."

Daily belt use percentages were calculated in the lab, then posted every one to two days.

Flyers. During the summer of 1989, Personal vs. Impersonal prompts to use safety belts were distributed to pool patrons. In the Impersonal condition at RC pool, 4" x 5.5" flyers were placed (every hour, on the hour) under the windshield wipers of vehicles sitting in the parking lot. In the the Personal condition at MC pool, a researcher stood at the exit of each pool's parking lot and distributed the same flyers to vehicle drivers as they departed. The flyer showed a buckled safety belt along with the phrase, "Thank You for Buckling Up" in large print. In addition, the phrase, "Please do not litter." was placed in small print along the bottom of the flyer. This flyer is illustrated in Figure 5.

Insert Figure 5 about here.

The patrons at RC pool experienced the Impersonal condition on one day per week (randomly chosen) for three consecutive weeks, and at MC pool the patrons experienced the Personal condition one day per week for two successive weeks.

Swimming lessons. For each year, swimming lessons began approximately 2-4 weeks after each pool opened for the summer, continued until the middle of August, and were conducted weekdays in 2-week blocks. Classes ranged from Beginners to Advanced, and students (ages 3-12) could

Figure 5: The Flyer Used in the "Personal" vs. "Impersonal" Prompt Phase.

enroll in consecutive 2-week classes. At the end of each lesson, the lifeguard gave a brief (30 - 60 sec.) safety talk which contained the following message:

> *"Now that you have just completed the safest part of your day (that is, swim lessons), we need to think about a more dangerous part of your day--traveling in an automobile. Just like we are lifeguards, you too can be a lifeguard by buckling your safety belt every time you ride in a car."*

Just prior to the Lessons, each lifeguard was verbally coached by the author with several sample safety messages. Variations of the message were allowed as long as the key points were mentioned, including: a) the importance of using a safety belt each time one travels in a vehicle, and b) the lifesaving parallel between lifeguards and safety belts. Manipulation checks were made randomly by the author and selected research assistants.

Results

Over the three consecutive summers, 72,354 observations were collected of adults in vehicles across both pools and 96% (n=69,436) were observed in the vehicle's front seat. There were 44,179 observations of children across both pools, and 36% (n=15,767) were seen in the front-right passenger seat. Adults and children seated in a vehicle's rear seat were not included in safety belt calculations due to the lack of rear seat shoulder belts in most vehicles. Children were defined as those individuals who appeared to the data observer to be less than 16 years in age.

The data were evaluated as: 1) Daily percentages, representing the number of front-seat occupants seen belted per day, divided by the sum total of front-seat occupants who were observed on that day, and multiplied by 100. 2) Weekly percentages, representing the number of front-seat occupants observed to be belted during that week, divided by the sum total of front-seat occupants observed within that same week, and multiplied by 100. 3) Phase percentages, representing the number of front-seat occupants seen belted during a given experimental phase, divided by the sum total of front-seat occupants observed within that phase, and multiplied by 100. 4) Percent increases over previous phase percentages, representing the difference between phase percentages, as a proportion of the first phase percentage (i.e., equivalent to an effect size, expressed as a percent).

Interobserver Reliability. Out of 53,821 total vehicle observations for all three years of the study, 25.4% (n=13,671) were recorded independently by primary and reliability data observers. Interobserver agreement percentages were calculated for belt use by dividing the total number of observations that

both observers agreed by the total number of agreements and disagreements, and multiplying by 100. Across all three years, interobserver agreement was 88.3% (ranging from 52.3% to 100%) for observing shoulder belt use, and 89.8% (ranging from 64.8% to 100%) for observing nonuse of front seat shoulder belts.

Adult and Child Belt Use.

Radford City Pool.

Summer of 1987. Figure 6 shows adult and child mean weekly belt use per phase, as well as corresponding sample sizes. Adults mean Baseline safety belt use was 13% (n=3267), while children used safety belts 14% (n=472) of the time. During the Intervention Program, adult safety belt use increased to 37% (n=3038), while that of children increased to 34% (n=875). In Withdrawal, with 302 adult and 66 child observations, the mean belt use was 41% and 31%, for adults and children, respectively.

Summer of 1988. Belt use for adults and children during Baseline was 40% (n=6411) and 37% (n=1062), respectively. Adult belt use increased to 45% (n=13,286) during the Intervention Program and increased to 47% (n=2390) in Withdrawal. Child safety belt use was 47% (n=2487) during the Intervention Program and 41% (n=408) during Withdrawal.

Summer of 1989. Adult Baseline belt use was 43% (n=3183), increased to 49% (n=5493) in the Flyer phase, decreased to 47% (n=5167) during the Intervention Program, and decreased to 40% (n=1260) during Withdrawal. Children's belt demonstrated the same general pattern: 36% (n=581) during Baseline, 49% (n=1344) during the Flyer phase, 50% (n=1190) during the Intervention Program, and 36% (n=123) during Withdrawal.

Insert Figure 6 about here.

Montgomery County Pool.

Summer of 1989. Figure 7 shows MC adult and child mean weekly belt use per phase, as well as corresponding sample sizes. Adults and children exhibited Baseline belt use levels of 22% (n=4224) and 24% (n=636), respectively. During the Intervention Program, adult belt use increased to 38% (n=2281), while children's belt use increased to 44% (n=565). Like RC, MC was plagued by an inadequate Withdrawal where mean adult belt use was 30% (n=47), and a mean childrens' belt use was 50% (n=20).

Summer of 1988. Baseline belt use for adults was 45% (n=7038), increased to 56% (n=5232) during the Intervention Program, and increased to 60% (n=1539) during Withdrawal. Baseline belt use for children was 41% (n=1477), increased to 53% (n=1495) during the Intervention Program, and increased to 63% (n=513) during the Withdrawal phase.

Summer of 1989. 1989 belt use at MC mirrored 1988 belt use. Adult belt use was 38% (n=4238) during Baseline, increased to 46% (n=4978) during the Flyer phase, increased to 54% (n=2474) in the Intervention Program, and increase to 65% (n=693) during Withdrawal. Children's belt use was 30% (n=875) during Baseline, increased to 47% (n=1327) in the Flyer phase, decreased to 46% (n=724) during the Intervention Program, and then increased to 62% (n=267) during Withdrawal.

Mean belt use at RC showed only modest gains compared to those observed at MC in 1989. At RC, adult mean belt use was highest in the Flyer

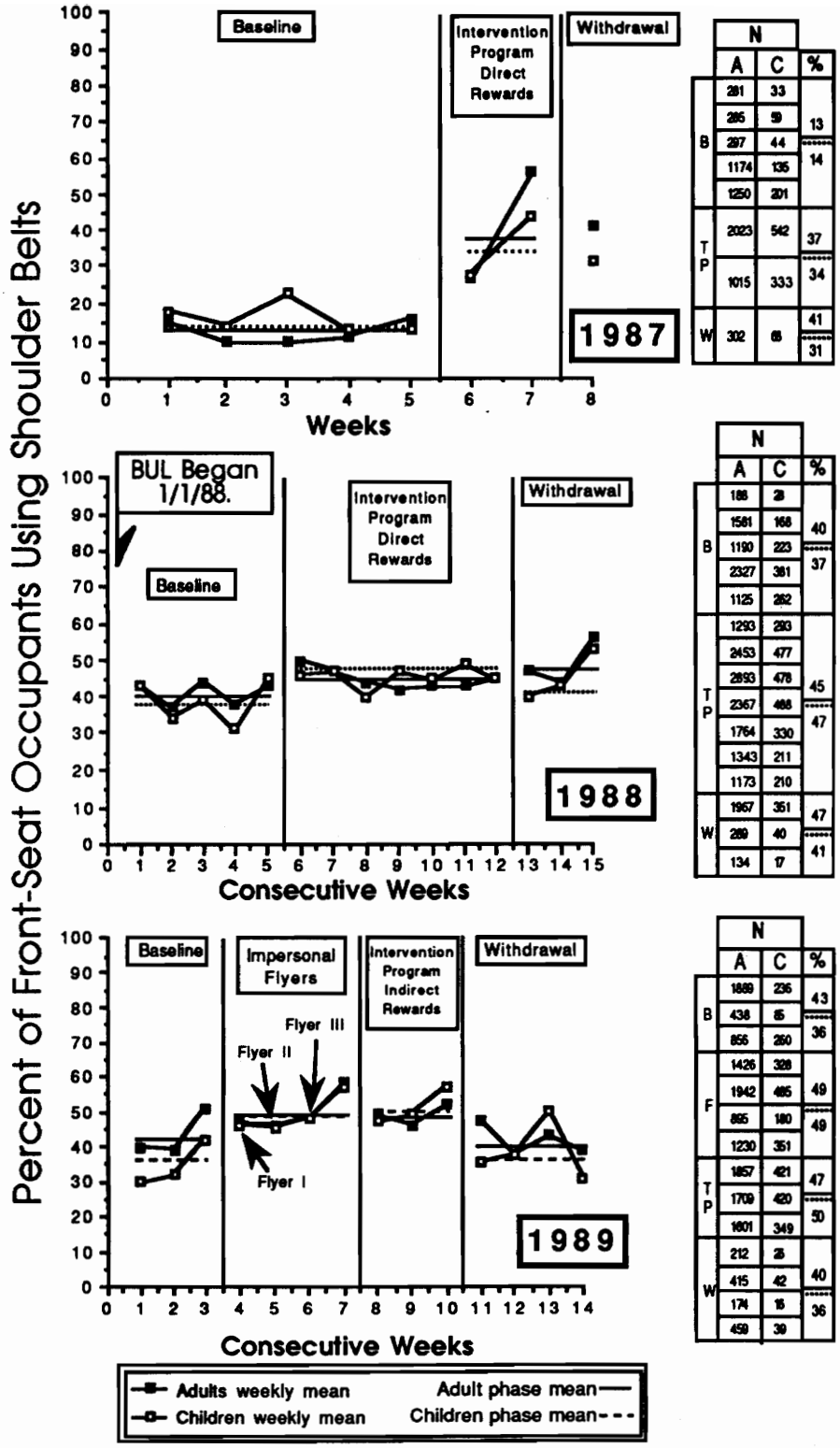


Figure 6: Weekly Shoulder Belt Use at Radford City Pool for Three Consecutive Years: 1987-1989.

phase at 49%, then decreased during Withdrawal to below Baseline use. MC adults, on the other hand, substantially increased belt use in each phase, increasing to a notable 64% in Withdrawal.

Insert Figure 7 about here.

Adult Gender Differences.

Radford City Pool.

Summer of 1987. Adult safety belt use habits differed as a function of gender. Figure 8 portrays the adult gender differences in safety belt use at both pools for all three years of the study. Table 1 provides sample sizes and the percentage of mean belt use in each phase. Males' mean Baseline belt use was 10% (n=1603), which increased to 20% (n=1166) in the Intervention Program, and increased to 40% (n=124) during Withdrawal. Females had a Baseline level of 16% (n=1663),which increased to 41% (n=1872) in the Intervention Program, and maintained at 41% (n=178) in Withdrawal.

Summer of 1988. Adults males' mean belt use was 34% (n=3150) in Baseline, 35% (n=6000) during the Intervention Program, and 40% (n=1027) in Withdrawal. Adult females mean belt use was 46% (n=3233) during Baseline, 54% (n=6872) in the Intervention Program, and 56% (n=1139) during Withdrawal.

Summer of 1989. Males' mean Baseline belt use was 34% (n=1376), which increased to 37% (n=1906) in the Flyer phase, maintained 37% (n=1906) in the Intervention Program, and increased 28% (n=350) in Withdrawal. Females' mean Baseline belt use was 49% (n=1804), which increased to 56% (n=3549)

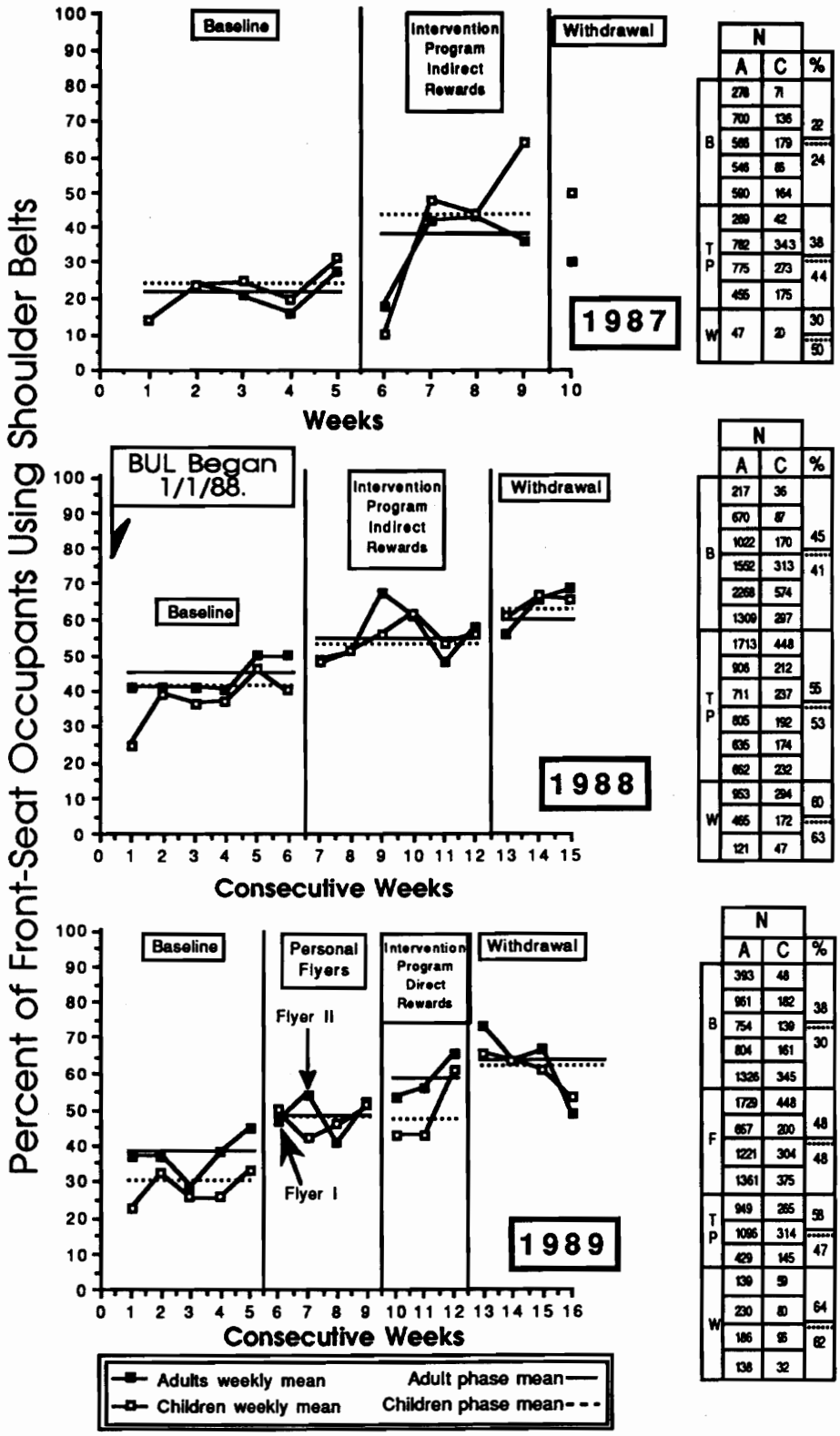


Figure 7: Weekly Shoulder Belt Use at Montgomery Co. Pool for Three Consecutive Years: 1987-1989.

during the Flyer phase, increased to 59% (n=3241) in the Intervention Program, and decreased to 55% (n=283) during Withdrawal.

Insert Figure 8 about here.

Insert Table 1 about here.

Montgomery County Pool.

Summer of 1987. Males' mean Baseline belt use was 17% (n=1024), which increased to 27% (n=708) in the Intervention Program and increased to 33% (n=18) during Withdrawal. Female' mean Baseline belt use was 28% (n=1689), which increased to 43% (n=1574) during the Intervention Program, and decreased to 28% (n=29) during Withdrawal.

Summer of 1988. Males' mean Baseline belt use was 37% (n=2539), an Intervention Program mean of 50% (n=1556), and a mean of 44% (n=479) during Withdrawal. Females' mean Baseline belt use was 50% (n=3635), 66% (n=3321) in the Intervention Program, and 73% (n=1072) during Withdrawal.

Summer of 1989. Males' mean Baseline belt use was 33% (n=1736), which increased to 36% (n=1583) in the Flyer phase, increased to 43% (n=736) in the Intervention Program, and peaked at 57% (n=171) in Withdrawal. Females' mean belt use was 42% (n=2483) in Baseline, increased to 56% (n=3221) during the Flyer phase, increased to 62% (n=1701) in the Intervention Program, and increased to a mean of 70% (n=521) during Withdrawal.

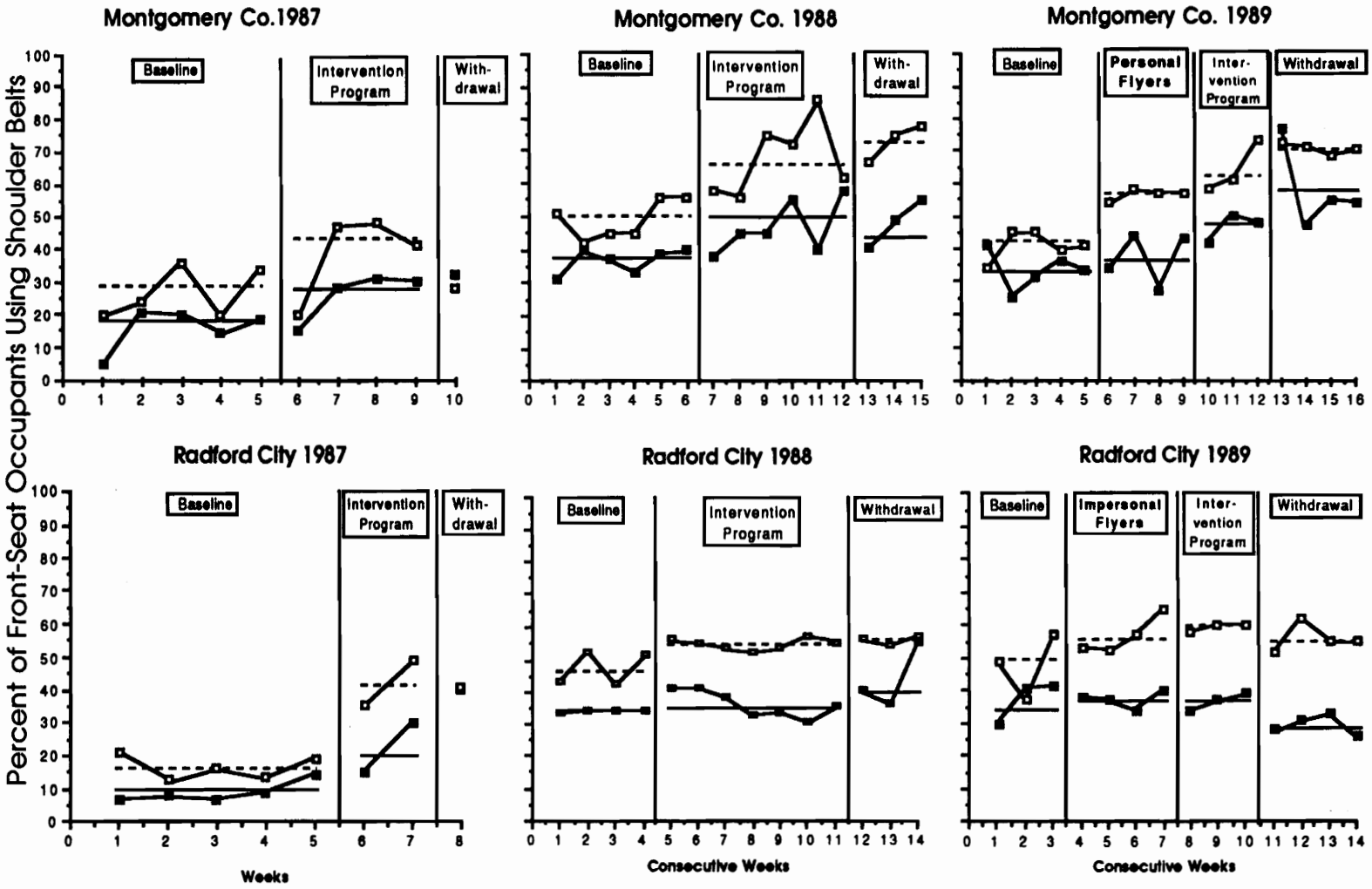


Figure 8: Shoulder Belt Use of Male vs. Female Front-Seat Occupants at Montgomery County and Radford City Pools During 1987, 1988 & 1989.

Table 1 Sample Sizes and Phase Means for Male and Female Belt Use.

Montgomery

1987

	N		
	M	F	%
B	102	176	17
	252	476	
	161	405	28
	276	270	
	233	362	
TP	125	144	27
	194	586	
	242	538	43
	147	306	
W	18	29	33
			28

1988

	N		
	M	F	%
B	104	113	37
	294	376	
	448	561	50
	624	920	
	555	981	
	514	684	
TP	610	1042	50
	309	549	
	145	411	66
	149	457	
	183	388	
	160	474	
W	321	659	44
	125	328	73
	33	85	

1989

	N		
	M	F	%
B	189	202	33
	402	554	
	321	426	42
	315	488	
	509	813	
F	557	1158	36
	220	447	
	362	706	55
	444	910	
TP	288	660	47
	337	728	62
	111	313	
W	39	100	57
	64	165	
	29	157	70
	39	99	

Radford

1987

	N		
	M	F	%
B	114	167	10
	118	147	
	169	128	16
	600	574	
	602	647	
TP	815	1208	20
	351	664	41
W	124	178	40
			41

1988

	N		
	M	F	%
B	1013	746	34
	533	656	
	1057	1249	46
	537	582	
TP	534	754	35
	869	1131	
	1440	1577	54
	1151	1213	
	825	932	
	647	654	
	534	611	
W	820	932	40
	140	132	55
	67	75	

1989

	N		
	M	F	%
B	895	993	34
	164	272	49
	317	539	
F	538	868	37
	671	1269	55
	365	525	
	362	857	
TP	726	1126	37
	611	1093	59
	569	1022	
W	198	217	28
	79	133	55
	95	78	
	254	205	

Child Gender Differences.

Radford City Pool.

Summer of 1987. Figure 9 illustrates the child gender differences in safety belt use at both pools for all three years of the study. Table 2 provides sample sizes and the percentage of mean belt use in each phase. Boys' mean Baseline belt use was 12% (n=95), a mean of 31% (n=458) during the Intervention Program, and a mean of 33% (n=27) in Withdrawal. Girls' mean belt use was 12% (n=50) in Baseline, 33% (n=287) in the Intervention Program, and 36% (n=28) in Withdrawal.

Summer of 1988. Boys' mean belt use was 30% (n=654) in Baseline, 44% (n=1408) in the Intervention Program, and 41% (n=207) during Withdrawal. Girls' mean Baseline belt use was 39% (n=389), 48% (n=922) in the Intervention Program, and 40% (n=145) during Withdrawal.

Summer of 1989. Boys' mean belt use was 36% (n=313) in Baseline, 44% (n=602) during the Flyer phase, 44% (n=556) in the Intervention Program, and 22% (n=51) during Withdrawal. Girls' mean belt use was 36% (n=184) in Baseline, 51% (n=418) in the Flyer phase, 72% (385) during the Intervention Program, and 57% (n=68) in Withdrawal.

Insert Figure 9 about here.

Insert Table 2 about here.

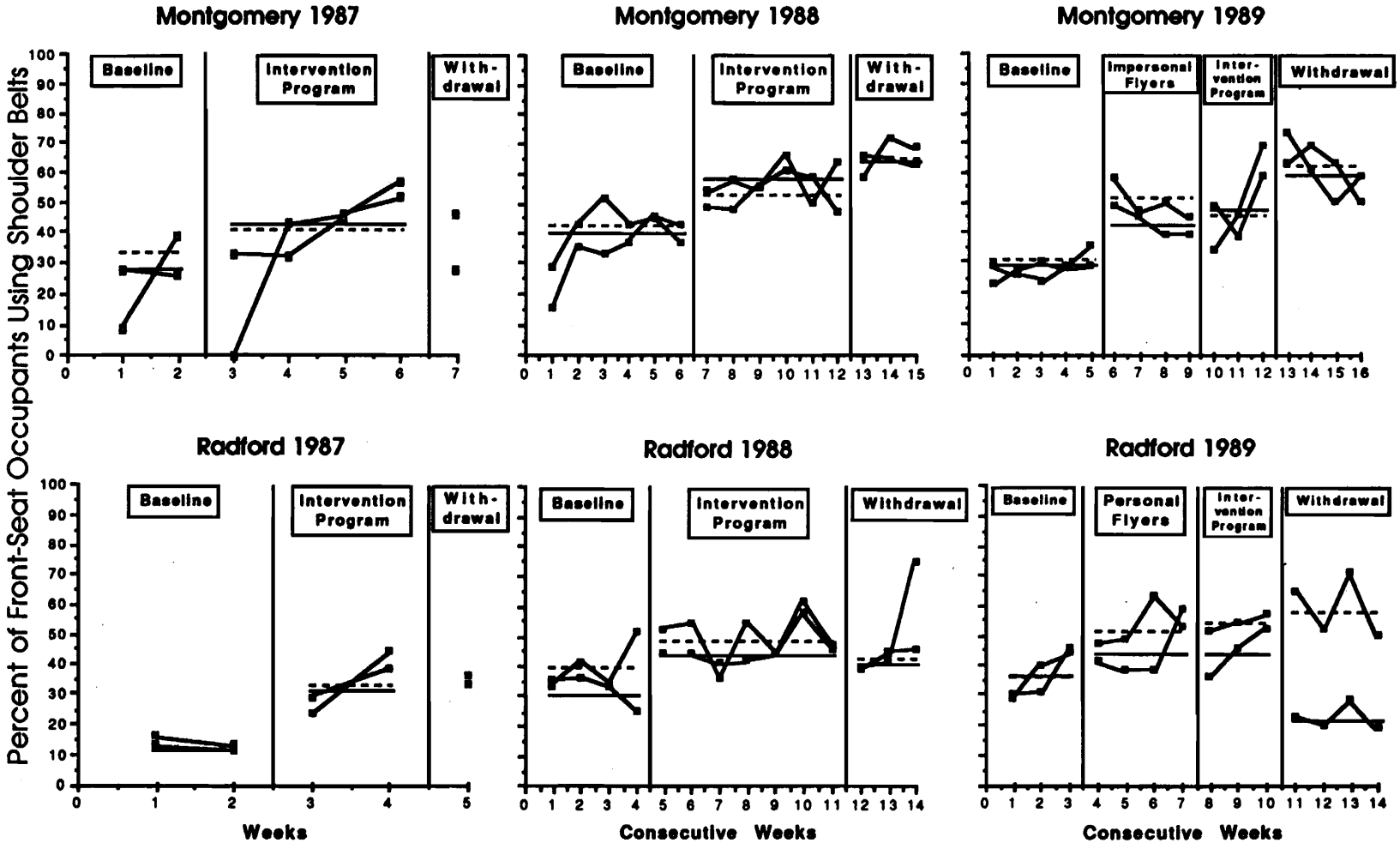


Figure 9: Shoulder Belt Use of Boys vs. Girls in Front-Seat at Montgomery County and Radford City Pools During 1987, 1988 & 1989.

Table 2: Sample Sizes and Phase Means for Boy and Girl Belt Use.

Montgomery

1987

	N		
	B	G	%
B	0	0	
	0 (27)	0	
	1	0	33
	18	11	
	68	49	
TP	23	9	
	184	151	43
	103	117	40
	77	44	
W	13	29	46
			28

1988

	N		
	B	G	%
B	20	14	
	37	47	
	78	63	40
	161	98	43
	207	132	
	155	87	
TP	170	152	
	114	67	
	93	72	58
	98	74	55
	100	111	
	105	6624	
W	154	141	64
	95	65	64
	32	16	

1989

	N		
	B	G	%
B	26	17	28
	105	47	30
	63	59	
	60	65	
	159	110	
F	188	125	
	55	51	43
	109	80	51
	132	99	
TP	111	80	47
	125	104	45
	74	34	
W	30	16	59
	36	16	
	54	19	62
	17	14	

Radford

1987

	N		
	B	G	%
B	0	0	
	0 (12)	0	
	0	0	12
	30	25	
	65	25	
TP	309	173	31
	149	114	33
W	27	28	33
			41

1988

	N		
	B	G	%
B	121	84	
	121	91	30
	203	132	39
	165	82	
TP	181	98	
	259	121	
	286	205	44
	278	184	48
	162	159	
	108	92	
	134	63	
W	172	124	41
	22	17	40
	13	4	

1989

	N		
	B	G	%
B	124	89	36
	48	32	36
	141	63	
F	179	107	
	189	151	44
	93	48	51
	141	112	
TP	195	144	44
	214	134	72
	147	107	
W	13	20	
	15	20	22
	7	7	57
	16	16	

Montgomery County Pool.

Summer of 1987. Boys at MC observed a mean Baseline use level of 27% (n=86) , 43% (n=387) in the Intervention Program, and 46% (n=13) during Withdrawal. Girls exhibited a mean Baseline use level of 33% (n=60), 40% (n=321) for the Intervention Program, and 28% (n=29) during the Withdrawal phase.

Summer of 1988. Boys' mean belt use was 40% (n=658) in Baseline, 58% (n=680) in the Intervention Program, and 64% (n=281) during Withdrawal. Girls' mean belt use was 43% (n=441) during Baseline, 53% (n=528) in the Intervention Program, and 65% (n=222) during Withdrawal.

Summer of 1989. Boys' mean belt use was 28% (n=413) in Baseline, 43% (n=485) in the Flyer phase, 47% (n=310) during the Intervention Program, and 59% (n=137) in Withdrawal. Girls' mean belt use was 30% (n=298) during Baseline, 51% (n=355) in the Flyer phase, 45% (n=218) in the Intervention Program, and 62% (n=65) during Withdrawal.

Lifeguard Safety Message.

Figure 10 portrays belt use of only vehicles observed during lessons, at both pools over the three year project. Table 3 provides sample sizes and the percentage of mean belt use in each lesson. Lessons for children occurred each summer in consecutive two-week blocks, five times per summer, for a total of ten consecutive weeks. For both pools in 1987, the first three lesson groups experienced the no-message Baseline condition while the remaining two lesson groups (i.e., Lessons 4 & 5) received the brief Lifeguard Safety Message. At both pools during 1988 and 1989, children enrolled in the first Lesson Group did not receive the Lifeguard Safety Message, thus experiencing

a Baseline condition. Children in the four remaining lesson groups did receive the safety message.

In the figure and text, children enrolled in lessons receiving the Safety Message are designated with the prefix "SM"; children in lessons not receiving the Safety Message are designated with the prefix "NSM". Data collection was sporadic in 1987 and because of the small sample sizes in the inadequate Withdrawal phases, little can be inferred from the RC data and even less from the MC data regarding the impact of the safety message upon belt use.

Radford City Pool.

Summer of 1987. No data were collected for first, third and fourth lesson groups. Belt use for adults in "NSM2" (i.e., no safety message given) was 5% (n=41), and 54% (n=1060) in "SM5" (i.e., safety message given). Children in "NSM2" experienced a 0% (n=8) mean belt use and a 51% (n=376) mean in "SM5".

Summer of 1988. Adults in "NSM1" had a 58% (n=589) mean belt use level, followed by means of 56% (n=675) in "SM2", 52% (n=1334) in "SM3", 59% (n=960) in "SM4", and 62% (n=592) in "SM5". Childrens' belt use means were 49% (n=193) in "NSM1", 54% (n=194) in "SM2", 50% (n=404) in "SM3", 54% (n=265) in "SM4", and 52% (n=152) in "SM5".

Summer of 1989. Adults in "NSM1" had a mean belt use of 64% (n=639), followed by 56% (n=912) in "SM2", 70% (n=1208) in "SM3"73% (n=486) in "SM4", and 70% (n=216) in "SM5". Childrens' means were: 60% (n=240) in "NSM1, 57% (n=307) in "SM2", 70% (n= 409) in "SM3", 70% (n=180) in "SM4", and 74% (n=201) in "SM5".

Insert Figure 10 about here.

Insert Table 3 about here.

Montgomery County Pool.

Summer of 1987. Adults in "NSM1" had a mean belt use of 24% (n=114), a mean of 19% (n=239) in "NSM3" , a mean of 42% (n=656) in "SM4", and a mean belt use of 50% (n=437) in "SM5". No data were collected during "NSM2". Children had mean safety belt use levels of 20% (n=25) in "NSM1", 20% (n=50) in "NSM3", 49% (n=275) in "SM4", and 47% (n=180) in "SM5".

Summer of 1988. Adults in "NSM1" had a mean belt use level of 61% (n=703). In each of the successive lessons, adults' mean belt use levels were 72% (n=400) in "SM2", 74% (n=623) in "SM3", 63% (n=356) in "SM4", and 73% (n=633) in "SM5". Children in "NSM5"buckled 50% (n=193) of the time, followed by levels of 68% (n=150) in "SM2", 64% (n=221) in "SM3", 62% (n=152) in "SM4", and 72% (n=285) in "SM5".

Summer of 1989. Adults' mean belt use was 62% (n=539) in "NSM1", 64% (n=654) in "SM2", 62% (n=791) in "SM3", 74% (n=609) in "SM4", and 72% (n=277) in "SM5". Children had mean belt use levels of 59% (n=159) in "NSM1", 57% (n=242) in "SM2", 55% (n=269) in "SM3", 64% (n=253) in "SM4", and 64% (n=132) in "SM5".

In 1988 and 1989, vehicles at both pools were counted to determine how many vehicles, if any, were seen in more than one lesson group per summer. Figure 11 presents the breakdown of the percentage of vehicles seen in

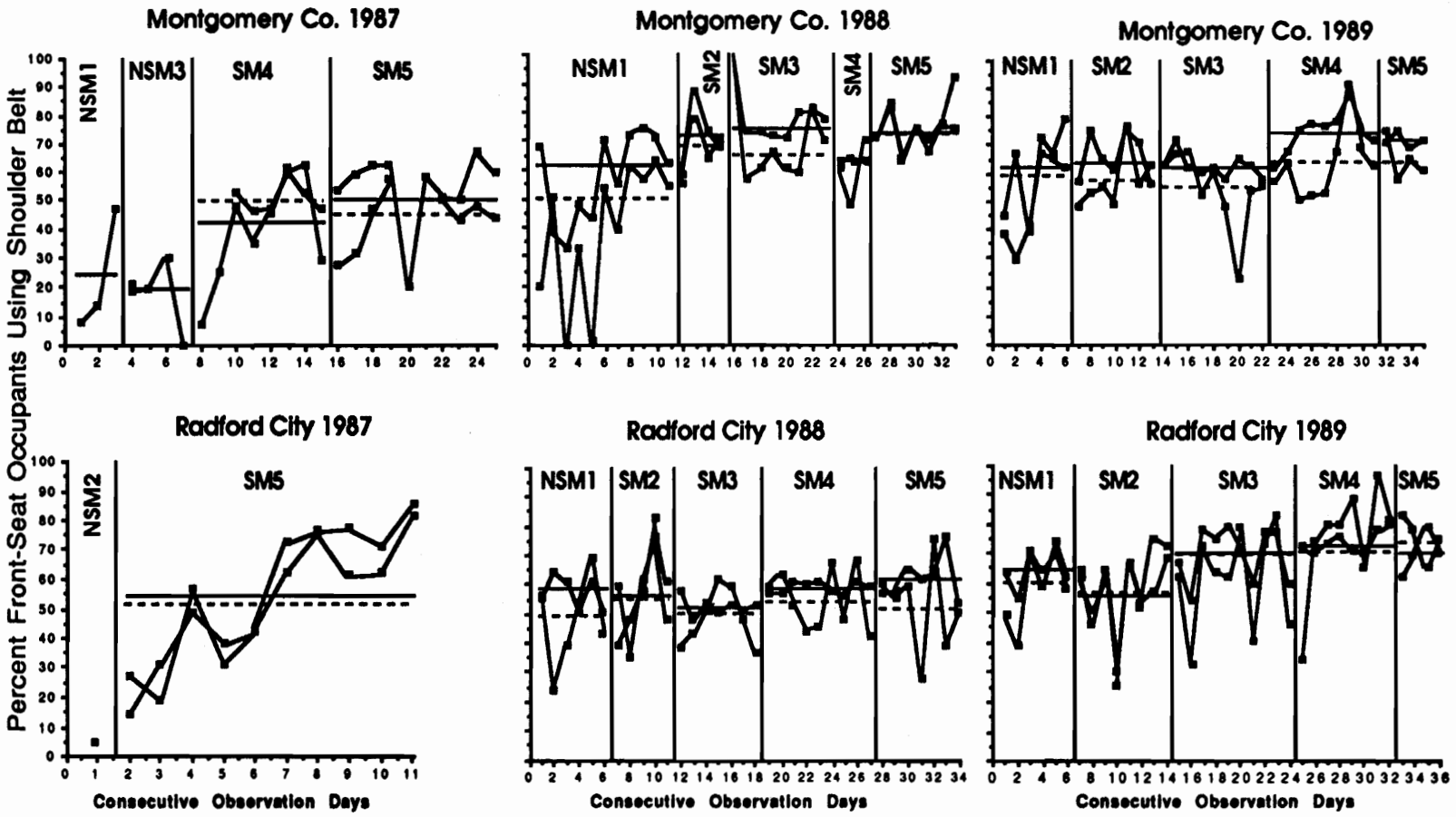


Figure 10: Three Years of Shoulder Belt Use by Front-Seat Occupants at Montgomery & Radford Pools During Consecutive Two-week Lesson Blocks

Table 3: Sample Sizes and Phase Means for Adult and Child Belt Use During Lessons.

Radford	1987				1988				1989			
	AN	A%	CN	C%	AN	A%	CN	C%	AN	A%	CN	C%
Group 1	—	—	—	—	589	58	193	49	639	64	240	60
Group 2	41	5	8	0	675	56	194	54	912	56	307	57
Group 3	—	—	—	—	1334	52	404	50	1208	70	409	70
Group 4	—	—	—	—	960	59	265	54	486	73	180	70
Group 5	1060	54	376	51	592	62	153	52	216	70	201	74

Montgomery	1987				1988				1989			
	AN	A%	CN	C%	AN	A%	CN	C%	AN	A%	CN	C%
Group 1	114	24	25	20	703	61	193	50	579	62	159	59
Group 2	—	—	—	—	400	72	150	68	654	64	242	57
Group 3	239	19	50	20	623	74	221	64	791	62	269	55
Group 4	656	42	275	49	356	63	152	62	609	74	253	64
Group 5	437	50	180	47	633	73	285	72	277	72	132	64

subsequent lesson groups at each pool for the latter two years. At RC in 1988, 115 different vehicles were observed over the course of the ten-week lesson period. Of these, 26% (n=30) were observed in two lesson groups, 15% (n=17) were seen in three lesson groups, 7% (n=8) were seen in four lesson groups, and 3% (n=3) were observed in all five lesson groups. During 1989, there were 120 different vehicles observed over the course of the five lesson groups. Of these, 28% (n=33) were seen in two lesson groups, 6% (n=7) were seen in three lesson groups, 3% (n=3) were seen in four lesson groups. No vehicles were observed in all five lesson groups.

Insert Figure 11 about here.

At MC, the distribution was similar. In 1988, 119 vehicles were observed over the course of the lessons. Of this total, 18% (n=22) were seen in two lesson groups, 7% (n=8) were observed in three lesson groups, and 1% (n=1) each was seen in both four and five lesson groups. In 1989, 93 different vehicles were seen during lessons. Of these, 31% (n=28) were observed in two lesson groups, 2% (n=2) were seen in three lesson groups, and 6% (n=6) were seen in four lesson groups. No vehicles were observed in all five lesson groups in 1989. Figure 10 suggests that sufficiently few vehicles were observed in more than one lesson, indicating that any increases in belt use were not the result of cumulative effects.

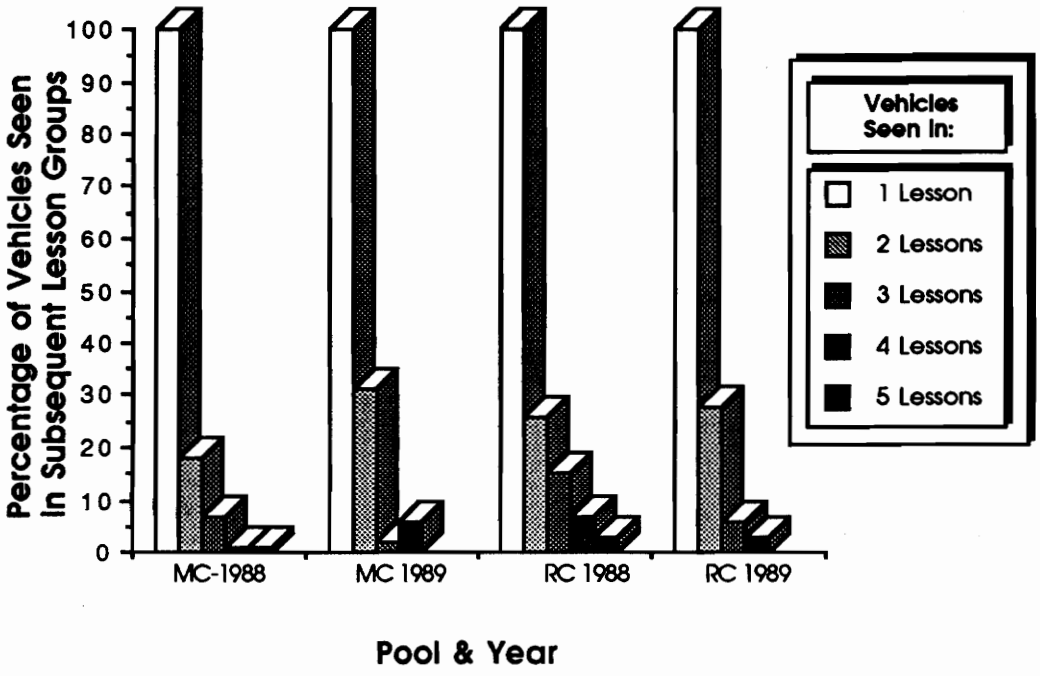


Figure 11: The Percentage of Vehicles Observed in More Than One Lesson Group in the Same Summer.

Mandatory belt use law.

On January 1, 1988, a mandatory safety belt use law (BUL) was enacted in Virginia, enabling a comparison between pre-BUL belt use with post-BUL belt use at the same locations and in some cases with the same, individuals.

At RC, during 1988 Baseline, adults' mean safety belt use increased 207% and childrens' mean use increased 164% over pre-BUL Baseline belt use in 1987 (see Fig. 6). For adult males at RC, 1988 Baseline belt use increased 240% over pre-BUL Baseline belt use in 1987 (see Fig. 8). Female adults' 1988 Baseline belt use increased 188% over their 1987 Baseline use level. Boys at RC increased 150% over pre-BUL Baseline as a result of the BUL, while girls increased 225% for the same period (see Fig. 9).

At MC during 1988 Baseline, adults' mean belt use increased 105% over pre-BUL Baseline, and childrens' mean percentage use increased 71% over 1987 pre-BUL Baseline (see Fig. 7). Adult male safety belt use in 1988 Baseline increased 118% over that observed in Baseline of 1987, while adult females' 1988 Baseline belt use increased 79% over their 1987 Baseline use (see Fig. 8). Boys at MC increased 48% over pre-BUL Baseline, while girls (compared to their counterparts at RC) increased a modest 30% over pre-BUL Baseline (see Fig. 9).

Long-term impact of BUL. Eighteen months after the passage of the BUL, overall mean belt use in Baseline 1988 and Baseline 1989 was similar at RC, while it declined at MC. At RC, adults showed an 8% increase over Baseline from 1988 to 1989, while children showed a 2% decrease. For the same period, adult males remained at a 34% mean belt use level seen in 1988, while adult females showed a 7% increase over the 1988 Baseline. Boys at RC showed a

20% increase over Baseline, yet girls demonstrated an 8% decrease under the 1988 Baseline.

Data for MC in 1989 illustrated an entirely different picture. Adults in Baseline showed a 16% decrease below the 1988 Baseline, while children showed a 27% decrease. Adult males showed an 11% decrease, and adult females showed a 16% decrease for the same period. Both boys and girls at MC showed 30% decreases under the 1988 Baseline. Thus, while front-seat vehicle occupants at RC had generally maintained or slightly increased their belt use 18 months after the passage of the BUL, front-seat vehicle occupants at MC were buckling 11% to 30% less than mean safety belt use levels found in Baseline 1988.

Flyers.

During the flyer phase in 1989, flyers were distributed twice at RC and three times at MC. MC patrons received their flyer(s) from a researcher (i.e., the "Personal" condition), while RC patrons received their flyer(s) under the windshield wipers of their parked vehicles (i.e., the "Impersonal" condition). For the entire phase, adults at RC showed a 14% increase in mean belt use over Baseline, from 43% to 49%. Children showed a 36% increase over Baseline, increasing from 36% to 49%. Adult females increased 14% over Baseline, while adult males' belt use only increased 9% over Baseline. Boys at RC observed a 22% increase over Baseline, while girls showed an increase of 42% over that found in Baseline.

At MC in 1989, where vehicle occupants received a "Personal" flyer from researchers, adults increased their belt use 26% over Baseline, while children showed a notable 60% increase. Adult males increased only 9% over

Baseline, yet adult females increased increased their belt use 33% over Baseline. Boys increased their belt use 54% over Baseline, while girls' belt use increased 70% over Baseline.

At RC, Flyers appeared to have the same impact upon mean belt use as did the Intervention Program. In fact, in 1988, adult belt use at RC increased 13% from Baseline to the Intervention Program, while in 1989, mean belt use for adults increased 14% from Baseline to the Flyer phase. Furthermore, the 1989 Intervention Program did not appear to positively impact mean belt use after the Flyer intervention: there was a two percentage point drop in adult mean belt use, from the Flyer phase to the Intervention Program.

Comparing this to MC, where in 1988, the Intervention Program increased adult mean belt use 22% over Baseline. In 1989, the Flyer intervention increased adult mean belt use 27% over Baseline, and the Intervention Program increases adult mean belt use over Flyers 21%.

Children at RC, as a result of the Intervention Program, showed a 27% increase over Baseline in 1988, while showing a 36% increase in mean belt use from Baseline in 1989 to Flyers, and a 2% increase from Flyers to the Intervention Program. Children at MC demonstrated similar, yet more robust, changes in belt use. From Baseline in 1988 to the Intervention Program, children showed a 29% increase in mean belt use. From Baseline in 1989 to the Intervention Program, children increased 60%, and a 2% decrease in mean belt use from Flyers to the Intervention Program.

Impact of the intervention program. Upon examination of the data for all three years, an interesting pattern emerged regarding the impact of the Intervention Program across the three summers. At RC, as a result of the

Intervention Program, adults increased 108% over Baseline in 1987, 13% over Baseline in 1988, and actually decreased 4% under the belt use level in the Flyer phase in 1989. For the same period, childrens' mean belt use at RC increased 143% over Baseline in 1987, 27% in 1988, and 2% from Flyer to Intervention phase in 1989. Adult males at RC showed increases over Baseline of 100% in 1987, 3% in 1988, and their belt use remained unchanged from the Flyer phase to the Intervention Program in 1989. Adult females showed a 156% increase over Baseline in 1987, a 156% increase over Baseline in 1988, and a modest 5% increase in belt use from the Flyer phase to the Intervention Program (see Fig. 7).

Boys at RC demonstrated a 158% increase from Baseline to the Intervention Program in 1987, a 47% increase over Baseline in 1988, and showed no change in mean safety belt use from the Flyer phase to the Intervention Program in 1989. For the same period, girls at RC showed an increase of 175% over Baseline in 1987, a 23% increase over Baseline in 1988, and a 41% increase from the Flyer phase to the Intervention Program in 1989 (see Fig. 8).

At MC, the pattern was the same: large initial increases were observed in belt use over low Baseline levels, followed by smaller increases in subsequent years. Adults showed increases over Baseline of 73% in 1987, 22% in 1988, and a 21% increase over the Flyer phase in 1989, which was implemented between Baseline and the Intervention Program. For the same period, children at MC showed increases of 83% and 29% in 1987 and 1988, respectively, and showed a 2% decrease in 1989 from the Flyer phase to the Intervention Program (see Fig. 7). Adult males showed increases over

Baseline of 59% in 1987, 35% in 1988, and 31% from the Flyer phase to the Intervention Program in 1989. For the same period, adult females at MC showed increases of 54% in 1987, 32% in 1988, and 11% in 1989 (see Fig. 8).

Boys at MC demonstrated a 59% increase over Baseline in 1987, a 45% increase in 1988, and a modest 9% increase from Flyers to the Intervention Program in 1989. Girls, for the same period, showed a 21% increase in 1987, a 23% increase in 1988, and a notable 12% decrease from Flyers to the Intervention Program in 1989 (see Fig. 9).

Pledge cards.

Pledge card use was infrequent and brief [i.e., only 2% (n=57,110) of the total vehicle observations were recorded as displaying a Pledge Card], but 85% (n=1024) of those who displayed their pledge card were, at the same time, buckled. Type of reward (direct or indirect) did not appear to influence use of Pledge cards. RC patrons received direct rewards during 1987 and 1988, and indirect rewards in 1989. The total percentage of vehicles displaying Pledge cards during these years was 4% (n=4881), <1% (n=16999), and 3% (n=11437), respectively. For those vehicle observations where Pledge cards were displayed, front-seat occupants were buckled 89% (n=212), 88% (n=16), and 88% (n=382) of the time.

MC patrons received indirect rewards during 1987 and 1988, and direct rewards in 1989. The total percentage of vehicle observations where Pledge cards were displayed during these years was 5% (n=3979), 1% (n=10009), and 1% (n=9805), respectively. For those same observations, front-seat occupants were buckled 77% (n=216), 94% (n=111), and 72% (n=87) of the time.

Discussion

As scientist-practitioners addressing problems of social importance, we are often faced with the dilemma of adopting process- vs. outcome-oriented perspectives. Ultimately, it comes to a question of balancing social relevance with experimental rigor in research when attempting to provide environmental modifications leading to beneficial behavioral changes in the community, the workplace, and the home.

During the summers of three consecutive years, safety belt use among pool patrons was the dependent variable under investigation, and a variety of strategies implemented to increase safety belt use. *Policy*, in the form of a mandatory safety belt use law, had a major impact on vehicle occupant's belt use. An *Intervention Program*, composed of Feedback, Promotion, and Reward components, also had a major impact upon belt use. However, less dramatic increases over Baseline were seen in the final two years of the study that followed the passage of the BUL. *Prompts*, in the form of small flyers, produced increases in belt use similar to those produced by the Intervention Program in 1988. *Awareness/Education*, in the form of the Lifeguard Safety Message, produced less robust, and more variable, results than the preceding strategies.

Belt Use Laws. The Virginia BUL, enacted on January 1, 1988, increased safety belt use among front-seat vehicle occupants at both MC and RC pools in the summer of 1988, and continued to influence the belt use of those individuals seen 18 months after it was enacted, in the summer of 1989. Substantial increases in shoulder belt use were observed in vehicle occupants from the low rates found during the baseline observations of 1987. Indeed,

the increases and maintenance in pool patron belt use were similar to those seen elsewhere in the general population (e.g., Campbell et al., 1987; Campbell et al., 1988) after BUL programs. Generally, dramatic increases in safety belt use were typically noted following the enactment of a BUL, but these gains are rarely maintained and mean belt use often stabilized between 40% and 50% as media attention and enforcement waned. While these gains are commendable, one-half of the driving population is still unbuckled in states with BULs.

Impact of the Intervention Program. The data suggest that the Intervention Program had a major impact upon Radford's pre-BUL belt use, but as was also seen at MC, belt use gains were modest in patrons during post-BUL 1988. Similarly, the Intervention Program appeared to contribute little to the belt use increases resulting from the Flyer phase in 1989. In fact, mean belt use for adults actually decreased two percentage points from Flyers to the Intervention Phase.

While absolute gains in belt use for 1987 were still below those found in 1988 and 1989, the Intervention Program appeared to have the greatest relative impact upon adults' and childrens' overall belt use. In 1988 and 1989, after the passage of the BUL, Baseline belt use was comparatively high and only modest gains were observed as a result of the Intervention Program.

Results do not support the initial hypothesis that Indirect Rewards would promote greater belt use and greater response maintenance. In fact, the data appear to demonstrate just the opposite in 1989. MC, which had been receiving Indirect Rewards in 1987 and 1988, received Direct Rewards in 1989, yet mean belt use continued to increase through Withdrawal after the

external source of reward had been removed. RC received Direct Rewards in 1987 and 1988, and received Indirect Rewards in 1989, but mean belt use decreased, during Withdrawal.

Interaction between BUL and Intervention Program. While several studies have looked at the effects of BULs on belt use and the effects of incentive programs on belt use, to date, there have not been any studies looking at the effects of an incentive program implemented pre- and post-BUL. In the current study, the data indicate that an incentive program in selected populations, is not effective in increasing belt use over and above that promoted by a BUL. This is best illustrated in the relatively small increase in belt use seen during the Intervention Program at RC 1988.

This does not seem to be the case at MC 1988, where the incentive program was effective in increasing mean belt use by 10 percentage points over the post-BUL Baseline, and apparently continued increasing belt use during the Withdrawal phase. The data suggest that those individuals who responded to the Intervention Program in pre-BUL 1987, were generally the same individuals who buckled up in response to the BUL in 1988. Therefore, they were already buckled up in 1988 when the Intervention Program was implemented and the Program was not effective enough to increase the belt use of those who were uninfluenced by the BUL.

Differences Between Radford and Montgomery: Physical characteristics at each pool may offer an explanation for the differences in belt use observed between RC and MC. Since MC is the smaller of the two pools in size and patronage (e.g., across all three years, MC averaged 481 patrons per week; RC averaged 708), researchers collecting data at MC may have been more

prominent to the casual observer. Despite rigorous attempts to remain unobtrusive, it became inevitable that the data collectors would sometimes be noticed by regular pool attendants. For example, on some occasions researchers were approached by individuals and asked what they were doing. In this event, attempts to assuage suspicion included a protocol: curious pool patrons were told that the researchers were,"...conducting a traffic survey for the County."

Another possible explanation for increased belt use among pool patrons at both pools, may simply be that as each summer's study progressed, patrons may have become more aware of the observers presence at each pool. Individuals may have perceived safety belt use as the socially desirable response in that context and subsequently increased their belt use. Small upward trends in weekly mean belt use can be observed near the end of each pool's Baseline phase for each year (see Figs. 5 & 6). It is conceivable that mean belt use in each phase might have been inflated as a result of this confound.

One is again reminded to be cautious when interpreting data of this nature. As evidenced in many of the figures in the text, relatively consistent phase means (e.g., as seen in Figs. 7-10) often camaflouge the highly variable nature of the daily means (e.g., Fig. 10), which themselves often belie the wide range of individual variability.

Multiple Intervention Level Model. This study offers empirical support for the Multiple Intervention Level (MIL) model advanced by Geller et al., (in press). The need for theory is driven by the need to conceptualize "What works?", "Why does it work?", "Does anything work better?", and "Who does

it work for?" In the field of Program Evaluations, there have recently begun attempts to organize the databases from the injury control, health, and community safety perspectives into a theoretical and pragmatic framework. The MIL model advanced by Geller and colleagues, represents such an effort.

This model states that intervention strategies can be segmented according to specific dimensions of intervention effectiveness. Simply stated, low level interventions are designed to provide mass appeal, while at the same time, require little in terms of cost and effort from behavior change personnel (i.e., a larger target audience for less agents). Those individuals uninfluenced by low level interventions require higher level interventions, which are successively more intensive, more intrusive, and more costly. Attendant to the MIL model is a scoring system, based on a taxonomy of 24 behavior change techniques, useful for predicting the short- and long-term effectiveness of particular interventions.

The interventions implemented within this study can be characterized within the MIL hierarchy. The 'Flyer' would be classified as a "Level 1" intervention. They were relatively inexpensive to produce and distribute, require little effort from the intervention agent, and are designed to have maximum large-scale appeal. Likewise, the Lifeguard Safety Message was a "Level 1" intervention. Given by a lifeguard to the children at the end of each day's lesson, the brief safety message could be an extremely cost effective behavior change method. Although the Safety Message does not meet the high target audience/low agent ratio criteria of the MIL model, the Safety Message itself requires minimal additional effort from the effort currently being exerted by the lifeguard.

The remaining two intervention strategies were both "Level 2" interventions, but lie along different ends of the same behavioral continuum. One one end, the BUL (i.e., a disincentive) seeks to promote the desired behavior by threat or punishment. If caught unbuckled, the humiliation and embarrassment of being stopped by an police officer, along with the resulting fine, serve as the punishment. On the other end of the continuum is the Intervention Program (i.e., an incentive) whose components (i.e., Feedback, Promotion, and Rewards) attempted to promote belt use in a positive manner. If caught buckled, the vehicle occupant(s) were given a small reward. These two strategies are characterized as "Level 2" interventions due to the increased intrusiveness of the intervention, the increased effort now required of the intervention agent(s), and the increased financial costs incurred by the intervention agency.

Impact of the Flyers. While the "Personal" flyer at MC pool provided the greatest relative increase in safety belt use, neither method could outperform the other in absolute gains. The method of flyer delivery (i.e., "Personal vs. Impersonal") seemed to have mixed effects upon belt use. While the "Personal" delivery method provided greater relative gains in belt use (i.e., greater increases over Baseline), neither method could increase safety belt use more than the other method in absolute terms. In every age and gender category, the mean belt use for each category at both pools never differed by more than one percentage point during the Flyer phase. There is however, evidence to support the stronger impact of a prompt delivered with a personal touch. Williams, Thyer, Bailey & Harrison (1989) found that vehicle

drivers buckled more in response to a sign displayed by a researcher than the same sign attached to a pole.

Impact of the Awareness/Educational Program. The success of awareness/education intervention is equivocal. Results are variable in the latter two years, and there were problems obtaining data in 1987. Data for RC in 1987 indicates something is definitely operating on safety belt use, but what it is, is not immediately apparent to this author.

Problems with Field Research. Faced with a socially valid problem and charged with finding a solution, the applied researcher is faced with a dilemma certainly encountered by every first year graduate student in research methods: How do you achieve internal validity while at the same time, maintain external validity? Perhaps a more accurate question would be, what is the most of either, that you are willing to sacrifice, and still have confidence in your results?

There are difficulties in conducting field studies of this nature. One particular problem is the lack of adequate controls, not only over the independent variable, but also over the particular reinforcement history of the individual(s) within the study. The opportunity to observe that individual is quite small, and we only see him or her if they happen to arrive at our place of data collection, within the scope of our sampling. Other than that, the researcher do not see him, and therefore cannot determine what other contingencies are operating on his life at the moment.

Attempts to promote behavior change in large-scale settings (or for that matter smaller settings), often result in the research design containing a contrived reinforcer (i.e., an artificial reinforcer not found occuring in a

natural state). An example can be found in the current study. Providing rewards for buckling one's safety belt is not a situation commonly found in nature. Contrived reinforcers do not promote response maintenance. Instead, it would behoove the researcher to identify those naturally occuring reinforcers that operate on the target behavior and construct interventions around them.

Future Directions.

Further testing and refinement of the MIL model and behavioral taxonomy are paramount. The opportunity is present for the currently disparate fields of health, safety, and injury control to be cogently combined under one conceptual roof, providing researchers with a more complete picture of human behavior.

REFERENCES

Aronson, E. (1966). The psychology of insufficient justification: An analysis of some conflicting data. In S. Feldman (Ed.) *Cognitive consistency*. New York: Academic Press.

Azrin, N. (1977). A strategy for aplied research: Learning based but outcome oriented. *American Psychologist, 32*, 2, 140-149.

Burnley (1988, March). Invited luncheon address by the Secretary of the U.S. Department of Transportation, Lifesavers 6 Conference, Boston, MA.

Campbell, R.J., Stewart, J.R., & Campbell, F.A. (1987). *1985-1986 experiences with belt laws in the United States*. Chapel Hill, NC: UNC Highway Safety Research Center.

Cope, J.G., Grossnickle, W.F., & Geller, E.S. (1986). An evaluation of three corporate strategies for safety belt promotion. *Accident Analysis and Prevention, 18*, 243-251.

Deci, E.L., (1975). *Intrinsic motivation*. New York: Plenum.

Deci, E.L., & Ryan, R.M (1980). The empirical exploration of intrinsic motivational processes. In L. Berkowitz (Ed.), *Advances in experimental social psychology, 13*, 39-60, New York: Academic Press.

Federal Register (1983). Federal motor vehicle safety standards: *Occupant crash protection, 48*(203). Washington DC: Department of Transportation.

Geller, E.S., (1989). Intervening to increase children's safety belt use. Alcohol, *Drugs, and Driving, 5*(1), 37-59.

Geller, E.S. (1984). Motivating safety belt use with incentives: A critical review of the past and a look to the future. *SAE Technical Paper Series* (No. 840326). Warrendale, PA: Society of Automotive Engineers.

Geller, E.S., Berry, T.D., Ludwig, T.D., Evans, R.E., Gilmore, M.R., & Clarke, S.W. (in press). A conceptual framework for developing and evaluating bahavior change interventions for injury control. *Health Education Research: Theory and Practice.*

Geller, E.S., & Hahn, H.A. (1984). Prompting safety belt use at industrial sites: An effective program for blue collar employees. *Professional Psychology: Research and Practice, 15,* 553-564.

Geller, E.S., Johnson, R.P., & Pelton, S.L. (1982). Community-based interventions for encouraging safety belt use. *American Journal of Community Psychology, 10(2),* 183-195.

Geller, E.S., Kalsher, M.J., Rudd, J.R., & Lehman, G.R. (1989). Promoting safety belt use on a university campus: An integration of commitment and incentive strategies. *Journal of Applied Social Psychology, 19,* 3-19.

Geller, E.S., Rudd, J.R., Kalsher, M.J., Streff, F.M., & Lehman, G.R. (1987). Employer-based programs to motivate safety belt use: A review of short and long-term effects. *Journal of Safety Research, 18,* 1-17.

Hayes, S.C., & Cone, J.D. (1981). Reduction of residential consumption of electricity through simple monthly feedback. *Journal of Applied Behavior Analysis, 14,* 81-88.

Jonah, B.A. (1989, June). *Occupant restraint use in Canada: Past, present, and future.* Paper presented at the Canadian Multi-disciplinary Road Safety Conference, Fredericton, New Brunswick: Canada.

Kalsher, M.J, Geller, E.S., Clarke, S.W., & Lehman, G.R. (1989). Promoting safety belt use on naval bases: A comparison of incentive and disincentive programs. *Journal of Safety Research, 20,* 103-113.

Kello, J.E., Geller, E.S., Rice, J.C., & Bryant, S.L., (1988). Motivating auto safety belt wearing in industrial settings: From awareness to behavior change. *Journal of Organizational Behavior Management,* 9(2), 7-21.

Lehman, G.R, & Geller, E.S. (in press). Educational strategies to increase children's use of safety belts: Are extrinsic rewards necessary? *Health Education Research: Theory and Practice.*

Lehman, G.R, & Geller, E.S. (in press). Participative education for children: An effective approach to increasing safety belt use. *Journal of Applied Behavior Analysis.*

Ludwig, T.D., & Geller, E.S. (1990). *Intervening to increase the safety belt use of pizza deliverers: Individual differences and response generalization.* Under editorial review.

McGinnis, J.M. (1984). Occupant protection as a priority in national efforts to promote health. *Health Education Quarterly, 11,* 127-131.

Nasanen, M., & Saari, J. (1987). The effects of positive feedback on housekeeping and accidents at a shipyard. *Journal of Occupational Accidents, 8,* 237-250.

Roberts, M.C., Fanurik, D., & Wilson, D. (1988). A community program to reward children's use of seat belts. *American Journal of Community Psychology, 16,* 395-407.

Roberts, M.C., & Layfield, D.A. (1987). Promoting child passenger safety: A comparison of two positive methods. *Journal of Pediatric Psychology, 12,* 257-271.

Roberts, M.C., & Turner, D.S. (1986). Rewarding parents for their children's use of safety seats. *Journal of Pediatric Psychology, 11,* 25-36.

Thyer, B.A., Geller, E.S., Williams, M., & Purcell, E. (1987). Community based "Flashing" to increase safety belt use. *The Journal of Experiemental Education, 55(3),* 155-159.

Sleet, D.A. (1987). Motor vehicle trauma and safety belt use in the context of public health priorities. *The Journal of Trauma, 27,* 695-702.

Spilman, C.L. (1988). Sates with mandatory belt-use laws. Memorandum dated March 29, 1988, *Traffic Safety Now, Inc.,* Detroit, MI.

Van Houten, R., Nau, P.A. (1983). Feedback interventions and driving speed: A parametric and comparative analysis. *Journal of Applied Behavior Analysis, 16,* 253-281.

Van Houten, R., Nau, P.A. (1981). A comparison of the effects of posted feedback and increased police surveillance on highway speeding. *Journal of Applied Behavior Analysis, 14,* 261-267.

Van Houten, R. Rolider, A., Nau, P.A., Friedman, R., Becker, M., Chalodovsky, I., & Scherer, M. (1985). Large-scale reductions in speeding and accidents in Canada and Israel: A behavioral ecological perspective. *Journal of Applied Behavior Analysis, 18,* 87-93.

Waller, J.A. (1987). Injury: Conceptual shifts and prevention implications. *Annual Review of Public Health, 8,* 21-49.

Wilson, T., & Lassiter, G. (1982). Increasing intrinsic interest with superfluous extrinsic controls. *Journal of Personality and Social Psychology, 42,* 811-819.

Winett, R.A., Neale, R.S., & Grier, H.C. (1979). Effects of self-monitoring and feedback on residential electricity consumption. *Journal of Applied Behavior Analysis, 12,* 173-184.

Zeigler, P. (1986, January). Observed safety belt and child safety seat usage at road intersections: 19-city survey results. *Research Notes.* Washington DC: Office of Driver and Pedestrian Research, National Highway Traffic Safety Administration, U.S. Department of Transportation.

VITA

Michael R. Gilmore

School Address:
5100 Derring Hall
Virginia Tech
Blacksburg, VA 24061
(703)231-8145

Home Address:
422 Marlington Street
Blacksburg, VA
24060
(703)951-9057

Personal

Birthdate: November 20, 1961

Marital Status: Single

Educational History

1. Christopher Newport College, Newport News, VA

   Major: Psychology
   Degree: Bachelor of Arts 1987

2. Virginia Polytechnic Institute & State University, Blacksburg, VA

   Major: Psychology
   Degree: Master of Science 1990
   Thesis: Safety Belt Promotion at Community Swimming Pools: Effects of Policy, Rewards, Prompts, and Education. (Chair: E. Scott Geller, Ph.D.)

3. Virginia Polytechnic Institute & State University, Blacksburg, VA

   Major: Psychology
   Degree: Doctor of Philosophy (expected: 5/92)

Professional Positions

1. Restaurant Management, Jomarbe-Hart, Inc., Atlanta, GA. 1982-1984
   Responsibilities: Worked at various levels of restaurant management throughout the southeastern US, culminating in the General Manager position. Managed food and labor budgets, inventories, payrolls, and acted as new store training manager.

2. Psych Tech, Annex 2, Riverside Hospital, Newport News, VA. 1985-1987
Full-time position. Responsibilities: Assisted in the care and treatment of mentally disturbed patients on a locked psychiatric unit.

3. GTA & GRA, VPI&SU. Halftime positions. 1987-1988
Taught 2 'Introduction to Psychology' Discussion sections.
Teaching Assistant for 'Nervous Systems & Behavior'.
Research Assistant in the Applied Behavior Systems Laboratory (Supervisor: E. Scott Geller, Ph.D.).

4. GRA, VPI&SU. Fulltime position. 1988-1989
Worked in Dr. Scott Geller's Applied Behavior Systems Lab, acting as co-project manager to CDC grant #R49/CCR302635-03. Coordinated data collection and data entry, supervised training and scheduling of undergraduate researchers, and disseminated results at professional conferences. Have a working knowledge of Foxbase+ and dBase III data management systems.

5. GRA, VPI&SU. Fulltime position. 1990-present
Worked in Dr. Lee Cooper's animal analogue lab under Research Grant #. Was responsible for the care and maintenance of animals assigned to the lab, the collection and graphical interpretation of data, and acted as executive assitant to the Boss.

Publications

Geller, E.S., Berry, T.D., Ludwig, T.D., Evans, R.E., Gilmore, M.R., & Clarke, S.W. (in press). A conceptual framework for developing and evaluating behavior change interventions for injury control. *Health Education Research: Theory and Practice.*

Geller, E.S., Ludwig, T.D., Gilmore, M.R., & Berry, T.D. (1990). A taxonomy of behavior change techniques for community intervention. *The Community Psychologist, 23*(2), 4-6.

Published Abstracts

McCarthy, D., Drummond, C., & Gilmore, M.R. (May,1988). Intervening to promote safety belt use among children and adults at a Montessori school. *Virginia Journal of Science, 39*(2), 185.

Welch, M., Gilmore, M.R., Evans, R.E., & Geller, E.S. (May, 1988). Lifeguards as agents in motivating children to buckle up. *Virginia Journal of Science, 39*(2), 188.

Manuals

Geller, E.S., Gilmore, M.R., & Bonner, M.J. (May, 1990). *Behavior Based Safety Management.* Safety training manual for United Telephone System, Carlisle, PA.

Geller, E.S., Kello, J.E., Bonner, M.J., & Gilmore, M.R. (December, 1989). *Achieving occupational health and safety: Safety motivation and presentation skills.* Safety training manual for UAW Chrysler Corporation, Detroit, MI.

Geller, E.S., Gilmore, M.R., & Evans, R.E. (1988). *Profit in Safety Belts: Northwest Regional Safety Belt Project.* Technical manual for safety belt interventions with the Northwest Regional Safety Belt Project, Erie, PA.

Geller, E.S., Gilmore, M.R., & Evans, R.E. (1988). *Profit in Safety Belts: Merging ideas....* Technical manual for safety belt interventions with the Florida Department of Community Affairs Bureau of Public Safety Management, Tallahassee, FL.

Presentations

Invited symposium: *Balancing rigor and relevance in behavior analysis research.* F.E. Balcazar, Chair. To be presented at the Annual Meeting of the Association for Behavior Analysis, Nashville, TN.

Gilmore, M.R., Berry, T.D, & Geller, E.S. (May, 1990). *"Personal" vs. "Impersonal" prompts to increase safety belt use: The human element as a moderator.* Paper to be presented at the Annual Meeting of the Association for Behavior Analysis, Nashville, TN.

Ludwig, T.D., Gilmore, M.R., & Wangler, J. (May, 1990). *A comparison of educational strategies: Reward vs. commitment.* Paper to be presented at the Annual Meeting of the Association for Behavior Analysis, Nashville, TN.

Gilmore, M.R., & Bonner, M.J. (August, 1990). *Community-based interventions for children: Rewards, prompts, education, and policy.* Paper to be presented at the Annual Meeting of the American Psychological Association, Boston, MA.

Gilmore, M.R., Evans, R.E., & Glindemann, K.E. (March, 1989). *Increasing safety belt use at public swimming pools: Direct versus indirect reward strategies.* Presented at the Annual Meeting of the Southeastern Psychological Association, Washington, D.C.

Lawless, W.F., Healy, J.E., & Gilmore, M.R. (March, 1989). *The (W)rap on condoms: Reactions and perspectives.* Presented at the Annual Meeting of the Southeastern Psychological Association, Washington, D.C.

Berry, T.D. & Gilmore, M.R. (May, 1989). *A long-term analysis of a single subject's variable use of automobile safety belts.* Presented at the Annual Meeting of the Association for Behavior Analysis, Milwaukee, WI.

Gilmore, M.R., Evans, R.E., Swartzbaugh, T., & Welch, M. (May, 1989). *Promoting safety belt use at community swimming pools: Moderator effects of a mandatory belt use law.* Presented at the Annual Meeting of the Association for Behavior Analysis, Milwaukee, WI.

Gilmore, M.R., Evans, K.J., & Schlueter, G. (August, 1989). *The television marketing of sex, booze, and unsafe driving.* Presented at the Annual Meeting of the American Psychological Association, New Orleans, LA.

Ludwig, T.D., Baker, B., & Gilmore, M.R. (August, 1989). *Domino's avoids the Noid: Corporate image and safety belt promotion.* Presented at the Annual Meeting of the American Psychological Association, New Orleans, LA.

Gilmore, M.R., Lehman, G.L., & Welch, M. (May, 1988). *Lifeguards as delivery agents for a safety belt program.* Presented at the Annual Meeting of the Association for Behavior Analysis Conference, Philadelphia, PA.

Gilmore, M.R., Evans, R.E., & Geller, E.S. (October, 1988). *Promoting belt use at community swimming pools: Direct versus indirect reward strategies.* Poster presentation at the Annual Meeting of the Southeastern Association for Behavior Analysis, Gatlinburg, TN.

Kalsher, M.K., Geller, E.S., Clarke, S.W., & Gilmore, M.R. (March, 1988). *Alcohol consumption at university parties: Innovative activities to prevent DUI.* Paper presented at the Lifesavers 6 Convention, Boston, MA.

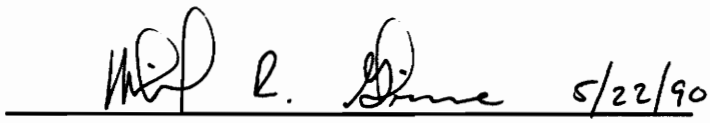
Kalsher, M.J., Glindemann, K.E., & Gilmore, M.R. (May, 1988). *Applications of behavioral technology to evaluate education in Nigerian health clinics.* Paper presented at the Annual Meeting of the Association for Behavior Analysis, Philadelphia, PA.

Lehman, G.L., Evans, R.E., Gilmore, M.R. (May, 1988). *An educational curriculum for increasing children's use of safety belts.* Paper presented at the Annual Meeting of the Association for Behavior Analysis, Philadelphia, PA.

McCarthy, D., Drummond, C., & Gilmore, M.R. (May, 1988). *Intervening to promote safety belt use among children and adults at a Montessori school.* Presented at the Annual Meeting of the Virginia Academy of Science, Charlottesville, VA.

Welch, M., Gilmore, M.R., Evans, R.E., & Geller, E.S. (May, 1988). *Lifeguards as agents in motivating children to buckle up.* Presented at the Annual Meeting of the Virginia Academy of Science, Charlottesville, VA.

Swartzbaugh, T.A., Gilmore, M.R., & Geller, E.S. (October, 1988). *Promoting belt use at a fast food restaurant: Some social marketing aspects.* Poster presentation at the Annual Meeting of the Southeastern Association for Behavior Analysis, Gatlinburg, TN.



Michael R. Gilmore, M.S.