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EVALUATION OF THE EFFECTS OF A SEAT BELT EDUCATION PROGRAM AMONG ELEMENTARY SCHOOL CHILDREN IN LOUDOUN COUNTY, VIRGINIA

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16. Abstract

Elementary school children in Loudoun County, Virginia took part in a program whose purpose was to acquaint them with the need to wear auto seat belts.

Before, during and after this program, passengers and drivers of cars with children of elementary school age were observed in and near shopping centers in Loudoun County and in a control county, Prince Georges County, Maryland.

There was an increase in seat belt usage among Loudoun County elementary school children, from the pre- to post-program periods, and no increase (actually, a decrease occurred) in Prince Georges County.

Also, many children (and their teachers) in Loudoun County claim to have increased their usage of seat belts.

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TABLE OF CONTENTS

		Page #
	OUTLINE OF THE STUDY	i
I.	INTRODUCTION: BACKGROUND AND OBJECTIVES OF THE STUDY	1
II.	RESEARCH METHODOLOGY	3
III.	OBSERVED SEAT BELT USAGE	12
IV.	INTERVIEW DATA	26
V.	DISPLAY OF BUMPER STICKERS	31
VI.	PROGRAM MATERIALS	34
VII.	CONCLUSIONS	36
	APPENDIX A: COMPARISON OF SEAT BELT USE ACROSS CONDITIONS FOR DUPLICATE OBSERVATIONS	38
	APPENDIX B: NUMBER OF CARS OBSERVED	41

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Mr. Pettersen Marzoni provided overall direction and valuable insight from previous studies related to restraint system usage.

OUTLINE OF THE STUDY

Background

NHTSA has developed a national educational program to encourage the use of safety belts. This program has produced a number of booklets designed for specific target audiences which, in total, span the majority of drivers and passengers. One of these programs was designed to increase safety belt usage among elementary school children. Before the program was to be recommended for use, a test of its effectiveness appeared warranted.

Study Design

The appropriate materials were distributed to all public school teachers for grades kindergarden through seventh grade in Londoun County, Virginia. The program was implemented for a one-month period (April 1972) during which each child was exposed to the program in class for approximately three hours. About 45 minutes were spent in related activities each week with each session lasting about 10-20 minutes. As a possible "spin-off" it was hoped that the children would influence their parents and older persons to wear safety belts.

To determine the effectiveness of the program, observations were made of safety belt usage in cars when one or more of the occupants appeared to be 6 to 11 years old. Observations were made at shopping centers on eight Saturdays both in Loudoun County, Virginia, and in a control county, Prince Georges, Maryland. Belt usage was observed on the two weekends before the program was implemented in the schools (Period 1), three weekends during the program (Period 2), and on three weekends after the program had ended (Period 3). A total of approximately 15,000 cars were observed.

Results

There are statistically significant differences in lap belt usage among elementary school children in Loudoun County, between Periods 1 and 2, and between Periods 2 and 3.

During Period 1, 6.1% of the elementary school children wore lap belts compared with 7.7% in Period 2 and 9.9% in Period 3. These results are based on observations of children in the front seat of 1965 or newer cars.

At the same time, usage among children in this age group decreased in Prince Georges County, making the increases in Loudoun County particularly noteworthy.

There were no increases in usage among older children or among adults. Apparently, there was no substantial diffusionary effect upon parents or older siblings.

On the final day of observation, elementary school children were asked about the program and its effects. Nine-tenths of the children questioned said they had discussed seat belts in school, several weeks earlier. Most frequently, these children said they learned that they should wear seat belts, that it's safer to wear seat belts, or that they learned how to use seat belts.

Seven-tenths of the children said they had told their parents what they had heard about seat belts in school.

Over a quarter (28%) of the children questioned said they wore safety belts most or all of the time during the two or three weeks preceding the interview, compared with 13% before the program. When asked why they did not wear them, 22% responded that the belts were inaccessable or not available (this is in cars where the belts are standard equipment), 20% did not wear belts due to discomfort or inconvenience and 40% said they just didn't think of it. On the last observation day in Loudoun County, belt usage of the target group was up to 19% in the front seats. This high usage on the last day was greater than any of the previous observations indicating that the program may have continued a little longer than expected and/or that the program's effect was still continuing to increase usage.

I. INTRODUCTION: BACKGROUND AND OBJECTIVES OF THE STUDY

This study was undertaken by National Analysts for the National Highway Traffic Safety Administration of the Department of Transportation to determine the impact of an elementary school seat belt education program on the use of automobile restraint systems by school children and their families.

The NHTSA has been engaged in extensive efforts to develop educational programs and materials which will increase the level of seat belt use among American motorists. To assist in those efforts, National Analysts conducted a separate study for NHTSA in 1970-1971, which examined both the level of seat belt use among American drivers and the motivations underlying use (or non-use) or restraint systems.* The figures obtained in that study indicated that the level of seat belt use is distressingly low: only one out of every six adults (17%) always wears a seat belt during "short" trips (25 miles or less one way), and half (51%) never wear seat belts for journeys of this distance. When motorists ride (as either driver or passenger) in cars equipped with shoulder belts, only one in thirty (3%) wears a shoulder belt for short trips, and only about one out of ten (13%) ever wears a shoulder belt at all.

In addition, demographic breakdowns of restraint system users and non-users indicated that the wearing of automobile safety belts is positively correlated with education level, and that participation in driver education programs in schools is significantly related to the regular use of seat belts. Based on these findings and on general evidence that young children are often more susceptible than adults to attitude and behavior change, the school was believed to represent a potentially important setting for the training and reinforcement of seat belt use among youngsters.

Although the NHTSA program was designed exclusively for the use of elementary schools and, therefore, only children in grades kindergarten through six were to be directly exposed, it was expected that parents and others in the family might be influenced indirectly by the program

*See "Motivating Factors in the Use of Restraint Systems" prepared by National Analysts for the National Highway Traffic Safety Administration of the U. S. Department of Transportation, September, 1971.

after observing children's increased seat belt usage or hearing references to the school program and seat belts in general. Thus, the study was designed to gauge not only the influence of the program on the children exposed to it but also the diffusion of that influence from the children to members of their families and other individuals with whom they interact.

II. RESEARCH METHODOLOGY

A. Study Design

There are certain practical and methodological difficulties involved in measuring the impact of an educational program on the use of restraint systems, particularly since the research objectives set out by NHTSA required the development of an experimental design within a field setting. It was believed that the most reliable and non-reactive measure of seat belt use that could be obtained would be direct observation of passengers in the cars containing children who had been exposed to the NHTSA program.

Survey or self-report procedures were rejected as less accurate than direct inspection of seat belt use because of the experimental nature of the investigation, although direct observations were supplemented by data obtained by asking 340 children some questions about the program and their seat belt usage on the last day of the study.

Development of the data collection procedures used was based on the following considerations:

Accuracy: Since NHTSA's concern was with changes in behavior following exposure to the educational program, interviews would require that respondents make gross estimates of their seat belt use over time. Such estimates could be expected to be considerably less accurate and less quantifiable than data obtained via direct inspection.

Reliability: Insofar as seat belt use constitutes mildly "desirable" behavior, it was thought that respondents might be tempted to exaggerate frequency of use, particularly where they have been "sensitized"--if not actually influenced--by a school program. Under these circumstances, children, especially, may experience some feelings of guilt at failure to comply with school instruction, and modify their interview responses accordingly.

Contamination: Any survey dealing directly with seat belt use administered prior to the termination of the program might be expected to exert some reactive influence on the success of the program, and distort any independent measure of behavior.

A dual approach was applied to the selection of comparison units for the dependent variable. Seat belt use was measured:

- Longitudinally, through comparison before and after exposure to the program in a selected experimental site

- Cross-sectionally, by comparing an exposed and a non-exposed (or control) community.

This design provided measures of both relative (longitudinal) and absolute (cross-sectional) levels of seat belt use over time, in the two selected sites.

Observation in both the experimental and control sites took place during three periods--before, during and after exposure*--so that data would be available for making comparisons within and between counties from one measuring period to the next. The longitudinal measure would be less susceptible to distortions in absolute level of seat belt use (due, for example, to data collection and sample procedures or to characteristics of a particular site) since such factors would presumably remain constant through all three measurement periods at a given site.

The cross-sectional comparison would, on the other hand, compensate for changes in regional or national levels of use that might result from such external factors as seasonal change in seat belt use, the effects of other programs, or unanticipated "contamination" from other sources. In effect, by combining the two approaches, observed changes could be assessed with greater reliability and precision.

*It should be noted that the program may have started late in some schools, and still have been going on after the observation period.

Development of Data Collection Procedures

Conditions: Although it was felt that observation would be the most reliable way to obtain data for this study, the logistics of direct inspection posed certain problems which required that more than one "observation condition" be incorporated into the design. For example, the use or non-use, of seat belts in a rapidly moving vehicle is usually not visible to observers, and high-speed photographic equipment was rejected as both expensive and impractical. Thus, only vehicles moving at a relatively slow rate of speed could be successfully observed.

Since it was necessary to obtain some personal data from most of the respondents (e.g., age of children, the school they attend), a large number of cars included in the sample had to be stationary just prior to or following inspection. Given this requirement, it seemed most practical to observe occupants of cars which were pulling into or out of a parking space. Personal data could then be obtained either prior to departure ("leaving condition") or just after the vehicle had parked ("arriving condition").

Although cars at high speeds could not be observed, it was felt that some additional measure of seat belt use in moving vehicles was necessary, since passengers may delay fastening their seat belts until the car has picked up speed (within a few minutes after pulling out of a parking space) and may unfasten belts several minutes prior to parking. Thus, a third observation condition was added to obtain data on in-transit vehicles at locations where conditions necessitated a considerable reduction in speed.

Since use of restraint systems is probably greatest at high speeds,* we would expect that the figures finally obtained from each of these observations would represent an under-estimation (constant over time) of seat belt use. Our primary concern, however, was with relative changes in the use of restraints as a function of time, rather than absolute levels, and it was believed that inspection of car occupants under these three conditions would provide a relatively accurate measure of those relative changes.

*See Appendix for related data.

B. Sites

Loudoun County, Virginia, a suburban and semi-rural area northwest of Washington, D. C. was selected as the experimental site primarily because mandatory county windshield stickers (or other local identification on cars) would facilitate identification of car occupants' residence. Prince Georges County, Maryland, another county adjacent to Washington, D. C. was designated as the control site. Neither county had been exposed to a similar program prior to this investigation.

Specific Locations

Several important specifications had to be met in the selection of particular locations at which to station observers for the recording of use or non-use of safety belts. It was necessary to maximize the number of eligible respondents who might be observed safely, efficiently and reliably.

Sampling Specifications: Since only vehicles containing elementary school children were eligible for inclusion in the sample, data had to be collected on weekends or after-school hours, in locations where children were likely to accompany their parents. Also, in order to ensure that a sufficiently large and representative sample would be obtained quickly and efficiently, observers had to be stationed at locations which customarily draw dense and heterogeneous local populations at a relatively continuous rate during daylight, after-school hours.

Convenience, efficiency and safety: It was essential that the layout of the selected locations allow the safe and efficient positioning of field staff within the areas in order for them to observe a maximum number of stationary and moving cars with relative ease and accuracy.

After careful consideration of a number of alternatives, it was concluded that shopping centers would best fulfill the above requirements. A number of other possible locations, such as churches, restaurants and commercial intersections were rejected because of probable sampling inequities and inefficiencies of

data collection. Traffic at any single restaurant or church was likely to be relatively sparse and restricted to brief, peak periods. School areas were dismissed as impractical, since a large proportion of children in these counties were believed to travel to school by bus.

In contrast, shopping centers appeared to meet the location requirements because their high traffic density and relative heterogeneity increased the likelihood that a representative sample of children and families could be obtained.* In addition, by stationing field personnel at large shopping centers, we were able to reduce the number of observation locations needed to obtain an adequate sample, thereby increasing efficiency and uniformity of field staff performance.

Data collection procedures were also facilitated by the relative safety and convenience of stationing field staff at key locations within the shopping center parking lots. Observers collecting the in-transit data were stationed at parking lot exits, where higher traffic density (as well as traffic lights or stop signs) require that vehicles reduce speed sufficiently to permit inspection of seat belt use and auto tags.

There are only five shopping centers in Loudoun County and all of them were used as data collection sites in the study. Four shopping centers were selected in Prince Georges County to reflect geographic and, insofar as possible, demographic variability. A complete list of these centers appears in the Appendix.

Development of sampling procedures: Although the data collection procedure designed for the study could not be expected to yield a truly randomized sample of eligible or "exposed" respondents (for example, motorists whose children did not accompany them shopping during the study were effectively excluded from the sample), shopping centers were expected to provide the most representative sample of eligible county residents possible under these study conditions.

*A previous study conducted by National Analysts for NHTSA (cited earlier) indicated that one or more members of nearly all households make short distance shopping trips at least once a week.

Trained field staff personnel stationed at strategic locations in the data collection sites selected "eligible" vehicles (cars containing children who appeared to be between the ages of 6 and 11) as they approached or prepared to depart, and then recorded the necessary information. For vehicles observed in the arriving and leaving conditions, field staff verified occupants' residence and other relevant personal data by direct inquiry. For the in-transit condition, however, they based their selection of "eligible" vehicles on their assumptions about the age of children in the cars, because there was no opportunity to verify or supplement this information. Since, however, the margin of sampling error expected to result from this procedure would necessarily remain constant for all three periods, it was not expected to bias relative changes in seat belt use over time.

Although it was originally expected that windshield stickers in Loudoun County would give an accurate indication of car occupants' residence it was, in fact, necessary to gather this information by direct inquiry since not all Loudoun County cars have a sticker identifying their car as such, and that a large number of families who had moved into the area within the past year still had out-of-state or out-of-county identification on their cars. Since occupants' county of residence could not be verified during the in-transit conditions, only cars which were specifically identifiable as Loudoun County cars were observed in transit. In Prince Georges County, all cars with Maryland license plates were included as long as occupants included at least one child in elementary school. In order to exclude children who are not yet in school, or who are in junior high school, observers included only cars with children who appeared to be 6 to 11 years old.

Procedure

A. Data Collection

Data was collected on the following Saturdays for each of the three data collection periods:

Period	Data Collection Days
1	March 18 and 25
2	April 15, 29 and May 6
3	May 13, 27 and June 3

Field staff were stationed in the designated shopping center parking areas in Loudoun County between the hours of 10:00 A.M. and 6:00 P.M. on each of those Saturdays. In Prince Georges County, data were collected between the hours of noon and 4:00 P.M., except on the first two Saturdays, when data were collected between the hours of 10:00 A.M. and 6:00 P.M., as in Loudoun County.

About four observers, each of whom worked a four-hour shift, were stationed on a rotating basis in each shopping center. Weather in both sites was fair and dry on each of the data collection days.

B. In-Transit Condition

Observers were stationed at exits of the parking lots, at each shopping center where cars leaving the area would stop for traffic signals or yield to cross-traffic. The observer stood at the side of the roadway and watched for cars that met the sampling requirements (vehicles with at least one child occupant who appeared to be 6 to 11 years old and bearing appropriate state and county identification).

For each eligible car, a form was completed, which included the following information:

- The age category of each passenger (under 6, 6-11, 12-17, adult)
- Whether or not lap and/or shoulder belts were in use
- License plate identification
- Shopping center
- Time period (10:00 A.M.-noon, noon-2:00 P.M., 2:00 P.M.-4:00 P.M., 4:00 P.M.-6:00 P.M.).

If an observer was not sure about a particular occupant's seat belt usage, he recorded a "don't know" for that item on the form. Data for front and rear seat occupants were recorded separately.

In the "during" and "after" periods, observers also recorded whether or not the observed cars were displaying the bumper stickers which had been distributed to the school children as part of the program, in Loudoun County. No information could be obtained from vehicle occupants by direct inquiry during the in-transit condition.

C. Arriving and Leaving Conditions

In addition to the information recorded for "in-transit" cars, "arriving" and "leaving" car forms also included:

- Grade in school of all children who appeared to be 6-11 years old (cars containing only pre-kindergarten children or children beyond grade 6 were later eliminated from the tabulations)
- School attended, in Virginia
- The make and year of the car
- A dummy question, "Do you usually bring your child(ren) when you shop here?"

Field observers made no references to seat belt use or car safety when interviewing car occupants in the arriving and leaving conditions, so that respondents remained unaware of the actual study objective. The data collectors explained instead that they were obtaining information for a study of shopping patterns, and to substantiate this claim, asked respondents the dummy question: "Do you usually bring your child(ren) when you shop here?" (The only information actually desired was the age and grade of child occupants and, in Virginia, the schools they attended, and occupants' county of residence.) Since respondents did not know the real purpose of the study, replication of respondents within and between periods did not have a biasing effect.

D. Department of Motor Vehicles Search

Because the government requires that all new cars be equipped with front lap belts as of 1966, rear lap belts as of 1967, and

shoulder belts as of 1968, the presence or absence of restraint equipment in a car can be inferred with a high degree of accuracy on the basis of its year of manufacture. In order to ascertain which of the vehicles observed actually did contain seat belts, a Department of Motor Vehicles search of car make and year was undertaken for all in-transit license plate numbers reported, and those arriving or leaving vehicles for which that information was missing. This information from two state Departments of Motor Vehicles, together with respondent information on arriving and leaving forms was used in tabulation of results.

E. Duplication of Cars

Some cars--particularly in Loudoun County where traffic at the shopping centers was less dense--were observed more than once. Some were observed at several shopping centers, some on different Saturdays, and a number were recorded more than once on the same day within the same shopping center. Since occupants of the car did not know the subject of the study, all of the observations were included in the analysis and treated as independent occurrences. That is, a driver reported to be wearing a belt upon arrival at a location but recorded as not wearing it when leaving the same shopping center on the same day was treated in the tabulations as two individuals.

F. Interview Data

Since there was no further need for precautions against respondent "sensitization" at the completion of the study, several questions were asked of child occupants of arriving vehicles sampled in Loudoun County on the final data collection day. As in previous data collection periods, interviewers approached arriving vehicle occupants after having already observed their use or non-use of restraint systems. The children were asked about their exposure to the program, their usage of seat belts before and after the program, and reasons for not using seat belts all the time.

III. OBSERVED SEAT BELT USAGE

This chapter reports the percentage of drivers and other car occupants who were observed to be wearing lap belts (or, where indicated, shoulder belts), during the experimental periods. It should be noted in interpreting these findings, that the total observation time was relatively short, and some of the children may not have already been exposed to the school program. Since there are signs that belt usage among elementary school children was increasing on the final day of observation, an extended experimental period may have produced greater belt usage than indicated here.

It should also be emphasized that while the only apparent impact on seat belt use was among elementary school children, it is precisely this group which was directly exposed to the program and therefore, the group we would reasonably expect to show largest differences over time. Any observed increases in seat belt use among other subject groups would constitute a "spin-off" or diffusionary effect rather than a direct result of the program. Thus, failure to obtain such differences is not a reflection of the direct effectiveness of the program, but is rather, an indication that only those members of a family directly exposed to the seat belt education program could be expected to change their behavior.

Furthermore, a significant proportion of children who were interviewed on the final observation day said they had increased seat belt use substantially since the onset of the program. Although self-report data of this type may be somewhat exaggerated, there is still a strong possibility that usage increased more sharply than field observations indicate. (A complete discussion of the interview data is contained in Chapter IV.)

Belt Use by Age Group

Children 6 to 11 Years Old

There are statistically significant increases from one time period to the next in front seat lap belt usage among children 6 to 11

years old in Loudoun County.[1] During Period 1, 6.1% of the 6 to 11 year old children wore lap belts, whereas the proportion increased to 7.7% in Period 2 and then to 9.9% in Period 3.

Comparing Periods 1 and 2, $\frac{X}{\sigma}$ is 1.3523[2], with only nine chances out of 100 that the difference is due to chance.

The difference between Periods 2 and 3 is greater,[3] with only two chances out of 100 that the difference is attributable to chance.

In sharp contrast, seat belt use in Prince Georges County appears to have decreased from one period to the next, although the differences are not significant.[4] While this reduction in belt use over time makes the increase in Loudoun County seem even more dramatic, caution must be exercised in the interpretation of these results, since a relatively constant rate of belt use was expected in the control county and the apparent decline is as yet unexplained.

It may be that the decreased use of seat belts observed in Maryland is attributable in part to seasonal factors. For example, the reduction in bulk of outer garments during warmer weather, and the increased likelihood that car windows will be open, may encourage passengers, particularly children, to position themselves closer to car windows. Given that seat belts probably serve to constrain or inhibit such active viewing behavior, it is possible that belt use declines in the spring and summer. Since, however, there is as yet no data available on seasonal variations in belt use, and

[1]The test to determine the significance of a difference between percentages is based on a ratio of the observed difference between two percentages divided by the standard error of their differences.

[2] $\sigma_{P1} = .9290$, $\sigma_{P2} = .7342$, $\sigma_{P1-P2} = 1.1832$

[3] $\underline{X} = 2.0696$, $\sigma_{P2} = .7342$, $\sigma_{P3} = .7662$, $\sigma_{P1-P2} = 2.0696$

[4]For Periods 2 and 3 combined versus Period 1:

$\frac{X}{\sigma} = .4022$, $\sigma_{P2} - .4135$, $\sigma_{P3} = .0697$, $\sigma_{P1-P2} = 1.0441$,

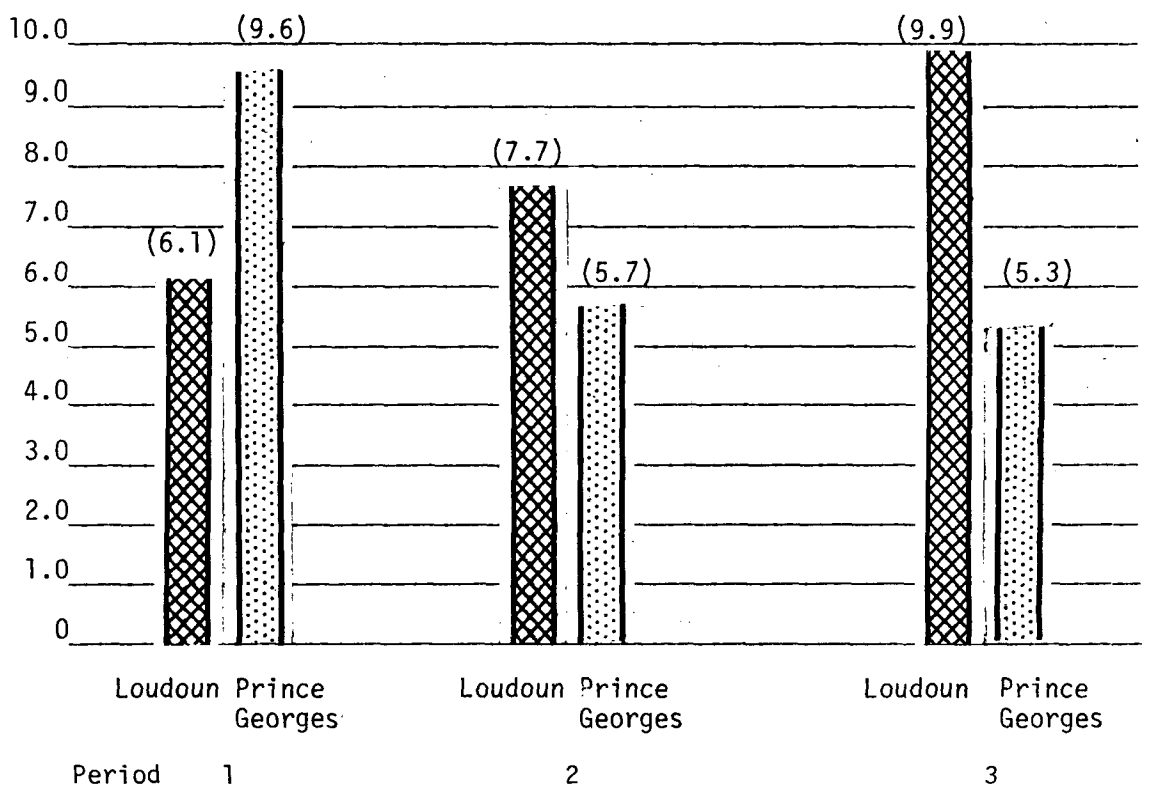
area of normal curve not covered = 34.39%

since, in addition, the figures for Prince Georges County do not meet the test of significance, it is equally likely that the decrease in use observed in the control county represents a random variation rather than a meaningful trend.

However, if there is a seasonal trend in seat belt usage, it would have an effect in Loudoun County as well, making the increase in usage there particularly noteworthy.

It is also notable that both front and rear seat lap belt usage in Loudoun County was higher during the final week of observation than in any other week. Among children in the front seat, 19.4% had a seat belt on, compared with an average usage rate of 7.8% for the entire eight week period. Usage in the rear seat on the final day of observation also was more than twice the average (9.1% versus 4.3%). These sharp increases suggest that belt use might have increased more substantially had the observation period been extended.

Lap Belt Usage, by Observation Period
(Front Seat, Children 6-11)



Lap Belt Usage

(6 to 11 Years Old)

	Front Seat (1)				Rear Seat (2)				Both Seats			
	Virginia %	(Base)	Maryland %	(Base)	Virginia %	(Base)	Maryland %	(Base)	Virginia %	(Base)	Maryland %	(Base)
Week												
1	7.1	(320)	13.8	(323)	7.7	(187)	4.9	(458)	7.2	(507)	9.2	(781)
2	5.2	(343)	5.5	(485)	.4	(229)	2.7	(594)	3.3	(572)	4.6	(1,079)
3	4.9	(336)	4.9	(190)	4.6	(362)	1.7	(270)	4.0	(698)	2.8	(460)
4	10.1	(511)	4.3	(376)	6.6	(457)	2.0	(562)	5.7	(968)	2.5	(938)
5	8.1	(471)	8.0	(269)	2.8	(361)	1.8	(379)	6.2	(832)	3.7	(648)
6	4.4	(600)	4.8	(408)	3.2	(482)	3.9	(393)	3.3	(1,082)	4.6	(801)
7	6.1	(604)	5.9	(317)	.7	(577)	4.4	(390)	2.6	(1,181)	3.2	(707)
8	19.4	(315)	5.3	(304)	9.1	(315)	1.4	(405)	12.3	(630)	2.2	(709)
Total	7.8	(3,500)	6.5	(2,672)	4.3	(2,970)	2.8	(3,451)	5.2	(6,470)	4.2	(6,123)
Period												
1	6.1	(663)	9.6	(808)	4.0	(416)	3.8	(1,052)	5.2	(1,079)	6.9	(1,860)
2	7.7	(1,318)	5.7	(835)	4.6	(1,180)	1.8	(1,211)	5.3	(2,498)	3.0	(2,046)
3	9.9	(1,519)	5.3	(1,029)	4.3	(1,374)	3.2	(1,188)	6.0	(2,893)	3.3	(2,217)

(1) Front seat usage is based on 1965 or newer cars.
(2) Rear seat usage is based on 1968 or newer cars.

Children 12 to 17 Years Old

Front seat lap belt use among 12 to 17 year old passengers decreased each period in both Loudoun and Prince Georges Counties, although the decrease was greater in Prince Georges County (6.5%) than in Virginia (2.3%). The bases for this age group tend to be small, making comparisons unreliable, but there appears to be no reasonable evidence that the program had any effect on lap belt usage by 12 to 17 year old passengers in either the front or rear seat.

Considering both seats together, decreases in the two counties are about proportionally equal, dropping from 4.8 to 3.5 in Loudoun County, and from 3.7 to 2.7 in Prince Georges County. Therefore, the program appears to have had no "spin-off" or diffusionary effect on belt usage among 12 to 17 year old youngsters.

Adults

Front seat lap belt use among adults in both Loudoun and Prince Georges Counties was greatest in Period 1. Although lap belt usage in both counties decreased from Period 1 to Period 2, and then increased in Period 3, it did not increase as high in rate in the last period as in Period 1.

Front seat lap belt usage did not decrease as much in Loudoun County as in Prince Georges. While the percentage in Prince Georges County changed from 12.9% to 7.4% to 9.1%, Loudoun County's usage started at a slightly lower level, 12.6%, decreased to 8.5%, and went up in Period 3 to 10.3%. Therefore, Loudoun County usage rate was .3 percentage point (SIC) lower than Prince Georges' in Period 1 and 1.2 percentage points higher in Period 3, although the difference between rates in the two counties is not statistically significant in any period.

As was the case with children 6 to 11, belt use among adults was substantially higher on the last day of observation than on most other days: 17.3% compared to the overall rate of 9.6% for the entire 8 week period. Since usage on the first week was also significantly

higher than usage rates recorded in subsequent weeks (18.0%), the meaning of this upsurge on the last observation day is not entirely clear. Prince Georges County, on the other hand, experienced highest usage rates in week one (16.4%) but no resurgence during the 8th week. Given the relatively lower usage rates recorded for Prince Georges County in the final week, it is tempting to hypothesize that the figure for week 8 in Loudoun County represents the beginning of an upward trend, but there is insufficient evidence to justify such a statement on the basis of only one week's increment.

Rear seat belt usage by adults cannot be evaluated reliably, since only 17 adults were observed in the rear seat in Loudoun County during an average week, and only 27, on the average, in Prince Georges County.

Lap Belt Usage

(12 to 17 Years Old)

	Front Seat (1)				Rear Seat (2)				Both Seats			
	Virginia %	(Base)	Maryland %	(Base)	Virginia %	(Base)	Maryland %	(Base)	Virginia %	(Base)	Maryland %	(Base)
Week												
1	8.3	(28)	5.5	(38)	33.3	(14)	2.1	(52)	7.1	(42)	3.3	(90)
2	5.7	(34)	7.5	(63)	0	(46)	1.1	(79)	2.5	(80)	4.2	(142)
3	4.7	(51)	0	(6)	3.7	(30)	0	(26)	3.7	(81)	0	(32)
4	11.6	(73)	6.6	(22)	6.5	(45)	.8	(68)	10.1	(118)	2.2	(90)
5	1.3	(58)	6.6	(14)	2.3	(40)	6.4	(58)	2.0	(98)	6.9	(72)
6	6.0	(55)	0	(14)	5.8	(61)	4.0	(54)	4.3	(116)	2.9	(68)
7	5.6	(84)	0	(11)	5.9	(59)	2.3	(46)	4.8	(143)	3.5	(57)
8	2.5	(32)	0	(7)	0	(32)	2.5	(46)	1.5	(64)	1.8	(53)
Total	5.9	(415)	4.5	(175)	4.3	(327)	3.0	(429)	4.7	(742)	3.4	(604)
Period												
1	7.0	(62)	6.5	(101)	16.6	(60)	1.6	(131)	4.8	(122)	3.7	(232)
2	5.8	(182)	4.4	(42)	4.1	(115)	2.4	(152)	5.2	(297)	3.0	(194)
3	4.7	(171)	0	(32)	3.9	(152)	2.9	(146)	3.5	(323)	2.7	(178)

(1) Front seat usage is based on 1965 or newer cars.
(2) Rear seat usage is based on 1968 or newer cars.

Lap Belt Usage

(Adults)

	Front Seat (1)				Rear Seat (2)				Both Seats			
	Virginia %	(Base)	Maryland %	(Base)	Virginia %	(Base)	Maryland %	(Base)	Virginia %	(Base)	Maryland %	(Base)
Week												
1	18.0	(630)	16.4	(949)	0	(8)	5.5	(23)	18.6	(638)	16.3	(972)
2	7.3	(706)	9.5	(1,191)	0	(11)	8.4	(37)	7.5	(717)	9.9	(1,228)
3	6.8	(823)	5.7	(559)	0	(6)	0	(12)	7.1	(829)	5.0	(571)
4	9.5	(1,076)	5.4	(1,161)	6.6	(18)	8.9	(42)	8.2	(1,094)	5.8	(1,207)
5	9.3	(1,028)	11.1	(794)	16.6	(15)	5.5	(12)	9.3	(1,043)	10.5	(806)
6	7.8	(1,274)	10.7	(1,032)	0	(15)	5.5	(29)	7.5	(1,289)	12.5	(1,061)
7	6.0	(1,393)	7.4	(825)	0	(43)	0	(30)	5.1	(1,436)	5.8	(855)
8	17.3	(718)	9.4	(875)	0	(17)	0	(31)	15.3	(735)	7.2	(906)
Total	9.6	(7,648)	9.7	(7,386)	2.5	(133)	4.1	(216)	9.0	(7,781)	9.3	(7,602)
Period												
1	12.6	(1,336)	12.9	(2,140)	0	(19)	6.9	(60)	13.0	(1,355)	13.1	(2,200)
2	8.5	(2,927)	7.4	(2,514)	7.7	(39)	4.8	(66)	8.2	(2,966)	7.1	(2,580)
3	10.3	(3,385)	9.1	(2,732)	0	(75)	1.8	(90)	9.3	(3,460)	8.5	(2,822)

(1) Front seat usage is based on 1965 or newer cars.
(2) Rear seat usage is based on 1968 or newer cars.

Children Under 6 Years Old

Figures for children under six are generally based on small sample sizes, and usage is much more variable from week to week in this group than in any of the others. Considering the under six year olds in the front and rear seats together, there is no evidence that the program had any effect on their use of seat belts. Use rates in Loudoun County are higher during Period 2 than Period 1, but lower in Period 3 than in either of the preceding periods. Usage in Prince Georges County is highest for Period 3.

Lap Belt Usage

(Under 6 Years Old)

	Front Seat (1)				Rear Seat (2)				Both Seats			
	Virginia %	(Base)	Maryland %	(Base)	Virginia %	(Base)	Maryland %	(Base)	Virginia %	(Base)	Maryland %	(Base)
Week												
1	0	(39)	0	(71)	10.8	(42)	1.2	(91)	3.7	(81)	.6	(162)
2	0	(56)	1.4	(87)	0	(48)	2.9	(127)	0	(104)	1.4	(214)
3	1.7	(59)	0	(27)	4.6	(85)	0	(55)	3.4	(144)	0	(82)
4	3.9	(89)	0	(62)	5.6	(143)	.4	(125)	3.0	(232)	.5	(187)
5	8.9	(68)	0	(54)	3.5	(102)	2.9	(79)	4.1	(170)	1.5	(133)
6	.9	(102)	4.6	(49)	0	(155)	6.9	(64)	.3	(257)	6.1	(113)
7	1.0	(94)	0	(51)	0	(152)	0	(85)	.4	(246)	0	(136)
8	2.3	(60)	0	(53)	3.3	(75)	2.5	(83)	2.9	(135)	1.4	(136)
Total	2.6	(567)	.8	(454)	2.9	(802)	1.9	(709)	2.0	(1,369)	1.3	(1,163)
Period												
1	0	(95)	.7	(158)	5.4	(90)	2.0	(218)	1.8	(185)	1.0	(376)
2	4.8	(216)	0	(143)	4.5	(330)	1.1	(259)	3.5	(546)	.6	(402)
3	1.4	(256)	1.5	(153)	1.1	(382)	3.1	(232)	1.2	(638)	2.5	(385)

(1) Front seat usage is based on 1965 or newer cars.
(2) Rear seat usage is based on 1968 or newer cars.

Belt Use by Car Make

Lap belt usage was higher among front and rear seat occupants of foreign cars, and among front seat occupants of American Motors cars. Rear seat belt use in American Motors cars was no higher than in other domestic cars, however.

In cars 1964 or newer, 10.3% of foreign non-sports car passengers in the front seat wore seat belts. (Usage in foreign sports cars is also high but the base is too small to permit reliable analysis.) The percentage of seatbelt use in American Motors cars (averaged for both counties) was almost as high, but since this 10.1% is the result primarily of a high rate in Loudoun County, it may be attributable to sampling variance. The high rate for foreign cars was obtained in both counties and therefore is probably more reliable.

Occupants of General Motors' cars had a slightly higher usage rate than either of the other large domestic manufacturers; 8.1% of all front seat occupants of General Motors cars had a lap belt on, compared with 7.6% of the people observed in Ford Motor Company cars, and 7.4% in Chrysler Corporation cars.

There was very little difference in rear seat belt usage among the four domestic manufacturers, but shoulder belt usage was much higher in foreign cars than in domestic cars. In foreign non-sports cars, 5.4% of front seat occupants had shoulder belts on, compared with 1.3% or less in any American manufacturers' cars. Shoulder belt use was extremely low (between 1.0% and 1.3% in all American cars).

Lap Belt Usage by Year Model of Car

There appears to be a positive relationship between recency of car model year and rate of seat belt use in Loudoun County, but the pattern is not so clear in Prince Georges. Front seat usage averaged 8.5% for 1967 or newer models in Loudoun County and only 5.4% for 1964-66 models. Note also that usage rates appeared to increase fairly steadily with each succeeding model. In Prince Georges County, however, seat belt usage averaged 7.3% in models 1964-66 compared with 8.4% in models 1967 or later, and the rates for 1964 and 1972 models were nearly the same (8.3% and 8.1% respectively).

Belt Usage by Make of Car

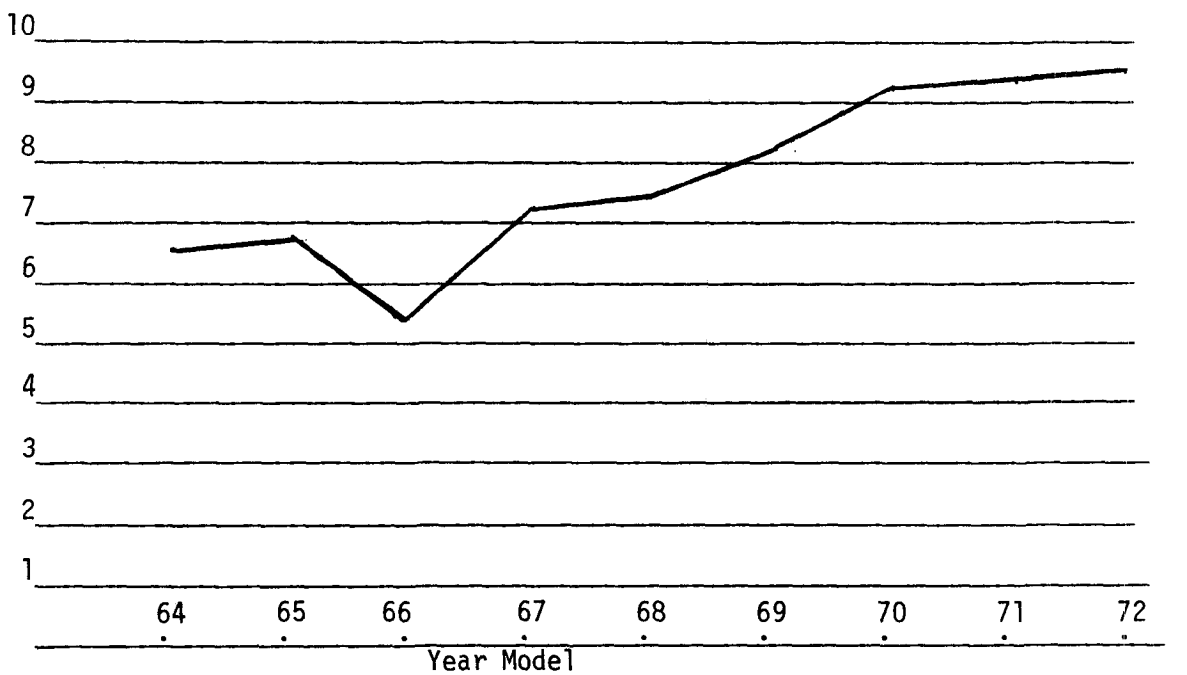
	Lap Belt Usage								Shoulder Belt Usage			
	Front Seat (1)				Rear Seat (2)							
	Loudoun County %	Prince Georges County %	Total %	(Base)	Loudoun County %	Prince Georges County %	Total %	(Base)	Loudoun County %	Prince Georges County %	Total %	(Base)
General Motors	7.6	8.6	8.1	(9,902)	2.6	2.4	2.5	(4,348)	.68	1.28	.97	(6,363)
Ford	7.5	7.7	7.6	(7,096)	3.4	1.7	2.6	(3,086)	.78	1.73	1.20	(4,834)
Chrysler	7.5	7.3	7.4	(4,103)	1.8	2.7	2.3	(1,888)	.96	1.40	1.18	(2,878)
American Motors	13.6	6.1	10.1	(624)	1.6	3.1	2.4	(247)	.94	1.74	1.30	(385)
Foreign Non-sport	10.5	10.7	10.3	(2,037)	4.0	3.6	3.8	(938)	4.82	5.93	5.37	(1,472)

(1) 1964 or newer cars.
(2) 1967 or newer cars.
(3) 1968 or newer cars.

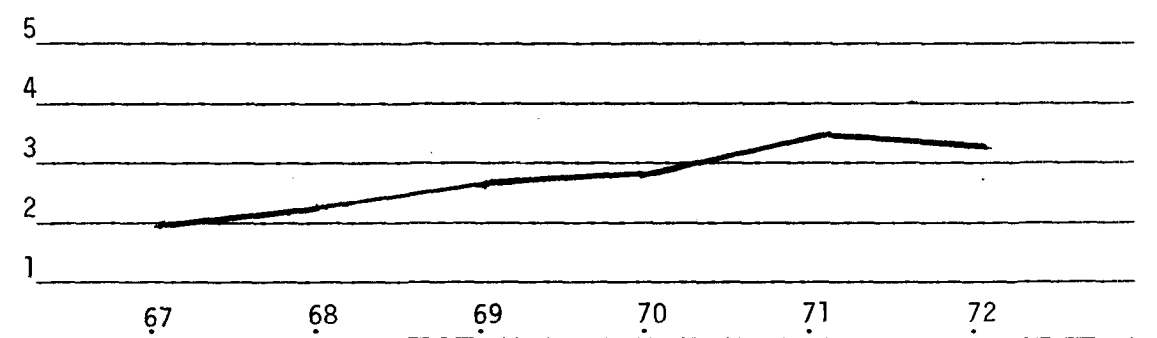
In both counties, rear seat belt usage increased with recency of car model in Loudoun County--the proportion rose from 1.4% of 1967 models to 3.6% of 1972 models--and in Prince Georges County, from 1.1% of 1967 models to 2.9% of 1972 models. Although we may speculate on factors which could account for such a relationship--for example, demographic or personal characteristics of older model car owners or improvements in newer model seat belt design--there is no way of determining the reason for increased usage in newer model cars on the basis of the data at hand.

Lap Belt Usage by Year Model of Car
(Loudoun and Prince Georges Counties Together)

Front Seat Belt Usage



Rear Seat Belt Usage



Lap Belt Usage by Year Model of Car
(Loudon and Prince Georges Counties Together)

	Front Seat				Rear Seat			
	Loudoun County		Prince Georges County		Loudoun County		Prince Georges County	
	%	(Base)	%	(Base)	%	(Base)	%	(Base)
1972	10.6	(1,209)	8.1	(1,114)	3.6	(600)	2.9	(704)
1971	9.1	(2,103)	9.4	(1,762)	3.4	(1,029)	3.6	(1,083)
1970	9.2	(1,871)	9.3	(1,790)	4.3	(946)	1.7	(1,118)
1969	7.5	(2,054)	9.0	(1,574)	2.3	(1,064)	1.9	(973)
1968	7.8	(1,630)	7.2	(1,426)	1.8	(822)	2.9	(927)
1967	7.1	(1,306)	7.5	(1,111)	1.4	(679)	1.1	(723)
1966	4.7	(1,109)	6.1	(1,051)	-		-	
1965	6.3	(1,113)	7.4	(861)	-		-	
1964	5.3	(840)	8.3	(621)	-		-	

IV. INTERVIEW DATA

On the last day of data collection, children 6 to 11 years old observed in arriving and leaving cars were asked several questions about the program. Where cars contained more than one eligible child, only one was questioned. To avoid contamination of respondents in the leaving condition, observers waited until the vehicle was backed out of its parking space and beginning to move forward before questioning the child. Seat belt usage was recorded on the basis of what the observer noted before questions were asked.

Discussion and Knowledge of Seatbelts

Nine out of ten children (89.4%) reported that their class in school had discussed seat belts several weeks earlier. When asked what they had learned about them, a little over 50% said that "You should use them all the time." Others were more specific in describing the reasons for using seat belts or the consequences of not doing so. For example, some of the children mentioned that it is safer to wear belts (19%); that seat belts prevent passengers from being thrown through the windshield (9%); that seat belts save lives (7%), etc. Only 8% of the children said they could not remember what they had learned.

Responses to the Question:
What Did You Learn About Seat Belts?*

Should wear them (all the time)	51%
It's safer to wear belts	19
How to use or wear belts	14
Prevents riders from being thrown through windshield	9
What happens if you don't wear belts	8
Seat belts save lives	7
Less chance of being hurt in an accident	6
Prevents riders from being thrown out of car	2
Should get parents to wear seat belts	1
Other responses	6
Don't remember, don't know	8
Base	(340)

*Note that percentages exceed 100% since some of the children gave more than one response.

Seven out of ten (70.6%) of all children interviewed--and eight out of ten 5th and 6th graders--said they had told their parents what they had heard about seat belts in school. Children wearing seat belts were also more likely (than those who were not) to have talked to their parents about the program. Eighty-one percent of those with belts on claimed to have discussed the school program at home compared with 68% of the children not wearing belts at the interview. (Since these tabulations are based on children in the front seats of 1964 or newer cars and the back seats of 1967 or newer cars, almost all of the children included in these results should have had seat belts available.) This apparent relationship between wearing seat belts and discussing the program at home is not necessarily a causal one, however. It is more likely that a child who was influenced by what he had learned in school was inclined both to talk to his parents about what he had learned and to wear a seat belt.

Reported Usage of Seat Belts

Most of the children say they wore seat belts more frequently after the program than they did before. Better than four fifths (84.6%) of those who were wearing belts at the time of interview and as many as 51.7% of those not wearing them reported that their use of belts had increased during the past several weeks. This self-reported increase in belt use among 6 to 11 year olds is considerably greater than would be expected on the basis of behavior observed during the data collection periods. There are several reasons why the two sets of data (self-reports and observations) may appear to be inconsistent.

While there may, for example, have been substantial increases in seat belt usage during longer or high-speed trips, such changes in behavior would not be susceptible to accurate measurement at local shopping centers. Most Loudoun County residents live in relatively concentrated areas such as Leesburg or Sterling Park and do not have to travel more than a mile to their local shopping center.

Since it has been shown in other studies that use of seat belts is directly related to length of trip, it is quite possible that increases in frequency of use were significantly under-estimated by these figures.

It is also possible that an extension of field operations beyond the scheduled observation period would have produced data more consistent with children's reported belt use, given unanticipated delays in program presentation (at some schools) and the relatively sharp increases in use observed on the final day of data collection.

It should be noted, on the other hand, that children as well as adults tend to give "socially-desired" responses to interview questions. They are likely to exaggerate reports of "good" or desirable behavior, and to understate responses which imply deviance from social norms and expectations. Since an interview situation has unavoidable "demand characteristics"--and in this case, children were questioned about a school-related program--a certain amount of exaggeration about the extent of their compliance was to be expected. On the other hand, the presence of a parent (in almost all cases) probably helped to minimize exaggeration, particularly since the child was asked to report on aspects of his behavior about which the parent had first-hand knowledge.

When asked about the frequency of their seat belt usage, 28% of the children* said that they had worn belts most or all of the time during the previous two or three weeks, whereas only 13% indicated that they had worn belts that frequently prior to the school program. It appears, from the children's responses to this item, that the program was somewhat more effective in increasing usage (i.e., among those who report having worn them prior to the program) than in initiating it. For example, 34% said that they never wore seat belts prior to the program, and almost as many, 27%, said they never wore them afterwards. In contrast, the proportion of those claiming to wear them most or all of the time since exposure to the program (28%) was twice as high as those who reported having worn them most or all of the time prior to the program (13%).

Children's Reported Frequency of Belt Use

	Before Program*#	During Past Two or Three Weeks*
Not at all	34%	27%
Sometimes, about half of the time	52	47
Most or all of the time	13	28
Base	(227)	(261)

Children's claimed frequency of seat belt use--both for the period preceding the program and the weeks following--is related to use of seat belts by the driver of the car. Children in cars whose drivers were wearing seat belts were considerably more likely to say they wore seat belts most of the time (both before and after the program) than were those in cars where the drivers did not have a belt on.

* In the front seat of 1964 or newer cars or in the rear seat of 1967 or newer cars.
# Includes only children who recall something about the program.

Furthermore, the absolute increase in the number of children claiming to wear belts most or all of the time since exposure to the program was considerably larger for those children occupying cars in which the driver wore a belt (a rise of 38% to 78%). In contrast, the proportion of children in cars whose drivers did not wear seat belts at the interview, and who claimed to wear belts all or most of the time rose from only 7% for the period before the program to 15% for the few weeks following it.

These findings suggest that children who were influenced by the program may have exerted some influence on their parents as well, or alternatively, that children whose parents wear seat belts were more susceptible to the program influence. There is no way to determine the relative importance of each of these two factors, but it is likely that both are in some measure responsible for the apparent relationship between adult belt use and reported frequency of use among children.

Children's Reported Frequency of Belt Use

	Before Program		During Past Two, Three Weeks	
	Driver Belt On	Not On	Driver Belt On	Not On
Not at all	20%	38%	4%	33%
Sometimes, about half the time	42	55	18	52
Most of the time	38	7	78	15
Base	(45)	(179)	(50)	(208)

When asked why they did not wear seat belts all of the time, nearly two out of five children said they had "no real reason". Other explanations offered frequently were seat belts are uncomfortable or confining; they are not readily available because they tend to become tangled or lodged under the seat; the car has belts only in the front and/or only two belts in the front; belts are a nuisance; and belts are stuck or otherwise not easily available.

It is noteworthy that a substantial proportion of children say that they do not have seat belts readily available; 9% say there are only belts in the front seat or only two belts in the front seat, the belts are not in working order, or that they are stuck. All together, 22% of the children mentioned these reasons for not wearing a seat belt all of the time.

Unavailability of seat belts reduces the absolute level of lap belt usage, of course, and can be expected to have affected the magnitude of change in use rates, since some children who may have wanted to use seat belts after program exposure were unable to do so.

Reasons for Not Wearing Seat Belts All of the Time

No real reason, just don't think of it	40%
Belts are uncomfortable, tight, confining	20
Car has only front seat belts, two belts in front seat	9
Belts are a nuisance, bothersome	9
Belts not easily available, under seat, stuck	8
Car not equipped with belts, not in working order	5
Use belts on certain occasions--going fast, far	4
Belts are complicated to use, don't know how to use	3
Belts can be dangerous	1
Other	2
I do wear them all the time	6

V. DISPLAY OF BUMPER STICKERS

As part of the program, each child was given a bumper sticker at school which said "Safety Belts Preserve a Vital Natural Resource -- Life." Approximately one out of twelve cars observed during the second period and about one-eighth of those observed in the third period displayed these stickers.

Display of stickers did not vary much by grade in school, with the exception of cars containing kindergarten children whose bumper sticker display rate averaged only 5.2% over the two periods. The proportion of cars displaying stickers ranged on the average from 10.6% to 13% for all other grades, with a slight tendency for more widespread sticker display among cars containing children in the higher grades.

With only one exception--a drop of 1.3% among cars with kindergarten children--display increased from Period 2 to Period 3 for all grades. Since an actual decrease in sticker display is quite unlikely (removal involves some effort) the drop in number of stickers on cars containing kindergarten children is probably attributable to sampling variance. Excluding kindergarten, therefore, average display across grades increased from 9.8% in Period 2 to 13.6% in Period 3. Although this increase reflects, to some extent, a later-than-expected presentation of the program in certain of the schools, it is probably the result also of a time lag between the distribution of stickers and their eventual display, perhaps due to an increase in motivation over time.

Bumper sticker display varied considerably by school. Children attending the Ashburn School, for example, were least likely to be observed in cars displaying stickers. They averaged only 4.7% compared with averages of 15.6% or higher among pupils of the Guilford, Sully, Lovettsville or Round Hill Schools. In most cases, display rates were higher in Period 3 than Period 2, with Lovettsville students showing a particularly large increase, from 6.9% in Period 2 to 25.0% in Period 3. Although there are some decreases (for example, Douglass and Hamilton), they are probably the result of sampling variance, since bases by school are not very large. Also, as was pointed out earlier, an actual reduction in sticker display over a relatively short period of time is unlikely, given that considerable effort is required to remove them.

Bumper Sticker Usage

Grade	Period 2	Base	Period 3	Base
Kindergarten	5.9	(85)	4.6	(65)
First grade	9.5	(253)	12.5	(297)
Second grade	9.0	(278)	12.7	(323)
Third grade	9.5	(264)	14.2	(316)
Fourth grade	12.1	(240)	13.7	(307)
Fifth grade	9.0	(200)	12.2	(221)
Sixth grade	9.6	(136)	16.3	(153)
School*				
Ashburn	2.3	(44)	7.1	(28)
Catoctin	8.7	(115)	8.2	(147)
Douglass	11.4	(88)	6.5	(92)
Emerick	3.8	(78)	8.5	(71)
Guilford	12.3	(73)	19.0	(121)
Hamilton	17.8	(45)	7.8	(51)
Lincoln	8.7	(46)	11.1	(45)
Lovettsville	6.9	(29)	25.0	(32)
Round Hill	13.0	(54)	19.0	(63)
Sterling	9.2	(142)	14.1	(163)
Sully	12.8	(117)	18.6	(172)
Total	8.3	(1,148)	12.1	(1,298)

*Only those schools with at least 25 children in both time periods

Sticker Display and Belt Use

All age groups exhibited a strong positive correlation between the display of a safety belt bumper sticker on the car and use of lap belts. In Periods 2 and 3, 15.7% of the 6 to 11-year-old children wore lap belts compared with only 3.9% of children in the same age groups observed in cars without stickers.

The difference in belt use according to the presence or absence of a sticker on the car is also substantial for adults: 21.8% of those in cars displaying bumper stickers wore lap belts, in contrast with 8.0% of those in cars without stickers. Belt use among 12 to 17-year-old children was more than twice as high in cars displaying stickers.

Children under six were least likely to wear seat belts whether or not stickers were present, but usage for this group was also higher in cars displaying stickers (2.6% versus 1.3%).

Presence of a bumper sticker was most highly correlated with use of lap belts among the 6- to 11-year-old group. Comparing all occupants of cars not displaying stickers, the 6-11-year-olds were no more likely than 12 to 17-year-olds to wear belts and only about half as likely as adults. In cars displaying bumper stickers, however, the belt use rate for children 6 to 11 was about 50% higher than the rate for 12 to 17-year-olds and three quarters as high as the rate observed among adults.

Lap Belt Usage, by Bumper Sticker on Car
(Loudoun County--Periods 2 and 3)

	Bumper Sticker On		No Bumper Sticker	
	Had Lap Belt On	Base	Had Lap Belt On	Base
Adults	21.8%	(283)	8.0%	(3,325)
12-17	9.4	(32)	3.7	(299)
6-11	15.7	(274)	3.9	(2,903)
Under 6*	2.6	(38)	1.3	(547)

*Children in car seats excluded from base.

VI. PROGRAM MATERIALS

The educational materials given to each teacher consisted of two booklets and a safety belt game. Each teacher received the "Automobile Safety Belt Fact Book", a 35 page booklet which summarizes relevant information about the effectiveness of safety belts. The Fact Book describes the motivating factors related to seat belt usage and suggests ways to influence others to wear belts. This booklet provides background information for the teacher, in order to more effectively encourage safety belt usage.

Teachers of grades kindergarten through three received a second booklet, "Teaching Children about Safety Belts". This is a 32 page booklet designed for the teacher, providing her with a choice of 16 suggested activities suitable for children in the first four years of school. In this booklet, the teacher is provided with a discussion of the objectives of the program, instructions on proper use of safety belts (including the shoulder harness), and materials such as songs, stories, plays and brochures. Teachers of grades four through seven received "The Automobile Safety Belt Activities Book, Grades 4-7". This booklet is similar to the booklet described above, but is designed for the teacher of children in these later grades.

The "Safety Belt Game" is a board game designed for two to four child players. The game is based on moving a marker along a path to the "amusement park", and is suitable for children in grades two through six. The teachers were given the material designed for their grade, and were asked to review it, and use whatever materials they felt were most appropriate for their students. These materials were to be used during the one-month period following Easter vacation.

The teachers were also asked to spend about 45 minutes each week during the test period on the program. During this monthly period, each child was exposed to a variety of program materials for approximately three hours, overall.

Teacher's Usage of Seat Belts

When the educational materials were distributed, a short form was included requesting the teachers to indicate which of the suggested program activities were used, and the extent to which each was used.

This form also requested each teacher to indicate her own use of seat belts before and after the program. The table below shows the teacher's self-reported use of seat belts during these two time periods.

Twenty-six percent of the teachers say they always wore their belts before the program, and 30% reported that they always wore them after the program. (The 26% rate corresponds closely with usage among the general population.)*

More importantly, there was a large increase in teachers' usage of belts "more than half the time", which rose from 15% before the program to 46% after the program. These results clearly indicate that the program had a very positive effect on belt usage among the teachers.

Teachers' Reported Use of Seat Belts

	Before Program	After Program
Always	26%	30%
More than half the time	15	46
Less than half the time	42	18
Never	17	6

Base = 190

*See "Motivating Factors in the Use of Restraint Systems," prepared by National Analysts for the National Highway Traffic Safety Administration of the U. S. Department of Transportation, September, 1971.

VII. CONCLUSIONS

The program appeared to produce a significant increase in the use of front seat belts among 6 to 11 year old children but did not influence the behavior of other groups in the sample. The absence of any discernible effect on either adult or adolescent seat belt use is not surprising, however, since only the 6 to 11 year olds were directly exposed to the education program. Therefore, had any changes in level of seat belt use among members of their families actually been detected, such changes would have constituted an indirect or diffusionary effect rather than a direct program impact.

There was a strong relationship for all groups between the use of seat belts and the display of bumper stickers, although it is not known whether children who wore seat belts were more likely to request that their parents display the stickers on the cars, or whether the decision to display them actually served to reinforce compliance with the program. It is likely that the display of stickers and the use of seat belts were mutually supportive.

Interviews conducted with 6 to 11 year olds on the final day of data collection revealed that most respondents recalled learning about seat belts in their classes and had discussed what they learned with their parents. It is important to note, however, that the level of self-reported seat belt use was considerably higher than observed usage rates. This discrepancy may be, in part, a function of the demand characteristics of the interview situation, but is believed that although such influences are difficult to eliminate entirely, they were successfully minimized in this study.

It is also possible that much of the discrepancy between observed and self-reported increases in seat belt use represents an increase in intention to wear seat belts rather than an undetected change in actual behavior. Although attempts at persuading people to modify behavior (e.g., use seat belts) typically focus on attitude as well as behavior, changes in cognition and behavior are frequently independent of one another. Furthermore, the decision to engage in new behavior once some change in attitude has occurred may take place over a relatively long period of time. Therefore, the levels of observed seat belt use obtained during the 8-week measurement period may not adequately reflect certain longer-run program effects.

Given the relative independence of attitude and behavior, an emphasis on bringing about modifications in behavior directly (for example, by compulsion or negative reinforcement) rather than indirectly (by changing attitudes) may be necessary to maximize compliance. Presumably, such an emphasis on behavior over attitude and cognition would be important in influencing adults, most of whom already know they "should" wear belts but require additional incentive to behave accordingly. Further research is recommended to determine the types and levels of inducements which may be necessary to obtain significant increases in seat belt use.

APPENDIX A

COMPARISON OF SEAT BELT USE ACROSS CONDITIONS FOR DUPLICATE OBSERVATIONS

A comparison was made of the level of seat belt use observed in arriving, leaving and in-transit cars as a means both of validating field procedures and of determining the degree of variation in belt use patterns that might be expected under the different conditions. Although these data were available for the entire sample, it was felt that some variance could be reduced if an additional cross-condition comparison was made based only on cars observed more than once during a consecutive four-hour period.

As was mentioned earlier, repeated observations of a given vehicle were treated in the primary data analysis as independent occurrences, since the data collection procedure involved no reactive measures. In this last treatment, however, cars observed under different conditions on a single day (based only on the third and sixth data collection days) were made to serve as their own controls by comparing occupants' behavior across the three conditions. Two basic criteria were used for selecting cars to be included in this analysis:

1. In order to maximize the likelihood that the same occupants were being compared across conditions, it was recognized that this stipulation would exclude some cars which were making a single (but longer than four-hour) trip to the center. However, most people in Loudoun County live near the shopping centers and may make several trips there during the course of a day. Thus, it was felt that cars observed more than once over longer (than four-hour) time periods were likely to have made more than a single trip and were most appropriately eliminated from this sub-sample. Only those cars which were believed to have been observed more than once during a single trip (that is, within a period of four consecutive hours) were included.

2. In addition, it was necessary that the age categories of car occupants remain constant across repeat observations in order to increase the probability that the same people occupied the car each time it was observed. Cars which appeared to have

picked up or dropped passengers were retained in the sample, but where there were obvious changes in age categories from one condition to the other, the car was excluded.

Applying these criteria to the third and sixth data collection days, a total of 208 cars were observed more than once during a single trip under the following combinations of conditions:

Conditions	Number of Cars Observed
Arriving and in-transit	107
Leaving and in-transit	87
Arriving and leaving	8
All three forms	6
Total	208

In 74.5% of the duplicated cases, recorded seat belt use or indeterminacy of use* remained constant for all car occupants. Thirty-one of the 51 remaining cases were instances in which usage varied across observations, and 20 were instances in which belt behavior was indeterminate on one observation but negative (no belt) on the other. There were no cases in which an occupant's belt usage was unknown during one observation but was recorded as positive during another. Determination of seat belt use was most difficult for "in-transit" cars, as reflected by the higher proportion of "don't know" observations in that category.

Arriving and In-Transit
(All Figures are Numbers)

	3rd Week	6th Week	Total
Base	25	82	107
Seat Belt Use			
Same	14	62	76
Arriving higher	2	8	10
In-transit higher	2	7	9
Fewer "Don't Know" Observation			
Arriving	6	3	9
In-transit	1	2	3

Among cars that were observed both leaving and in transit, belt use was higher under the leaving condition. We would expect in transit belt use to equal if not exceed use in departing cars, however, and thus it is likely that the absolute level of in transit usage has been under-estimated due to poorer visibility under that condition. Since such an underestimation would remain constant throughout the entire study, it would not, therefore, be expected to influence the magnitude of relative differences in belt use from one period to another.

Leaving and In-Transit

(All Figures are Numbers)

	3rd Week	6th Week	Total
Base	34	53	87
Seat Belt Usage			
Same	23	45	68
Leaving higher	3	7	10
In-transit higher	1	0	1
Fewer "Don't Know" Observation			
Leaving	7	0	7
In-transit	0	1	1

APPENDIX B

Number of Cars Observed

	Loudoun County				Prince Georges County			
	Total	Arriving	Leaving	In-transit	Total	Arriving	Leaving	In-transit
March 18	750	164	150	436	941	257	253	431
March 25	822	190	226	406	1,235	173	233	829
April 15	840	135	219	486	502	81	127	294
April 29	1,132	226	178	728	972	139	193	640
May 6	1,047	225	165	657	681	118	177	386
May 13	1,240	262	172	806	866	162	238	466
May 27	1,352	301	220	831	801	126	134	541
June 3	667	200	143	324	822	134	190	498