

NPP-17

I SAFETY BELT USAGE AMONG DRIVERS
II USE OF CHILD RESTRAINT DEVICES, PASSENGER SAFETY BELTS AND POSITION OF PASSENGERS IN CARS
III MOTORCYCLE HELMET USAGE

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16. Abstract This report presents findings from three observation studies conducted for NHTSA. <u>Safety Belt Usage Among Drivers:</u> The purpose of this study was to continue to monitor the use or non-use of safety belts by drivers in 19 U.S. cities. A total of 159,842 observations, collected during November 1977-November 1979, form the basis of this report. The study shows a declining use of safety belts by drivers. During 1979, the average usage rate was 10.9%. This compares with an average usage rate of 13% in 1978. <u>Use of Child Restraint Devices, Passenger Safety Belts and Position of Passengers in Cars:</u> The main objectives were to assess the use of restraint devices for infants and small children and to monitor belt usage by sub-teen, teen and adult passengers. Also, to determine the extent of any "out of position seating" problem for all unrestrained passengers. Findings are based on a total of 29,168 observations collected in 19 U.S. cities during July-December 1979. Use of restraint devices for infants and small children and safety belts by passengers are at relatively low levels. 45.3% of infants and 8.7% of small children were observed to be in child restraint seats. The percent of other passengers wearing a safety belt were: small children (2%), sub-teens (3.3%), teens (3.7%) and adults (6.9%). <u>Motorcycle Helmet Usage:</u> The main purpose was to ascertain the use of helmets by drivers and passengers of motorcycles in 19 U.S. cities. Findings are based on 10,039 observations collected from May-September 1979. In cities with helmet laws, 97.5% of drivers and 96.5% of passengers used helmets. In cities with no or only limited laws, only 51.7% of drivers and 46.7% of passengers used helmets.					
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METRIC CONVERSION FACTORS

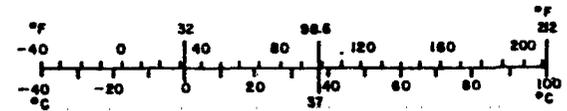
Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
in ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
VOLUME				
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.96	liters	l
gal	gallons	3.8	liters	l
ft ³	cubic feet	0.03	cubic meters	m ³
yd ³	cubic yards	0.76	cubic meters	m ³
TEMPERATURE (exact)				
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price \$2.25, SD Catalog No. CT13.10-286.

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares (10,000 m ²)	2.5	acres	
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
VOLUME				
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m ³	cubic meters	36	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³
TEMPERATURE (exact)				
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



FOREWORD

This report presents findings from three observation studies conducted by Opinion Research Corporation under a contract with the National Highway Traffic Safety Administration.

The report is organized into three sections. Each section includes the following:

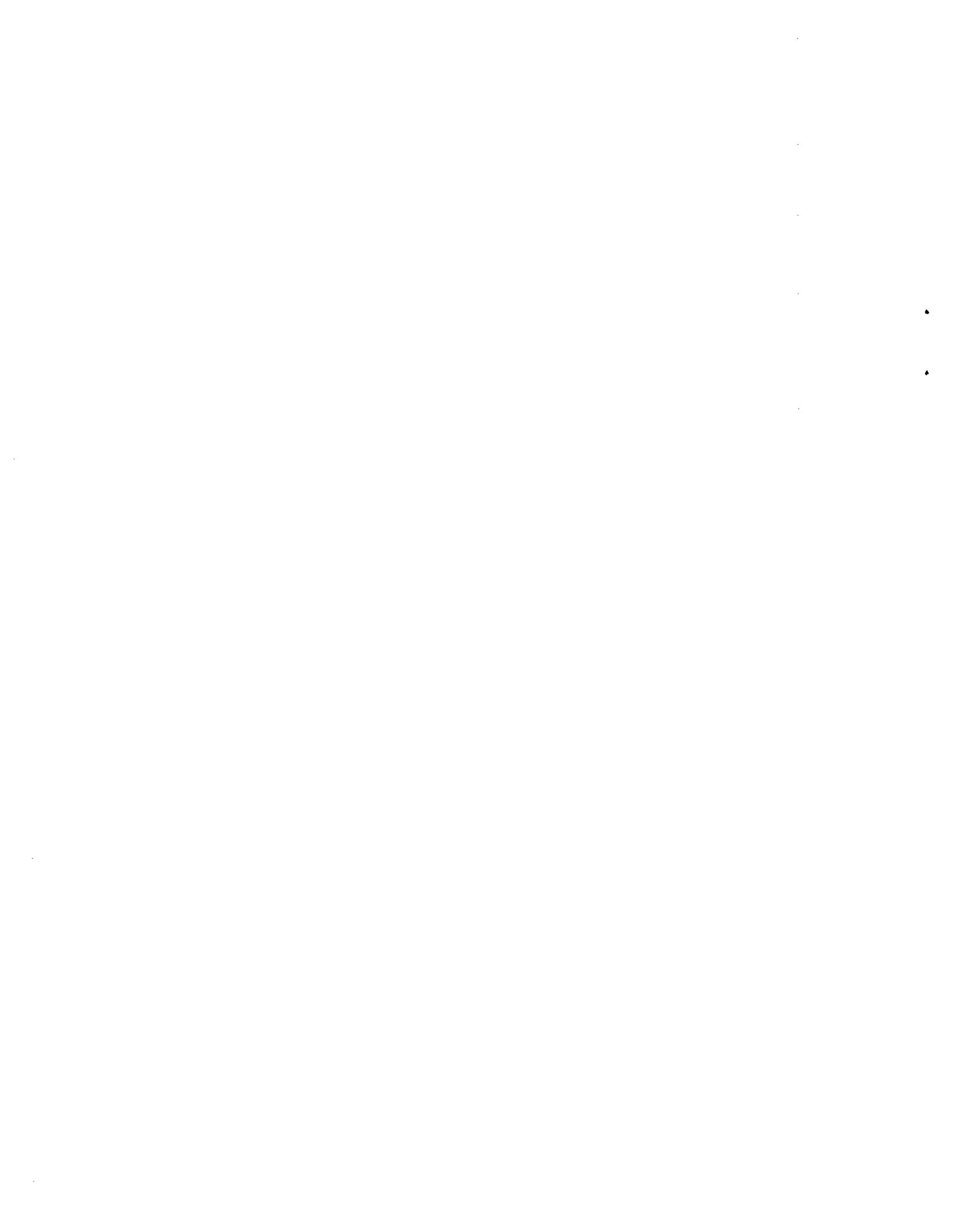
- Introduction and Methodology
- Summary
- Detailed Findings

Study findings are presented in the following order:

- I Safety Belt Usage Among Drivers:
Survey of Cars in the Traffic Population
- II Use of Child Restraint Devices, Passenger
Safety Belts, and Position of Passengers
in Cars
- III Motorcycle Helmet Usage

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I

Safety Belt Usage Among Drivers:
Survey of Cars in the Traffic Population

INTRODUCTION: BACKGROUND AND OBJECTIVES

Background

It is generally recognized that the utilization of the safety belts already in passenger cars would constitute the most cost-effective single measure to reduce fatalities and injuries in motor vehicle crashes.

Although lap belts were required in passenger vehicles as early as 1964 and lap and shoulder belts were required in 1968 models, their rate of usage was discouragingly low. In an attempt to increase wearing rates, NHTSA established a requirement for light-and-buzzer warning systems for 1972 and 1973 model cars. The "use-inducing" warning systems initially increased belt usage from about 20 percent to approximately 40 percent. Unfortunately, after about 2 years, belt usage in these cars had decreased to former levels (20 percent). Shoulder belts were detachable in these systems, and were used less than 5 percent of the time.

Requirements for 1974-1977 systems were changed, making the shoulder harness permanently attached to the lap belt so that it would be used when the lap belt was used. Secondly, the shoulder belt was put on an extensible reel to allow greater freedom of movement and enhance comfort.

In addition to the light-and-buzzer system, a starter interlock (designed to prevent starting of the engine), and a sequential logic (to prevent circumvention of the system), were required for the 1974 model cars. NHTSA studies of belt usage in 19 cities indicated that there was a dramatic increase in usage in interlock-equipped cars. Initially, usage was about 75 percent but, due to many factors, usage in these cars decreased to about 30-35 percent by 1976. Factors associated with this reduction of belt usage include ease of system defeat; discomfort and inconvenience of belts; and public resentment of interlocks. These same factors, no doubt, also played a significant role leading to Congressional action that prohibits NHTSA from requiring interlock and continuous buzzer safety belt systems. As a result, 1975-1977 model cars are equipped with a warning system that consists of a "fasten seat belt" light that illuminates for 4-8 seconds after the ignition is turned on, and a buzzer that sounds for 4-8 seconds if the driver does not have his belt buckled. Limited data in cars equipped with this warning system during 1976 indicates that belt usage was about 25 percent.

In 1976, manufacturers began installing single retractor belt systems rather than the retractor systems, and most 1976 and newer model cars were equipped with these systems. As compared with the earlier restraint systems, the newer systems have been found to have significantly more problems with accessibility and the buckling of the latch plate.

Objectives

NHTSA has sponsored several studies in the past which have been directed to observe and record belt usage by drivers in cars equipped with different warning and hardware systems in 19 cities. The purpose of the current research effort is to continue observing and recording belt usage for a period of 26 months (November 1977-December 1979) in these same 19 cities to determine the effectiveness of various older, as well as newer, safety belt systems in increasing belt usage.

Specific Objectives of This Study Are:

1. To continue to monitor safety belt usage rates by drivers in all model year cars (Model years 1964 through 1980)
2. Analyze usage data by:
 - Type of belt system
 - Age and sex of driver
 - Model year of car
 - Region of country
 - Type of road
 - Month of year
 - Car make and model

In addition to observing and recording safety belt usage at primary road intersections and freeway exit sites in the 19 cities, the study was designed to observe safety belt usage: (1) in rural areas; and (2) on three major turnpikes -- Massachusetts, Pennsylvania and Florida for a period of 12 months. The primary purpose of the Turnpike Study was to measure daytime vs. nighttime safety belt usage among drivers.

METHODOLOGY

This study on safety belt usage is a follow-up to earlier studies of this type conducted for the National Highway Traffic Safety Administration (NHTSA). In the current study, safety belt usage was monitored on a continuous basis over a 26-month period (November 1977-December 1979) by observing drivers of passenger cars as they stopped for a red light at traffic intersections in each of 19 major U.S. cities. Only passenger vehicles of 1964 and later model years were observed.

To meet survey objectives, the research design called for a number of tasks. The major tasks, in addition to the analysis and preparation of this report, were:

- Sample design
- Train four full-time observers
- Collect observation data
- Periodic field checks by supervisory personnel
- Verify license plate numbers through the respective state DMV's (Department of Motor Vehicles)

Sample Design -- 19-City Study

The research design detailed below was developed in response to the NHTSA requirement that direct observation of safety belt usage be carried out.

The 19 cities to be covered by the survey are the same cities observed in past NHTSA studies of safety belt usage. A regional breakdown of the 19 cities is presented below:

Northeast

New York, N.Y.
Boston, Mass.
Providence, R.I.
Pittsburgh, Pa.
Baltimore, Md.

South

Atlanta, Ga.
Miami, Fla.
Dallas, Tex.
Houston, Tex.
New Orleans, La.
Birmingham, Ala.

North Central

Chicago, Ill.
Minneapolis-St. Paul, Minn.
Fargo, N.D.-Moorhead, Minn.

West

Los Angeles, Cal.
San Francisco, Cal.
San Diego, Cal.
Phoenix, Ariz.
Seattle, Wash.

The 19 cities were purposively selected, and probability sampling within each of the cities was undertaken in order to select traffic sites that would provide representative and cost-effective data.

The major aim of the sample design was to allow for the estimation of the proportion of automobile drivers on the road who were wearing their safety belts.

NHTSA specified that, for each of the 19 cities in the survey, two primary road intersections and one freeway exit be selected for each month of the observation period, so that over the complete contract period these sites will provide aggregate data that is representative of the city.

For each city area (the corporate city, along with the contiguous suburban areas), detailed road maps were used. Each map was subdivided into a mutually exclusive and exhaustive system of square grid areas.

The square grids on each map were then carefully examined and classified as being one of three stratum: (1) squares in open country areas containing few or no primary roads running through them; (2) squares containing one or more freeway exits; and (3) squares containing primary roads but no freeway exits.

Those squares in the first group were assigned a zero probability of being selected into the sample. The squares in the second and third groups were then ordered in a serpentine fashion, and 22 primary road squares and 11 freeway exit squares were systematically selected. This stratification procedure was carried out in order to ensure two different types of traffic -- high-speed automobiles exiting freeways, and slower moving traffic on primary urban and suburban roads.

The basic sample design called for observers to collect data at a traffic intersection in two of the primary road grids for each of the 26 observational months and in one freeway exit grid each month. In order to reduce the amount of time the observer must spend traveling between traffic observation sites, we grouped the 33 selected squares into 11 triplets (one freeway and two primary road squares,) based on the criterion that the three locations be as close as possible to each other in any given month.

This selection procedure ensured a good geographical spread of observation sites.

Several primary road intersections and/or freeway exits were designated as eligible for observation in each selected square. At the beginning of each month, the observers were furnished with a list of potential traffic observation sites and they proceeded to determine whether the first site on the list was appropriate as an observation point. If it was not, they examined the second site and so on until a viable intersection or freeway exit was located in the grid square.

Criteria for this stage of site selection included: (a) safety of the observer with regard to the traffic flow; (b) crime rate in the area; (c) a traffic volume heavy enough to allow collection of sufficient observations; (d) the incidence of buses and trucks in the observation lane; (e) no road construction or repair work; and (f) no factors, such as new car dealers or shopping centers nearby, that might bias the data collected at the site. Upon selecting a primary road intersection, the observer gathered data from the corner which was most cost effective, in the sense that it allowed for the greatest number of observations per hour.

Sample Design -- Rural Sites

In response to NHTSA's request to carry out direct observation of safety belt usage in rural areas, a sample of towns in the vicinity of each of the 19 cities was drawn. The first step in the rural observation sample design was to list all towns under 2,500 population (in 1970), and all towns with a 1970 population between 2,500 and 5,000 that were within 50 miles of the central city. A simple random sample of towns with less than a 2,500 population was selected. This was also done for towns with a population between 2,500 and 5,000. For each month of rural observing, the observer was provided with the name and location of two towns, one of which was used for rural observation during that month. The observer was responsible for determining if a town offered any suitable sites for observing, and which site in town to select. A necessary condition for observation was that the observation site be guarded by a traffic signal. Another condition was that the observation site not be on a road that draws traffic entirely from a nearby large town, city, or freeway. For each city, half of the rural locations in which observations were recorded were towns with under a 2,500 population, and half were towns with a population between 2,500 and 5,000. The observation period was five hours per month, for a 12-month period.

Sample Design -- Turnpikes

Three major U.S. turnpikes were selected for this special study of safety belt usage:

Massachusetts Turnpike
Pennsylvania Turnpike
Florida Turnpike

Each of the turnpikes met the requirement of having booths where drivers stop to get a toll ticket before entering the turnpike and had adequate lighting so as to conduct nighttime observations. ORC obtained permission from the turnpike authorities to conduct the observation studies.

At each turnpike, an ORC observer recorded and observed safety belt usage by drivers for four (4) hours on one day each month, for a period of 12 months. The 4 hours of observation were divided as follows: 2 hours before dark and 2 hours after dark. Only drivers entering the turnpike stopping to get a toll ticket were observed. Drivers exiting turnpikes were not observed because some people unbuckle their belts to get out money for toll charges.

Observer Training

In October 1977, four full-time field observers were assigned to a full week of training at ORC's Princeton, New Jersey headquarters. The program was under the direction of the ORC Project Director assisted by two individuals designated as field supervisors. The CTM for NHTSA assisted in the training program. The first phase of the training included a two-hour classroom instruction period, during which the

research objectives and data collection materials were explained. Each observer was provided with a 20page training manual which covered procedures for site selection, traffic observation, and recording of data.

The second phase of the training program was carried out in the field under the direction of ORC supervisory personnel. These sessions were conducted in Trenton, New Jersey over a period of four and one-half days for at least six hours per day and consisted of training in site selection and data collection methods.

Observers collected and recorded safety belt data on a trial basis at a number of traffic intersections and freeway exit sites in the City. Each of the four field observers was "certified" as being ready to collect "real data" at the end of the training session. When a field observer had to be replaced by a new observer, the replacement was trained by an ORC supervisor in his "home base" city, in the same manner as described above.

Data Collection Procedures

Each observer was assigned either four or five cities which he traveled to each month for a period of 26 months. Three days were spent in each city -- two days for observing at a primary road site and one day at a freeway exit site. In each city, the assignment of observations was balanced by day of week and time of day. The collection of safety belt usage data was scheduled so that each month the field person observed for 16 hours in each city. Of the total 16 hours, six were allocated to a freeway exit site and five to each of the two primary road sites. During months when observers were given rural area assignments or other special assignments, certain modifications were made in the number of hours to be spent on the basic safety belt usage study.

The data collection assignments were rotated and covered four time segments -- 7 a.m. to 10 a.m., 10 a.m. to 1 p.m., 1 p.m. to 4 p.m., and 4 p.m. to 7 p.m. During winter months, visibility problems necessitated shortening the first and last time periods.

Observers were required to collect data on the second car in line at a traffic light and then proceed to collect data on the third, fourth, etc., cars when time permitted. When only one car stopped at the light, he observed that car. (A copy of the observation form is appended to this report).

Observers wore highly visible safety vests. A sign, "Traffic Survey" printed on the back of a clipboard in English and Spanish, and a DOT booklet on road signs to be used as a handout when needed, facilitated the process.

Field Checks by Supervisory Personnel

Over the course of the study, each of the four observers were visited by an ORC supervisor at least eight times. During each visit the supervisor spent two days observing alongside the field observer at a primary road site or a freeway exit. At the end of each day, the supervisor would tally his data and compare it with the data collected by the observer. These field checks not only helped to ensure accurate data collection but served as a morale booster for the observer.

Verification of Data Through DMV Search

The "unvalidated" usage data collected by the field observers were sent to ORC on a monthly basis. Each month the data were keypunched on cards and the data transferred to computer tapes. After several months of data had accumulated, the license plate numbers were sent to the respective state DMV's (Department/Division of Motor Vehicles) for further vehicle information, including car make, model year, and VIN (Vehicle Identification Number). Only cars whose observed make and recorded make agreed were retained in the "validated data" file. Using the Vindicator Program furnished by the Highway Loss Data Institute, Washington, D.C., data were further analyzed according to criteria available from the VIN code, such as wheelbase length and specific car series.

A total of 159,842 verified observations, collected during the period November 1977 through November 1979, form the basis of this report.

SUMMARY

Safety Belt Usage Among Drivers *

During the period, January - November 1979, safety belt usage for 1964-1980 model cars averaged 10.9% (8.5% for lap and shoulder belt, plus 2.4% for lap belt only). This usage rate is lower than the average usage of 13% in 1978.

Among different types of restraint systems, VW's automatic system scores an outstanding lead on usage (79.1%). This compares with a usage rate of 12.5% for cars with the combination belt, 12.3% for cars with the two-piece belt, and 8.1% for those which include only the lap belt.

Belt usage in newer models (1976-1980) is lower than usage in older models (1972-1973). This may indicate that the 4-8 second buzzer and light warning system is not having any impact on belt usage. Also, it may suggest that there are more comfort and convenience problems associated with belt systems in the more recent models.

Usage rates are higher for women than men (14.2% vs. 11.5%), and higher in the West (18.3%) than in other regions.

Among 19 cities, usage is highest in Seattle (24.5%) and lowest in Fargo/Moorhead (4.8%).

Among late model cars (1976-1980), usage is highest for sub-compact cars (18.5%), next highest for compact cars (11.1%), and lowest for intermediate (9.5%) and full-size (8.6%) cars.

Also, among recent models, foreign cars generally score higher in terms of belt usage than the four leading American makes.

Safety belt usage was measured on turnpikes and rural roads as well as in metropolitan areas. The usage results:

Turnpikes	17.6%
Freeway exits	13.6%
Primary roads	11.8%
Rural roads	6.9%

Turnpikes were covered primarily to measure daytime vs. nighttime usage. The results are as follows:

Day	17.9%
Night	17.2%

* Usage data for drivers is based on observations conducted for 25 months (November 1977 - November 1979) unless specified otherwise in the report.

DETAILED QUANTITATIVE FINDINGS

The primary body of data reported in this section is based on the following number of verified observations:

All Model Year (1964-1980)	159,842
Newer Cars (1976-1980 Model Year)	73,581

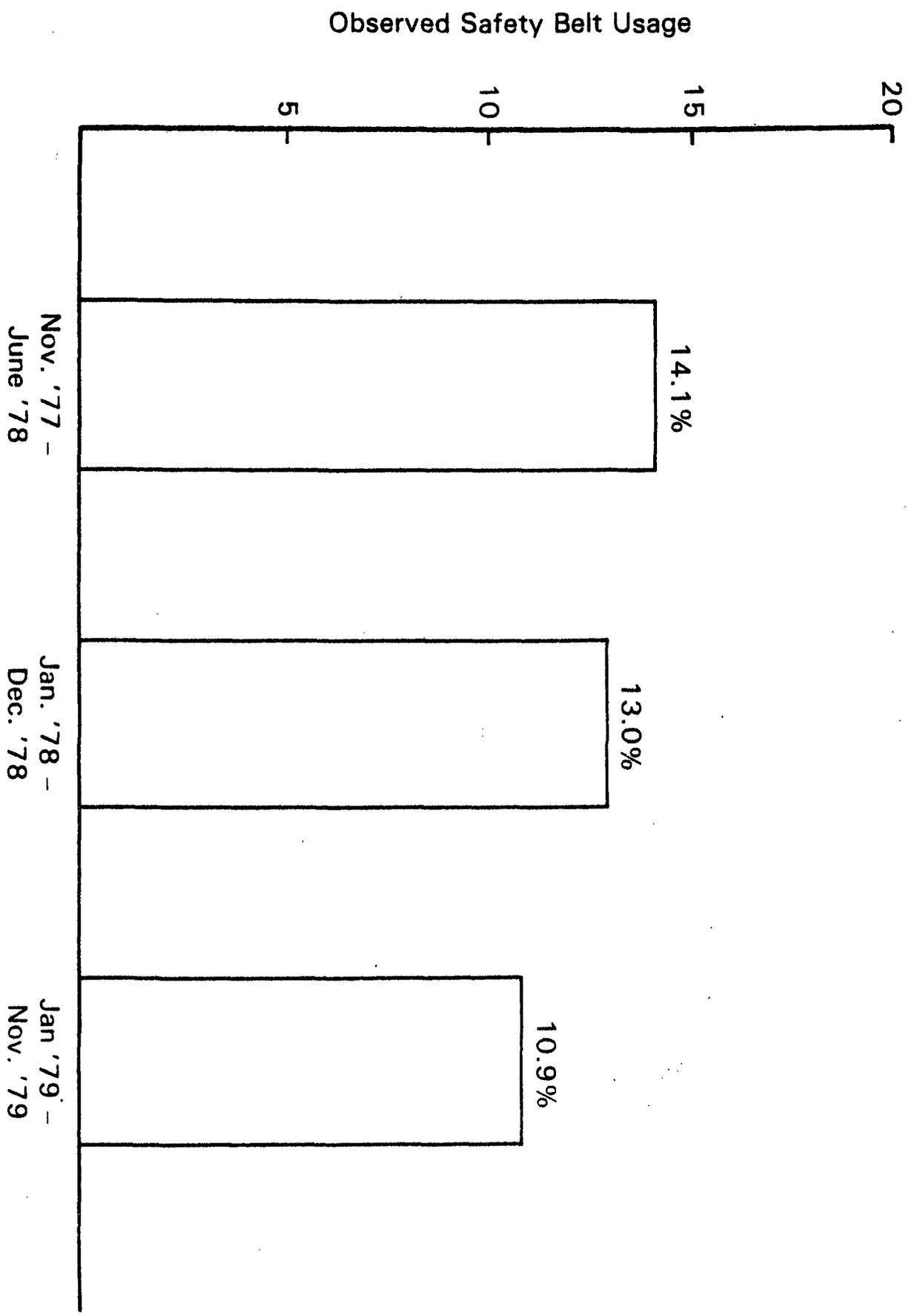
Throughout the report, tests of statistical significance (at the 95-in-100 confidence level) have been applied. Thus, any statements to the effect that "A" is larger (or smaller) than "B" may be taken as having met the test of statistical significance.

Safety Belt Usage by Drivers

In the 19-city observation study, safety belt use by drivers between January and November, 1979 averaged 10.9% (8.5% for lap and shoulder belt and 2.4% for lap belt only). During the 12 months of 1978, average belt usage by drivers was 13% (8.8% for lap and shoulder belt and 4.2% for lap belt only). During the period November 1977 to June 1978, the average belt usage rate was 14.1%. A declining use of safety belts by drivers in private passenger cars is evident and can be seen in Table 1 opposite.

Safety Belt Usage by Drivers

TABLE 1



Safety Belt Usage by Type of System

Among different types of restraints, the automatic belt systems in Volkswagen Rabbits were observed at an outstanding usage rate of 79.1%. This compared with usage rates of 12.5% for cars with the combination belt, 12.3% for cars with the two-piece belt, and 8.1% for those which include only the lap belt.

Table 2

USAGE BY TYPE OF BELT SYSTEM INSTALLED

	Both On	Lap Belt Only	<u>N</u>
Passive System (VW Rabbit)		79.1%	(441)
Lap/Shoulder Combination (1974+ Models)	11.2	1.3	12.5% (106,803)
Lap/Shoulder Separate (1968-1973)	3.1	9.2	12.3% (46,197)
Lap Belt Only (1964-1967)		8.1%	(5,368)

Safety Belt Usage by Model Year

Safety belt usage is lower in newer model cars (Model years 1979-1980) than in earlier model cars.

Table 3 below puts into perspective the general declining trend in usage as the restraint systems changed from one model year to another.

Some reasons that usage is lower in newer cars include:

(1) The 4-8 second warning system has been shown to have no positive effect on belt usage. Older cars (1972-1974) were equipped with more effective continuous warning and interlock systems; (2) the automobile manufacturers have gradually introduced single retractor belt systems to replace the older dual retractor systems. In many of these single retractor systems the latch plate is more difficult to reach and to extend over to the buckle than dual retractor systems; and (3) the introduction of non-detachable shoulder belts has no doubt discouraged some lap belt users from wearing the newer combination systems because of poor fit and excessive pressure.

Table 3

	USAGE BY MODEL YEAR			<u>N</u>
	Both On	Lap Belt Only		
1979-1980	11.2	0.5	11.7%	(4,895)
1978	11.9	0.8	12.7%	(19,591)
1977	11.2	1.0	12.2%	(27,231)
1976	10.9	1.3	12.2%	(22,300)
1975	11.1	1.7	12.8%	(15,505)
1974	12.8	2.4	15.2%	(17,752)
1973-1972	3.7	11.0	14.7%	(24,797)
1971-1968	2.4	7.1	9.5%	(21,401)
1967-1964	8.1		8.1%	(5,370)

Safety Belt Usage by Sex and Age of Driver

Overall, usage of safety belts is higher for women drivers than for men drivers (14.2% vs. 11.5%). Note, however, that almost twice as many women as men wear only the lap belt. The proportions of men and women who do use the belts properly are quite similar (8.6% vs. 8.8%).

In terms of full protection (lap and shoulder), the youngest drivers were observed to have the highest usage, the oldest drivers the least. In terms of some protection, however, older drivers show the highest usage.

Table 4

USAGE BY SEX AND AGE OF DRIVER

	Both On	Lap Belt Only		<u>N</u>
Men	8.6	2.9	11.5%	(99,022)
Women	8.8	5.4	14.2%	(59,818)
24 or Under	9.1	3.5	12.6%	(26,993)
25-49	8.6	3.5	12.1%	(93,463)
50 or Over	8.2	5.8	14.0%	(27,867)

(All Model Years)

Usage by Region of Country

Safety belt usage is highest in the West; lowest in the Southwest and North Central regions. In the three other regions -- New England, Mid-Atlantic, and Southeast -- the proportions of drivers who wear their belts are quite similar.

	USAGE BY REGION			<u>N</u>
	Both On	Lap Belt Only		
New England	8.5	2.2	10.7%	(11,627)
Mid-Atlantic	8.3	2.3	10.6%	(23,171)
Southeast	8.0	3.3	11.3%	(36,868)
Southwest	6.3	2.7	9.0%	(21,413)
North Central	5.9	2.7	8.6%	(20,019)
West	11.8	6.5	18.3%	(45,744)

(All Model Years)

Usage by City

In the 19 cities surveyed, safety belt usage among drivers is highest in Seattle (24.5%) and lowest in Fargo/Moorhead (4.8%).

Table 6

USAGE BY CITY

	<u>% Lap and Shoulder</u>	<u>% Lap Belt Only</u>	<u>% Total</u>	<u>N</u>
Seattle	16.2	8.3	24.5	(8,803)
San Francisco	12.4	5.8	18.2	(8,084)
San Diego	10.9	7.0	17.9	(8,618)
Phoenix	10.3	6.4	16.7	(11,859)
Atlanta	11.0	5.0	16.0	(9,192)
Los Angeles	9.7	5.0	14.7	(8,380)
Minn.-St. Paul	8.8	4.3	13.1	(7,792)
Baltimore	9.3	2.8	12.1	(7,804)
Boston	9.2	2.7	11.9	(6,816)
Pittsburgh	9.1	1.9	11.0	(8,397)
Miami	7.4	3.5	10.9	(8,199)
Houston	7.7	2.6	10.3	(11,291)
Birmingham	7.6	2.3	9.9	(9,883)
Providence	7.5	1.6	9.1	(4,811)
New York	6.3	2.3	8.6	(6,970)
New Orleans	6.1	2.4	8.5	(9,594)
Dallas	4.7	2.9	7.6	(10,122)
Chicago	4.9	1.9	6.8	(5,749)
Fargo-Moorhead	3.3	1.5	4.8	(6,478)

(All Model Years)

Usage by Wheelbase (All Model Years)

Drivers in sub-compact cars and in compact cars are more likely to wear the safety belt than are drivers in cars in the heavier weight classes.

Table 7

USAGE BY WHEELBASE

<u>Wheelbase Inches</u>		Both On	Lap Belt Only	<u>N</u>
≤ 101	Subcompact	15.2	2.6 17.8%	(39,279)
> 101 ≤ 111	Compact	9.1	3.9 13.0%	(35,577)
> 111 ≤ 120	Intermediate	6.2	3.5 9.7%	(49,365)
> 120	Full Size	4.1	5.5 9.6%	(29,293)

(All Model Years)

Usage by Wheelbase (1976-1980 Model Years)

The pattern of safety belt usage for new model cars is similar to that for all model year cars observed. Among late model cars (1976-1980), usage is highest for sub-compact cars (18.5%), next highest for compact cars (11.1%), and lowest for intermediate (9.5%) and full-size (8.6%) cars.

Table 8
USAGE BY WHEELBASE

Wheelbase Inches	Both On	Lap Belt Only	<u>N</u>
≤ 101 Sub-compact	17.4	1.1	18.5% (19,649)
> 101 ≤ 111 Compact	10.1	1.0	11.1% (19,075)
> 111 ≤ 120 Intermediate	8.6	.9	9.5% (26,914)
> 120 Full Size	7.5	1.1	8.6% (7,686)

(1976-1980 Model Years)

Usage By Manufacturer (All Model Years)

Among all model years observed (1964-1980), foreign cars score higher in terms of belt usage than do the four leading American makes. Usage ranges from 34.4% for the V.W. Rabbit to 10.0% for Ford.

Table 9

USAGE BY MANUFACTURER

	<u>Both On</u>	<u>Lap Belt Only</u>	<u>Total On</u>	<u>N</u>
VW Rabbit (Active)	33.6	.8	34.4	(1,311)
Misc. Foreign	20.5	2.3	22.8	(10,515)
Toyota	16.9	2.5	19.4	(5,955)
Datsun	15.3	2.0	17.3	(4,769)
VW Other	12.6	1.6	14.2	(6,535)
AMC	8.7	4.9	13.6	(3,672)
Chrysler	7.3	5.3	12.6	(16,741)
GM	6.3	4.0	10.3	(72,412)
Ford	5.9	4.1	10.0	(36,417)

(All Model Years)

Usage by Manufacturer (1976-1980 Model Years)

The safety belt usage scores and rankings for 1976-1980 model cars are shown in the table below.

Table 10

USAGE BY MANUFACTURER

	<u>Both On</u>	<u>Lap Belt Only</u>	<u>Total On</u>	<u>N</u>
VW Rabbit (Active)	34.7	1.0	35.7	(1,049)
Misc. Foreign	20.7	1.0	21.7	(5,474)
VW Other	21.4	.3	21.7	(576)
Toyota	17.5	1.0	18.5	(3,760)
Datsun	14.9	.8	15.7	(2,704)
Chrysler	11.4	.9	12.3	(6,746)
AMC	10.3	1.0	11.3	(1,305)
GM	8.8	1.1	9.9	(35,510)
Ford	8.0	.9	8.9	(16,476)

(1976-1980 Model Years)

Usage In Foreign Cars vs. U.S. Sub-Compacts

The higher belt usage in foreign cars is not necessarily a function of their generally smaller size and lighter weight. The average usage rate for 16 foreign cars (1976-1980 models) is 20.6%. By comparison, the average usage rate for 13 American sub-compact cars of the same model years is 12.2%.

Usage by Manufacturer (Trend Data)

The average decline in safety belt usage between the observation period (November 1977-June 1978) and (January 1979-November 1979) noted earlier, is again apparent when usage data is analyzed by manufacturer. With the exception of the VW Rabbit, all of the foreign makes and the four American makes show lower belt usage during the current period (January 1979-November 1979) than during the earlier period (November 1977-June 1978).

Table 11

USAGE BY MANUFACTURER

	<u>Nov. '77-June '78</u>	<u>Jan. '78-Dec. '79</u>	<u>Jan. '79-Nov. '79</u>
	<u>%</u>	<u>%</u>	<u>%</u>
VW Rabbit	32.8	32.4	37.1
Misc. Foreign	24.6	23.7	20.2
Toyota	20.9	20.1	17.1
Datsun	17.9	17.8	17.0
VW Other	15.0	13.9	14.6
AMC	15.1	14.1	11.6
Chrysler	14.1	13.4	10.5
GM	11.9	10.8	8.8
Ford	11.5	10.4	8.5

Usage by Type of Road

In the 19-city study, drivers leaving freeway exits show higher belt usage than do those observed at primary road intersections. Also, usage tends to be somewhat higher in suburban areas than within the city limits.

Table 12

USAGE BY ROAD TYPE

	Both On	Lap Belt Only		<u>N</u>
Primary Roads	7.9	3.9	11.8%	(96,847)
Freeway Exits	9.8	3.8	13.6%	(61,995)
City	8.5	3.7	12.2%	(104,514)
Suburb	9.1	4.1	13.2%	(54,328)

(All Model Years)

Usage by Weekday vs. Weekend and by Weather Conditions

As shown in Table 13, the level of belt usage on weekdays is not significantly different than the level of belt usage during weekends. In terms of weather conditions (Table 14), more drivers were observed to be wearing belts on wet roads than on dry roads.

Table 13

USAGE BY WEEKDAY VS. WEEKEND

	Both On	Lap Belt Only		<u>N</u>
Mon.-Fri.	8.7	3.9	12.6	(119,850)
Sat.-Sun.	8.7	3.6	12.3%	(38,992)

(All Model Years)

Table 14

USAGE BY WEATHER CONDITIONS

	Both On	Lap Belt Only		<u>N</u>
Rain	9.9	4.1	14.0%	(22,499)
Dry	8.5	3.8	12.3%	(128,252)

Usage at Four Locations

Among four types of roads, safety belt usage among drivers is highest on turnpikes (17.6%) and lowest on rural roads (6.9%).

Table 15

USAGE BY ROAD TYPE

	Both On	Lap Belt Only		<u>N</u>
Turnpike	14.9	2.7	17.6%	(6,073)
Freeway Exits	9.8	3.8	13.6%	(61,995)
Primary Roads	7.9	3.9	11.8%	(96,847)
Rural Roads	4.7	2.2	6.9%	(19,069)

(All Model Years)

Day vs. Night Usage on Turnpikes

Safety belt usage was observed on turnpikes primarily to measure daytime vs. nighttime usage. As shown in Table 16, the proportion of drivers wearing belts at night is not significantly different from the proportion wearing belts during daylight hours.

Table 16

DAY VS. NIGHT USAGE ON TURNPIKES

	Both On	Lap Belt Only		<u>N</u>
Day	14.9	3.0	17.9%	(3,544)
Night	15.0	2.2	17.2%	(2,529)

(All Model Years)

APPENDIX TABLES

The charts on the following pages show safety belt usage, for 1976-1980 model years, by models for each manufacturer.

USAGE BY CAR MAKE

	<u>%</u>	<u>N</u>
<u>American Motors</u>		
Concord	7.1	(127)
Gremlin	11.9	(295)
Hornet	12.8	(281)
Matador	7.8	(103)
Pacer	11.6	(481)

(1976-1980 Model Years)

USAGE BY CAR MAKE

	<u>%</u>	<u>N</u>
<u>Plymouth</u>		
Fury	13.3	(75)
Horizon	25.7	(175)
Satellite	9.9	(345)
Valiant	15.3	(137)
Volare	14.7	(1946)

(1976-1980 Model Years)

USAGE BY CAR MAKE

	<u>%</u>	<u>N</u>
<u>Dodge</u>		
Aspen	14.4	(1495)
Charger	8.4	(202)
Coronet	10.4	(77)
Dart	12.6	(111)
Diplomat	8.4	(203)
Magnum XE	5.5	(73)
Monaco/Polara	4.7	(107)
Omni	18.8	(149)

(1976-1980 Model Years)

USAGE BY CAR MAKE

	<u>%</u>	<u>N</u>
<u>Chrysler</u>		
Cordoba	6.8	(880)
Le Baron	10.3	(369)
Newport	8.1	(161)
New Yorker	5.1	(217)
Town & Country	*	(21)

(1976-1980 Model Years)

* Too few cases for analysis

USAGE BY CAR MAKE

	<u>%</u>	<u>N</u>
<u>Ford</u>		
Custom 500	4.4	(45)
Elite	4.3	(277)
Fairmont	11.7	(1097)
Fiesta	18.8	(133)
Ford Wagon	10.9	(411)
Granada	9.2	(2952)
LTD	8.6	(1648)
Maverick	14.6	(369)
Mustang	7.7	(1325)
Pinto	12.1	(1334)
Thunderbird	4.7	(1624)
Torino	10.3	(1211)

(1976-1980 Model Years)

USAGE BY CAR MAKE

	<u>%</u>	<u>N</u>
<u>Mercury</u>		
Bobcat	15.1	(152)
Comet	11.3	(53)
Cougar	4.6	(1112)
Marquis	8.6	(661)
Monarch	9.4	(903)
Montego	14.3	(77)
Zephyr	12.2	(254)

(1976-1980 Model Years)

USAGE BY CAR MAKE

	<u>%</u>	<u>N</u>
<u>Lincoln</u>		
Continental	3.8	(343)
Mark Series	5.6	(391)
Versailles	9.4	(53)

(1976-1980 Model Years)

USAGE BY CAR MAKE

	<u>%</u>	<u>N</u>
<u>Chevrolet</u>		
Camaro	8.0	(1719)
Caprice	11.4	(2147)
Chevelle	10.6	(1467)
Chevette (Passive) ^{1/}	--	--
Chevette (Active)	11.0	(1395)
Citation	6.5	(46)
Corvette	3.8	(157)
Impala	11.6	(2044)
Laguna	0	(10)
Malibu	14.6	(958)
Monte Carlo	6.8	(3047)
Monza	11.2	(436)
Nova	11.7	(2361)
Vega	12.5	(457)

(1976-1980 Model Years)

^{1/} No cases for analysis

USAGE BY CAR MAKE

	<u>%</u>	<u>N</u>
<u>Oldsmobile</u>		
Custom Cruiser	13.8	(138)
Cutlass	10.7	(3941)
Delta 88/Dynamic	11.7	(1276)
Ninety-Eight	8.9	(845)
Omega	12.1	(331)
Starfire	14.6	(82)
Toronado	10.4	(134)
Vista Cruiser	8.3	(36)

(1976-1980 Model Years)

USAGE BY CAR MAKE

	<u>%</u>	<u>N</u>
<u>Pontiac</u>		
Astre	8.1	(123)
Bonneville/Catalina	8.3	(953)
Firebird	8.7	(781)
Grand Prix	4.8	(1577)
Le Mans	10.8	(434)
Phoenix	10.0	(120)
Sunbird	9.4	(341)
Ventura	10.7	(205)

(1976-1980 Model Years)

USAGE BY CAR MAKE

	<u>%</u>	<u>N</u>
<u>Buick</u>		
Apollo/Skylark	12.2	(754)
Electra	6.4	(875)
Estate Wagon	15.7	(108)
Le Sabre	9.0	(1065)
Regal	9.8	(650)
Riviera	7.5	(161)
Skyhawk	11.4	(149)
Skylark/Century	10.1	(1403)

(1976-1980 Model Years)

USAGE BY CAR MAKE

	<u>%</u>	<u>N</u>
<u>Cadillac</u>		
Other Cadillacs	8.9	(2210)
Seville	11.5	(548)

(1976-1980 Model Years)

USAGE BY CAR MAKE

	<u>%</u>	<u>N</u>
<u>Foreign Models</u>		
Arrow	11.7	(264)
Audi	23.9	(309)
Colt	20.5	(516)
Datsun	15.7	(2704)
Fiat	18.3	(492)
Honda	25.6	(1850)
Mazda	17.5	(269)
Mercedes	15.9	(371)
MG	7.6	(79)
Opel	9.9	(162)
Porsche	21.3	(164)
Rabbit (Active)	35.7	(1049)
Rabbit (Passive)	80.8	(401)
Subaru	20.6	(214)
Toyota	18.5	(3760)
Volvo	27.9	(501)
Other VW's	21.7	(576)

(1976-1980 Model Years)

II

Use of Child Restraint Devices, Passenger
Safety Belts, and Position of Passengers in Cars

INTRODUCTION AND METHODOLOGY

Introduction

A recent study conducted by the National Highway Traffic Safety Administration (NHTSA) indicates that approximately 1,000 children up to age 5 are killed and 100,000 injured every year in auto accidents. ^{1/} It is recognized that the utilization of properly designed child restraint systems would be an important step toward reducing fatalities and injuries to the under 5 years old passengers in motor vehicle crashes. Federal Motor Vehicle Safety Standard 213, the safety standard relating to child restraints, was revised in 1980. Testing procedures for these devices would be upgraded to require dynamic (in-motion) crash tests with anthropometric dummies, simulating a 3-year-old child and 6-month-old infant.

The main objectives of this study was to assess the current use of child restraint devices for infants (up to 1 year) and for children (1 to 4 years) in private passenger cars. In addition, the study was designed to ascertain the use or non-use of safety belts by all passengers and to observe the seat positions and specific posture of all unrestrained passengers.

Methodology

This observation study of passengers was conducted in the same 19 metropolitan areas and used basically the same sampling design as the one being used for the Safety Belt Usage Study Among Drivers (Contract DOT-HS-7-01736). During the period July-December 1979, the study among drivers was modified so as to allow for both the observation of restraint usage by passengers as well as drivers. To accomplish this, ORC field personnel spent one day each month at a sample site location observing on the Driver Study and two days observing for the Child Restraint and Occupant Position Study.

ORC Field Personnel

The same four full-time field personnel that worked on the Driver Study received special training for the Passenger Study under the direction of ORC supervisory personnel. Field personnel traveled to ORC's Princeton, N.J. headquarters and received instructions on how to observe and record the information required for the Passenger Study. One phase of this training included eight hours spent at a local traffic intersection so as to obtain actual field experience under the direction of ORC supervisory personnel.

^{1/} National Traffic Safety Newsletter, April 1979, page 11.

In training for the passenger Study, emphasis was given to the observation and recording of data on child restraint devices since this was an important part of the study. Field personnel were provided with pictures of the various types of child restraint devices currently on the market. Each picture was identified as one that was "proper" or "not proper." With this information in hand, field personnel were instructed to: (1) record on the observation form that the child was in a child restraint device if he considered it to be one of the "proper" types and (2) record on the observation form that the child was not in a child restraint device if he considered it to be one that was not a "proper" type of seat. Field personnel were instructed to further indicate on the observation form whether or not the device was secured by the adult safety belt.

Data Collection Procedures

Data collection included the observing of cars with passengers with priority being given to cars containing infants and small children as the cars stopped for lights at traffic intersections. Data collected for each passenger included: age, sex, seated position, posture (sitting, standing, etc.), location (on seat or floor), position of occupant's knees (facing forward, to the left or right of center), and restraint usage (secured by child restraint device or adult safety belt). (A copy of the observation form will be found in the Appendix.)

The tables that follow indicate, for each group, the percentage of passengers in one of five positions. A description of each of the five positions is given below:

1. On Seat: Sitting, Back Supported:

"Passenger is sitting on the seat with his/her back supported by the back of the seat."

2. On Seat: Sitting, Back Not Supported:

"Passenger is sitting on the seat (usually the edge of the seat) and his/her back is not touching the back of the seat."

3. On Seat: Standing, Kneeling, Lying:

"Passenger is on the seat, but is either standing, kneeling, or lying."

4. On Floor:

"Passenger is either sitting, standing, kneeling, or lying on the floor of the car."

5. On Passenger's Lap:

"Passenger is either sitting, standing, kneeling, or lying on another passenger's lap."

SUMMARY

Child Restraint and Seat Position Study

Among 16,359 cars observed in the Driver Study during July-December 1979, less than one percent had an infant passenger. The percentage of cars with passengers in four other age categories were: small children (4.3%); sub-teens (4.9%); teens (6.4%); and adults (28.1%).

The Passenger Study, based on 29,168 observations, shows that seat locations of passengers varies by age. Majorities of adults (84%), teens (66.7%), and infants (64.4%) were observed to be front seat occupants, while majorities of sub-teens (61%), and small children (56%) were observed to be rear seat occupants.

Use of child restraint devices was observed for infants and small children. Safety belt usage was measured for small children, sub-teen, teen, and adult passengers. The usage results:

	<u>Restrained by:</u>	
	<u>Child Seat</u>	<u>Car Safety Belt</u>
Infants		
Seat secured by car belt	22.1%	--
Seat <u>not</u> secured by car belt	23.2%	--
Small Children		2.0%
Seat secured by car belt	4.5%	
Seat <u>not</u> secured by car belt	4.2%	
Sub-Teens		3.3%
Teens		3.7%
Adults		6.9%

Seat position and posture were observed for passengers in each of the five age groups to determine, for those not restrained, the proportions who were in a normal seat position and those who were not properly seated. The results:

	<u>Not Restrained</u>	
	<u>Normal Seat Position 1/</u>	<u>Out of Position 2/</u>
Infants	0%	54.7%
Small Children	22.4%	66.9%
Sub-Teens	54.8%	41.9%
Teens	88.6%	7.7%
Adults	90.3%	2.8%

1/ Passenger sitting on seat with back supported

2/ Passenger sitting on seat with back not supported and those who were either standing, kneeling, or lying on the seat or floor. Also included are those sitting on the floor of the car.

DETAILED FINDINGS

The primary body of data reported in this section is based on the following number of passenger observations:

Infants (Under 1 year)	706
Small Children (1 to 4 years)	3,218
Sub-Teens (5 to 12 years)	3,229
Teens (13 to 19 years)	4,539
Adults (20 years and over)	17,476

The data that follows are analyzed separately for each of the above age groups.

Percentage of Cars with Passengers by Age Groups

Among 16,359 cars observed during July-December 1979 in 19 metropolitan areas, less than one percent had an infant passenger. The percentage of cars with passengers in four other age categories were: small children (4.3%); sub-teens (4.9%); teens (6.4%); and adults (28.1%).

Percent of Cars with Passengers in Five Age Groups

	<u>Total</u>
Total Cars	16,359
Infants (Under 1 yr.)	.9%
Small Children (1-4)	4.3%
Sub-Teens (5-12)	4.9%
Teens (13-19)	6.4%
Adults (20 and over)	28.1%

Number of Passengers per Car

The table below shows for the 16,359 cars observed, what percent of the cars had 1 passenger, 2 passengers, etc.

	<u>TOTAL</u>
TOTAL CARS	<u>16,359</u>
Number of Passengers:	
One	26.3%
Two	7.0
Three	2.7
Four or more	1.5
No passengers	62.5

Note: The data above comes from the Safety Belt Usage Study Among Drivers, during the period July-December 1979 and is based on the observation of every second car stopped for a traffic light. Thus, it is a representative sample of the incidence of passengers in cars by the five age categories. Base = 16,359 cars.

The findings that follow are derived from a purposive sample of passengers rather than a random sample since field personnel were instructed to give priority to cars that included infants and small children. Base = 29,168 passengers.

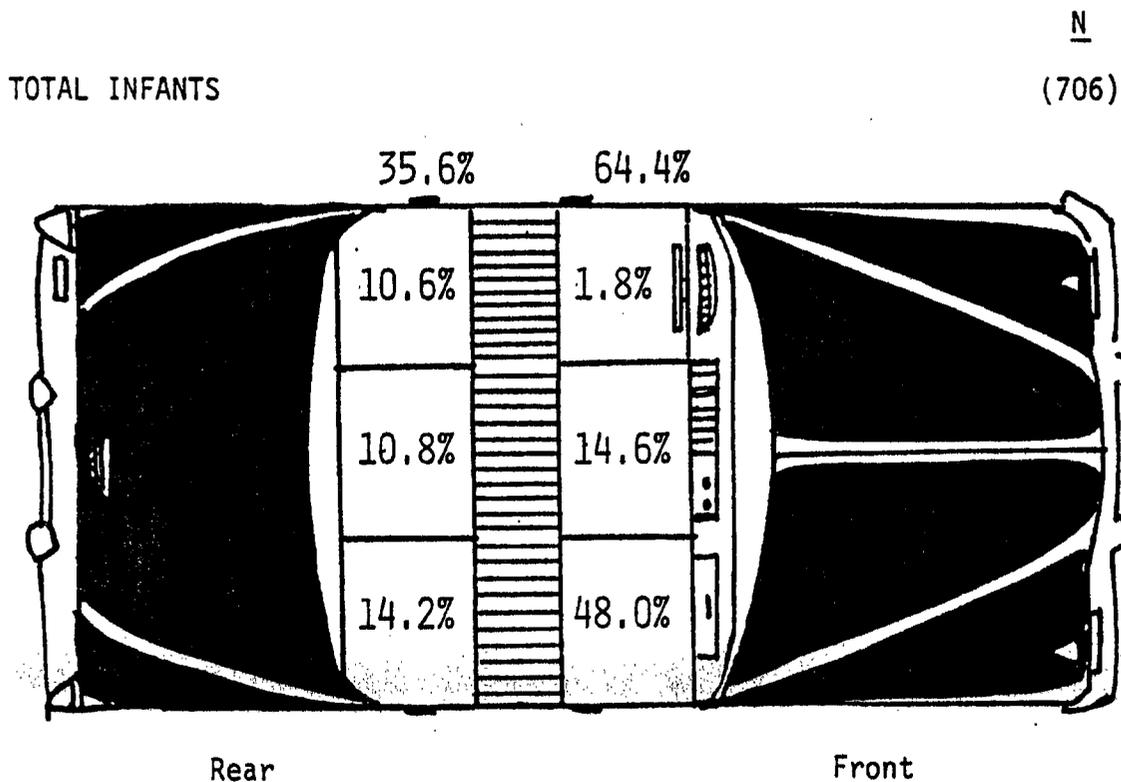
RESTRAINT AND SEAT POSITION DATA

Seat Locations of Infants (Under 1 year)

In the study conducted during the period July-December 1979, a majority of infants (64.4%) were observed to be front seat occupants with about half of the infants (48%) located on the front outboard seat. The proportions observed in other seat locations are also shown in the figure below. Among 706 infants observed, 1.8% or about 13 in number were observed to be sitting on the driver's lap.

Table 1

Infant Passengers (Under 1 year)
Seat Locations of Infants in Cars



Seat Positions of Infants

Use of properly secured child restraint devices for infant passengers is at a relatively low level. Only about one infant in five (22.1%) was observed to be in a child restraint device that was secured by the adult safety belt. A similar proportion (23.2%) were in a restraint device that was not secured by the adult safety belt. Among all infants, 42.6% were sitting on a passenger's lap unrestrained, 11.5% were on the seat unrestrained, and .6% were on the floor of the car.

Table 2

Infants (under 1 year) Seat Postures of Infants in Cars

			<u>N</u>				
TOTAL INFANTS			(706)				
In Child Restraint Device	<table border="1"> <thead> <tr> <th>Secured by Car Belt</th> <th>Not Secured</th> </tr> </thead> <tbody> <tr> <td>22.1</td> <td>23.2</td> </tr> </tbody> </table>	Secured by Car Belt	Not Secured	22.1	23.2	45.3%	(320)
Secured by Car Belt	Not Secured						
22.1	23.2						
On Passenger's Lap <u>1/</u>		42.6%	(301)				
On Seat		11.5%	(81)				
On Floor		.6%	(4)				

1/ Passenger not wearing seat belt

Seat Positions of Infants by Seat Location

Among all infants, 21.4% were in a child restraint device on the front seat and 23.9% in a restraint device on the back seat. In both locations, only about half of the infants in restraint devices were properly secured. In the front seat, more infants were held on someone's lap than were observed to be in a restraint device. In the rear, the opposite is true with more infants in restraint devices than being held on someone's lap.

Table 3

Infants (Under 1 year)
Seat Positions of Infants in Cars

			<u>N</u>
<u>FRONT</u>			(706)
In Child Restraint Device	 9.1 12.3	21.4%	(151)
On Passenger's Lap		35.0%	(247)
On Seat		7.6%	(54)
On Floor		.5%	(3)
<u>REAR</u>			
In Child Restraint Device	 13.0 10.9	23.9%	(169)
On Passenger's Lap		7.6%	(54)
On Seat		3.9%	(27)
On Floor		.1%	(1)

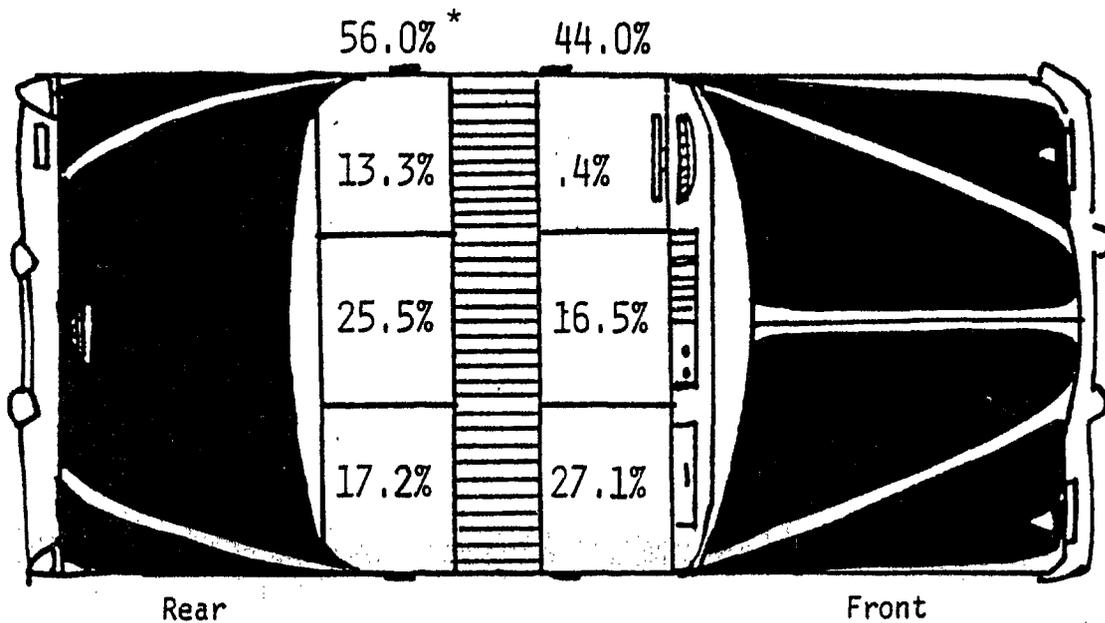
Seat Locations of Small Children (1-4 years)

Among children in this age group, 56% were observed to be back seat occupants and 44% to be front seat occupants. The seat locations most frequently used for small children are the front outboard and rear center locations.

Table 4
Small Children (1 - 4 years)
Seat Locations of Small Children in Cars

N
(3,218)

TOTAL SMALL CHILDREN



* The percent of small children in the rear of the car (56%) includes .9% or 30 in number who were located behind the rear seat of a station wagon or a hatchback. They were observed to be in the following positions:

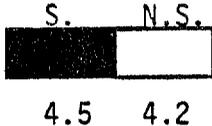
	<u>Number</u>
Sitting	17
Kneeling	10
Standing	2
Lying	1
	<hr style="width: 50px; margin: 0 auto;"/> 30

Seat Positions of Small Children (1-4 years)

Among children one to four years of age, 8.7% were in a child restraint device (4.5% in a device secured by an adult safety belt), 22.4% were sitting normally on the seat, 42.1% were not sitting normally on the seat, 16.8% were on the floor, and 9.3% were on a passenger's lap.

Table 5

Small Children (1 - 4 years)
Seat Positions of Small Children in Cars

			<u>N</u>
TOTAL SMALL CHILDREN			(3,218)
In Child Restraint Device	 <p style="margin-left: 20px;">S. N.S. 4.5 4.2</p>	8.7%	(280)
On Seat:			
Sitting, Back Supported *		22.4%	(721)
Sitting, Back Not Supported		21.0%	(676)
Standing, Kneeling, Lying		21.1%	(678)
On Floor		16.8%	(540)
On Passenger's Lap		9.3%	(300)
Sitting on Front Seat -- Hands on Dashboard		.7%	(23)

S = Child Restraint Device Secured by Car Belt
NS = Not Secured by Car Belt

* 2% were restrained by automobile safety belt

Seat Positions of Small Children

Table 6 below shows the percent of all small children observed in each of a number of specific postures (sitting, standing, kneeling, lying) by seated positions. Read as follows: among all children observed, 8.7% were in a child restraint device -- 2.9% in a restraint device in the front of the car and 5.8% in a restraint device in the rear of the car, etc.

Table 6

Small Children (1 - 4 years)

Seat Positions of Small Children in Cars

	<u>N</u>	<u>TOTAL</u>	<u>N</u>	<u>FRONT</u>	<u>N</u>	<u>REAR</u>
In Child Restraint Device	280	8.7%	94	2.9%	186	5.8%
Secured by Car Belt	144	4.5%	52	1.6%	92	2.9%
Not Secured	136	4.2%	42	1.2%	94	2.9%
Restrained by Car Belt	64	2.0%		(NA)		(NA)
<u>On Seat</u>						
. Sitting, Back Supported	721	22.4%	358	11.1%	363	11.3%
. Sitting, Back Not Supported	676	21.0%	227	7.0%	449	14.0%
. Standing	460	14.4%	317	9.9%	143	4.5%
. Kneeling	172	5.3%	74	2.3%	98	3.0%
. Lying	46	1.4%	19	.6%	27	.8%
<u>On Floor</u>						
. Standing	453	14.0%	27	.8%	426	13.2%
. Sitting	50	1.6%	9	.3%	41	1.3%
. Kneeling	32	1.1%	1	*%	31	1.0%
. Lying	5	.1%	0	0%	5	.1%
<u>On Passenger's Lap</u>	300	9.3%	264	8.2%	36	1.1%
<u>Sitting on Front Seat --</u> <u>Hands on Dashboard</u>	23	.7%	23	.7%		

Seat Locations of Sub-Teens (5-12 years)

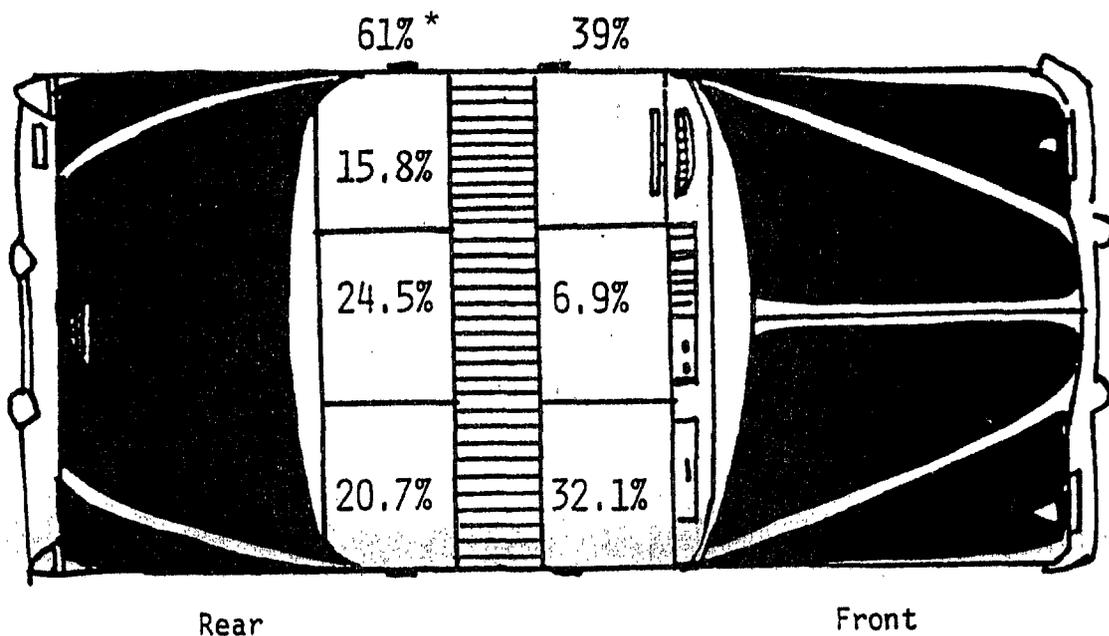
Among passengers in this age group, 61% were observed to be riding in the rear of the car and 39% in the front of the car. About one third (32.1%) were on the front outboard seat with most of the others in one of the three rear seat locations.

Table 6

Sub-Teen Passengers (5 - 12 years)

Seat Locations of Sub-Teens in Cars

TOTAL SUB-TEEN PASSENGERS N
(3,229)



* The percent of sub-teens in the rear of the car (61%) includes 1% or 33 in number who were located behind the rear seat of a station wagon or a hatchback. They were observed to be in the following positions:

	<u>Number</u>
Kneeling	16
Sitting	15
Lying	2
	<u>33</u>

Seat Positions of Sub-Teens (5-12 years)

Among passengers in this age group, only 3.3% were restrained by an adult safety belt. A little more than half (54.8%) were observed to be seated normally although unrestrained. 41.9% were either not seated properly (back not supported) or were standing, kneeling or lying on the seat or floor.

Table 8

Sub-Teen Passengers (5 - 12 years)
Proportions Restrained and Not Restrained

Seated, back supported
 Seated, back not supported
 Other positions

	<u>N</u>
<u>TOTAL SUB-TEEN PASSENGERS</u>	(3,229)
RESTRAINED 3.3%	(105)
NOT RESTRAINED <div style="position: absolute; left: 0; width: 54.8%;"></div> <div style="position: absolute; left: 54.8%; width: 26.8%; background-color: black;"></div> <div style="position: absolute; left: 81.6%; width: 15.1%; background: repeating-linear-gradient(45deg, transparent, transparent 2px, black 2px, black 4px);"></div> 96.7%	(3,124)
	54.8% 26.8% 15.1%
<u>FRONT</u>	
RESTRAINED 2.7%	(86)
NOT RESTRAINED <div style="position: absolute; left: 0; width: 27.2%;"></div> <div style="position: absolute; left: 27.2%; width: 5.6%; background-color: black;"></div> <div style="position: absolute; left: 32.8%; width: 3.5%; background: repeating-linear-gradient(45deg, transparent, transparent 2px, black 2px, black 4px);"></div> 36.3%	(1,173)
	27.2 5.6 3.5
<u>REAR</u>	
RESTRAINED .6%	(19)
NOT RESTRAINED <div style="position: absolute; left: 0; width: 27.6%;"></div> <div style="position: absolute; left: 27.6%; width: 21.2%; background-color: black;"></div> <div style="position: absolute; left: 48.8%; width: 11.6%; background: repeating-linear-gradient(45deg, transparent, transparent 2px, black 2px, black 4px);"></div> 60.4%	(1,951)
	27.6 21.2 11.6

Seat Positions of Sub-Teens (5-12 years)

Table 9 shows the percent of all sub-teen passengers observed in each of a number of specific postures (sitting, standing, kneeling, lying) by seated postures. Read as follows: among 3,229 sub-teen passengers, 3.3% were restrained by an adult safety belt -- 2.7% were wearing the belt while seated in the front of the car and .6% were wearing the belt while seated in the rear of the car, etc.

Table 9

Sub-Teens (5 - 12 years)

Seat Postions of Sub-Teens

	<u>N</u>	<u>TOTAL</u>	<u>N</u>	<u>FRONT</u>	<u>N</u>	<u>REAR</u>
RESTRAINED BY ADULT BELT	105	3.3%	86	2.7%	19	.6%
NOT RESTRAINED	3,124	<u>96.7</u>	1,173	<u>36.3</u>	1,951	<u>60.4</u>
<u>ON SEAT</u>						
● Sitting, back supported	1,770	54.8%	879	27.2%	891	27.6%
● Sitting, back not supported	865	26.8%	180	5.6%	685	21.2%
● Kneeling	103	3.2%	37	1.2%	66	2.0%
● Standing	79	2.4%	51	1.6%	28	.8%
● Lying	18	.6%	5	.1%	13	5%
<u>ON FLOOR</u>						
● Standing	184	5.7%	5	.2%	179	5.5%
● Sitting	43	1.3%	0	*	43	1.3%
● Kneeling	38	1.2%	2	0.0%	36	1.2%
● Lying	5	.1%	0	0.0%	5	.1%
<u>ON PASSENGER'S LAP</u>	19	.6%	13	.4%	6	.2%

Seat Locations of Teen Passengers (13-19 years)

Two thirds (66.7%) of the passengers in this age group were observed to be riding in the front of the car and one third (33.3%) in the rear of the car. More than three out of five teenage passengers occupy the front outboard seat.

Table 10

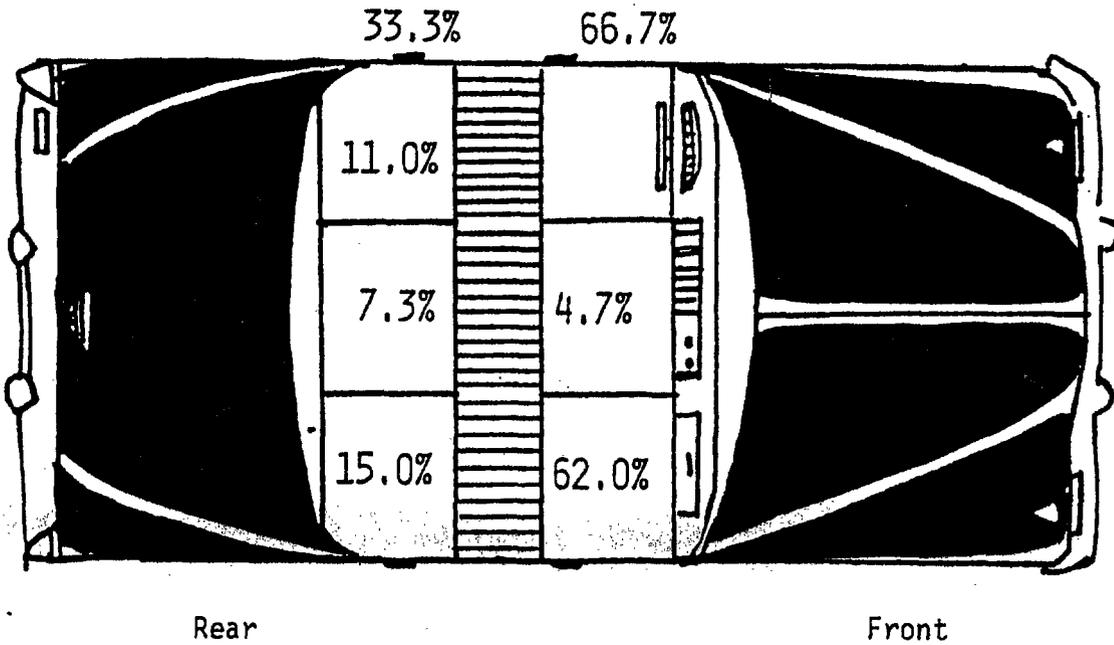
Teen Passengers (13 - 19 years)

Seat Locations of Teens in Cars

N

TOTAL TEEN PASSENGERS

(4,539)



Seat Positions of Teen Passengers (13-19 years)

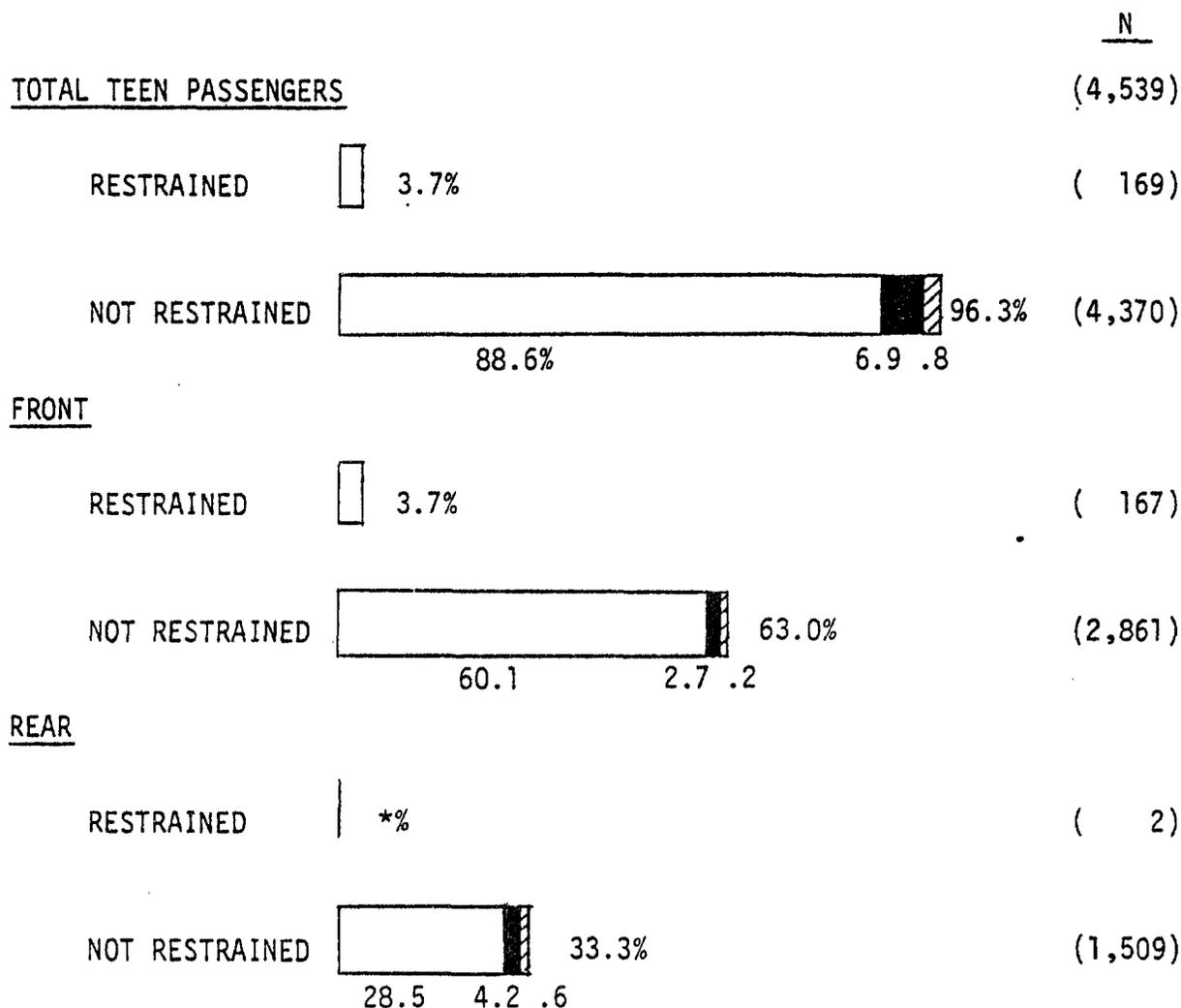
Among all teenage passengers observed, 3.7% were restrained by an adult safety belt. Although unrestrained, the large majority of teens (88.6%) were seated properly.

Table 11

Teen Passengers (13 - 19 years)

Proportions Restrained and Not Restrained

Seated, back supported
 Seated, back not supported
 Other positions



Seat Positions of Teen Passengers (13-19 years)

Table 12 shows the percent of all teen passengers observed in each of a number of specific postures (sitting, standing, kneeling, lying) by seated positions. Read as follows: among 4,539 teen passengers, 88.6% were sitting with their backs supported (unrestrained) -- 60.1% were sitting properly in the front of the car and 28.5% were sitting properly in the rear of the car, etc.

Table 12

Teen Passengers (13 - 19 years)

Seat Postions of Teens

	<u>N</u>	<u>TOTAL</u>	<u>N</u>	<u>FRONT</u>	<u>N</u>	<u>REAR</u>
RESTRAINED BY SAFETY BELT	169	3.7%	167	3.7%	2	*%
NOT RESTRAINED	4,370	<u>96.3</u>	2,860	63.0%	1,510	<u>33.3</u>
<u>ON SEAT</u>						
● Sitting, back supported	4,022	88.6%	2,728	60.1%	1,294	28.5%
● Sitting, back not supported	313	6.9%	123	2.7%	190	4.2%
● Standing	2	--	2	--		
● Kneeling	1	--	1	--		
● Lying	11	--	3	--	8	--
<u>ON FLOOR</u>						
● Sitting	13	--	1	--	12	--
● Lying	1	--			1	--
<u>ON PASSENGER'S LAP</u>						
● Sitting	5	--	2	--	3	--
● Lying	2	--			2	--

-- % not shown because of small number of cases

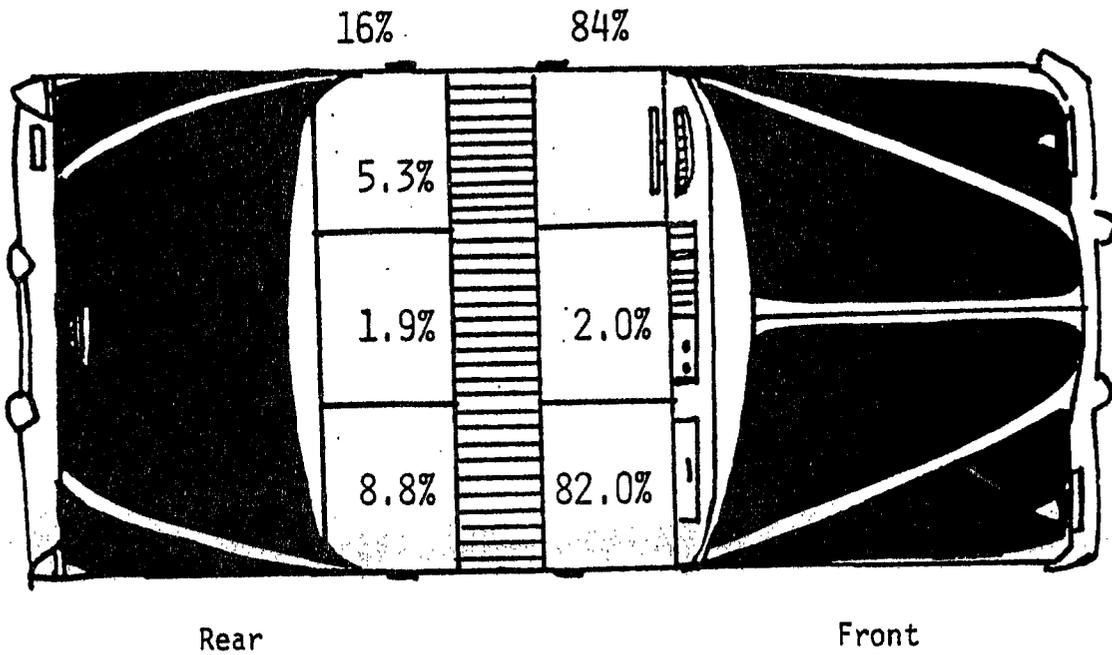
Seat Locations of Adult Passengers (20 years or over)

The large majority of adult passengers were observed to be riding in the front of the car with more than four out of every five sitting on the front outboard seat.

Table 13

Adult Passengers (20 years and over)
Seat Locations of Adults in Cars

TOTAL ADULT PASSENGERS N
(17,476)

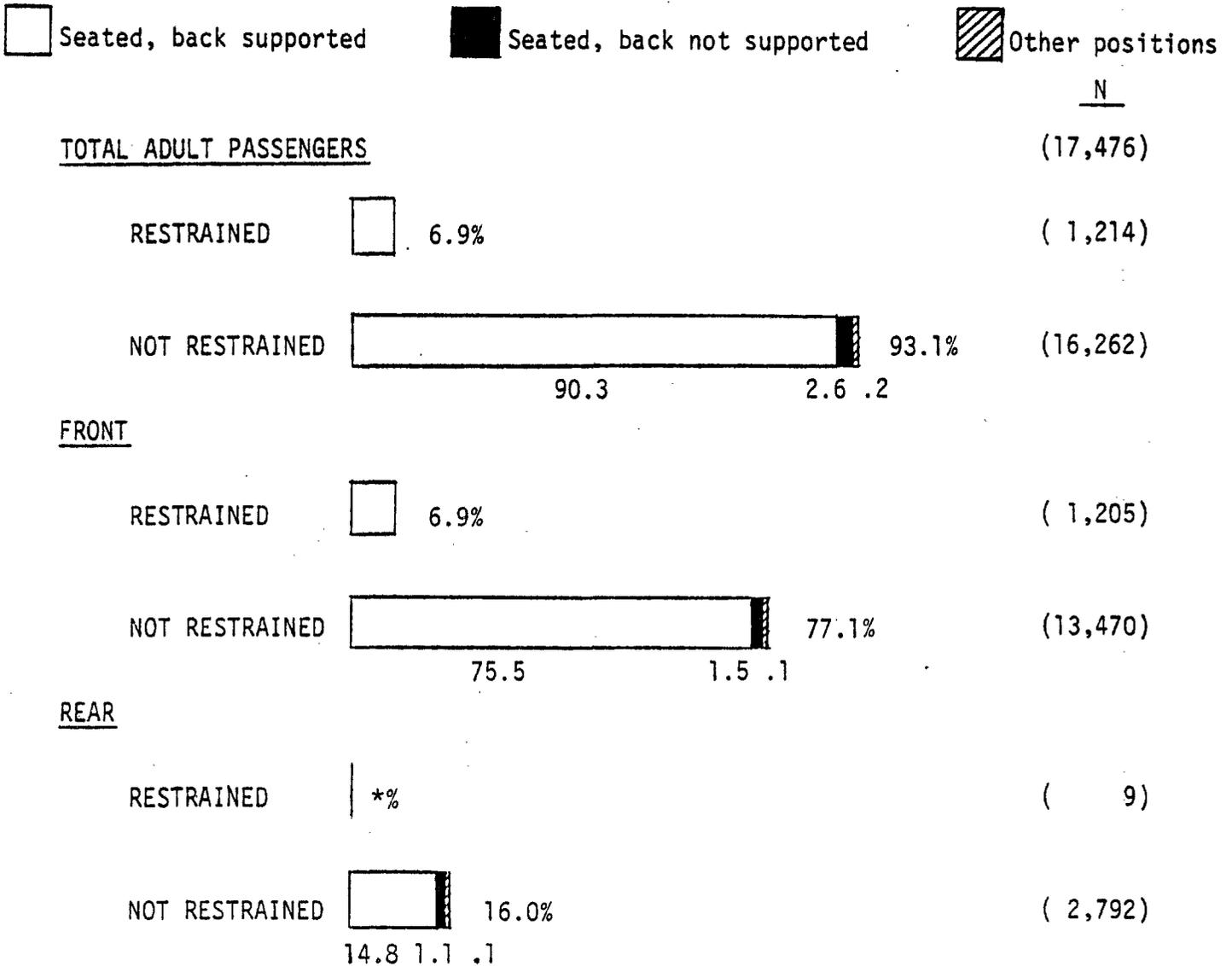


Seat Positions of Adult Passengers (20 years or over)

Among all adult passengers observed, 6.9% were restrained by an adult safety belt. Nine out of ten adults (90.3%) were in a normal seat position, but unrestrained.

Table 14

Adult Passengers (20 years and older)
Proportions Restrained and Not Restrained



Seat Positions of Adult Passengers (20 years or over)

Table 15 shows the percent of all adult passengers observed in each of a number of specific postures (sitting, standing, kneeling, lying) by seated positions. Read as follows: among all adult passengers, 90.3% were sitting with their backs supported (unrestrained) -- 75.5% were sitting properly in the front of the car and 14.8% were in a normal seat position in the rear of the car, etc.

Table 15

Adult Passengers (20 years and older)
Seat Positions of Adults Not Restrained

	<u>N</u>	<u>TOTAL</u>	<u>N</u>	<u>FRONT</u>	<u>N</u>	<u>REAR</u>
RESTRAINED BY SAFETY BELT	1,214	6.9%	1,205	6.9%	9	*%
NOT RESTRAINED	16,262	93.1	13,470	77.1	2,792	16.0
<u>ON SEAT</u>						
● Sitting, back supported	15,781	90.3%	13,194	75.5%	2,587	14.8%
● Sitting; back not supported	454	2.6%	262	1.5%	192	1.1%
● Lying	12	--	6	--	6	--
● Kneeling	3	--	2	--	1	--
<u>ON LAP</u>						
● Sitting	6	--	4	--	2	--
● Lying	2	--	1	--	1	--
<u>ON FLOOR</u>						
● Sitting	3	--	1	--	2	--
● Lying	1	--		--	1	--

-- % not shown because of small number of cases

III

Motorcycle Helmet Usage

INTRODUCTION AND METHODOLOGY

Objective

The main purpose of this observation study was to ascertain the use or non-use of helmets by drivers and passengers of motorcycles in the same 19 metropolitan areas covered in the basic Safety Belt Usage Study Among Drivers of private passenger cars. A secondary purpose of the study was to determine the use or non-use of helmets by drivers and passengers of mopeds.

Methodology

In addition to observing safety belt usage among drivers in private passenger cars at sampled traffic intersections and freeway exits in each of 19 metropolitan areas, the four ORC field personnel observed and recorded, on a special form, the use or non-use of helmets by drivers and passengers on motorcycles and mopeds as they approached intersections. This data was obtained while observers were waiting for the traffic light to turn red and could return to observing safety belt usage among operators of passenger cars. The study, which used the same sampling design as the one used for the Safety Belt Usage Study Among Drivers, was conducted for five months during the period May - September, 1979.

SUMMARY

The findings from this observation study indicates that in states that have laws requiring drivers and passengers of motorcycles to wear helmets the laws are highly effective. In six states with helmet laws, 97.5% of motorcycle drivers and 96.5% of their passengers were observed to be wearing helmets in the cities surveyed. By comparison, in ten states with none or only limited helmet laws, usage was only 51.7% for drivers and 46.7% for passengers.

Motorcycle Helmet Usage

States with mandatory laws that require drivers and passengers of motorcycles to wear protective helmets are highly effective. In six states with mandatory helmet laws, 97.5% of drivers of motorcycles and 96.5% of their passengers were observed to be wearing helmets. By comparison, in ten states with no or only limited helmet laws, usage declined to 51.7% for drivers and 46.7% for passengers.

Table 1

Motorcycle Helmet Observation Study

(May - September 1979)

Percent of Drivers and Passengers Wearing Helmets

STATES WITH HELMET LAWS (6)

			<u>N</u>
DRIVERS	[REDACTED]	97.5%	(2,440)
PASSENGERS	[REDACTED]	96.5%	(459)

STATES WITH NO OR LIMITED HELMET LAWS (10) ^{1/}

DRIVERS	[REDACTED]	51.7%	(6,011)
PASSENGERS	[REDACTED]	46.7%	(1,129)

^{1/} Includes 6 states that require helmets for riders under 18 years of age and 1 state that requires helmets for all passengers.

Motorcycle Helmet UsageCities in States with Mandatory HelmetLaws for All Riders

Table 2 shows, for each city, the percent of drivers and passengers of motorcycles who were observed to be wearing protective helmets as they approached traffic intersections or leaving freeway exits.

Table 2

	<u>May - September 1979</u>	
	<u>DRIVERS</u>	<u>PASSENGERS</u>
	<u>%</u>	<u>%</u>
Atlanta	100.0	100.0
Pittsburgh	99.7	100.0
Miami	99.4	100.0
Birmingham	99.1	100.0
New York City	91.9	89.9
Boston	91.8	94.0
	(2,440)	(459)

Motorcycle Helmet UsageCities in States with No or Only
Limited Helmet Laws

Table 3 shows, for each city, the percent of drivers and passengers of motorcycles who were observed to be wearing protective helmets as they approached traffic intersections or were leaving freeway exits.

Table 3

	<u>May - September 1979</u>	
	<u>DRIVERS</u>	<u>PASSENGERS</u>
	<u>%</u>	<u>%</u>
Providence	78.3	93.6 <u>1/</u>
Baltimore	77.5	87.8 <u>2/</u>
Seattle	73.7	66.3
San Diego	52.5	28.6
Dallas	51.9	56.6 <u>2/</u>
Fargo/Moorhead	49.9	50.0 <u>2/</u>
Minneapolis/St. Paul	48.2	37.0 <u>2/</u>
Phoenix	47.4	33.0 <u>2/</u>
Houston	45.7	35.6 <u>2/</u>
New Orleans	45.0	25.9 <u>2/</u>
San Francisco	44.5	34.8
Los Angeles	43.8	31.1
Chicago	32.8	22.7
	(6,011)	(1,129)

1/ Requires all passengers to wear helmets

2/ Requires all passengers under 18 years of age to wear helmets

Mopeds

In addition to observing helmet usage by motorcyclists, data was also collected on helmet usage by moped drivers and passengers. The incidence of helmet usage among moped drivers and passengers is well below that for motorcyclists. In the 19-city study, 37.5% of moped drivers and 19.6% of passengers were observed to be wearing helmets over the five-month period. The comparable usage rates among motorcyclists were 64.9% for drivers and 61.6% for passengers.

Mandatory helmet laws for motorcyclists do not appear to have any impact on moped riders. Among moped riders, helmet usage in states that have helmet laws for motorcyclists is actually lower than in those states with no or only limited laws for motorcyclists.

Table 4

Percent of Moped Drivers and Passengers Wearing Helmets

	<u>May - September 1979</u>	
	<u>DRIVERS</u>	<u>PASSENGERS</u>
	<u>%</u>	<u>%</u>
Total 19 cities	37.5	19.6
States with helmet laws for motorcyclists	29.6	10.0
States with no or limited helmet laws for motorcyclists	39.6	25.0
	(654)	(56)

* Helmet usage for each city not shown because of the limited number of cases.

51495
070279

CHILD RESTRAINT/OCCUPANT POSITION
PASSENGER OBSERVATION FORM

Observer _____ City _____
 Intersection _____ 1 Primary Road 1 City
 Location No. _____ 2 Freeway Exit 2 Suburb
 Day _____ 3 Turnpike (Night) 3 Rural
 Date _____ 4 Turnpike (Day) 4 Rural
 Month _____ 5 Turnpike
 Time Started _____ 1 AM Time Ended _____ 1 AM
 _____ 2 PM _____ 2 PM
 Conditions 1 Daylight 2 Twilight 3 Night
 1 Dry 2 Rain 3 Snow, Ice

LICENSE NUMBER	TOTAL PASSENGERS (Write in Number)	AGE GROUP		SEX	SEAT	POSITION	POSTURE	LOCATION	OCCUPANT'S BACK	OCCUPANT'S KNEES	IN CHILD RES.?	ADULT BELT
		1 Infant	2 Small Child									
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AGE GROUP: 1 Infant; (Under 1 yr) 2 Small Child; (1-4 yrs) 3 Sub-teen; (5-12 yrs) 4 Teen; (13-19 yrs) 5 Adult (20 yrs and over)

LICENSE NUMBER	TOTAL PASSENGERS (Write in Number)	AGE GROUP	SEX	SEAT	POSITION	POSTURE	LOCATION	OCCUPANT'S		IN CHILD RES.?	ADULT BELT
								BACK	KNEES		
	1	Infant						1 Seat	1 Forward	1 Yes	1 Both
	2	Small Child	1 Male	1 Front	1 Driver	1 Sit	1 Seat	2 Seat	2 R.C.		
	3	Sub-Teen			2 Side	2 Stand	2 Floor	3 Donr	3 L.C.		2 Lap
	4	Teen	2 Female	2 Back	2 Center	3 Kneel	3 Lap	3 Person	4 Rear	2 No	3 None
	5	Adult			3 Outboard	4 Lie		4 Non Sup.			
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AGE GROUP: 1 Infant; (Under 1 yr) 2 Small Child; (1-4 yrs) 3 Sub-teen; (5-12 yrs) 4 Teen; (13-19 yrs) 5 Adult (20 yrs and over)

=	DRIVER 1 HELMET ON 2 HELMET OFF	PASSENGER* 1 HELMET ON 2 HELMET OFF (*IF NO PASSENGER, LEAVE SPACE BLANK)	<ul style="list-style-type: none"> • IF MOTORCYCLE. LEAVE SPACE BLANK • IF MOPED OR MOTOR- BIKE, RECORD "1"
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