November 1983
Final Report

DOT HS-806-523

EXPERIMENTAL FIELD TEST OF PROPOSED PEDESTRIAN SAFETY MESSAGES

US Department of Transportation
National Highway Traffic Safety Administration

VOLUME III
ADULT MESSAGES

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16. Abstract

A detailed re-analysis of available pedestrian accident data was utilized to define three sets of pedestrian safety public information and education (PI&E) messages. These messages were then produced and field tested. The objectives and theoretical background for the study are addressed in Volume I. The messages directed at child pedestrian accidents and using an animated character named "Willy Whistle" are covered in Volume II. Two sets of adult-oriented messages are the focus of this Volume. The child messages were successful in reducing pedestrian accidents in three test cities. The adult messages also yielded some positive results. It was concluded that these messages are viable pedestrian accident countermeasures. The success of these messages leads to the additional conclusion that PI&E, in general, can be an effective countermeasure modality for modifying simple behaviors if adequate exposure is obtained.

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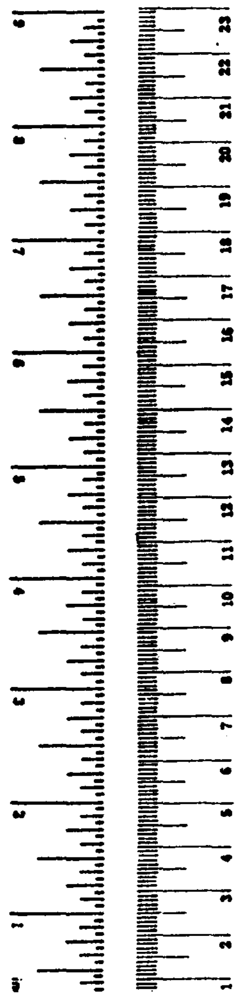
METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

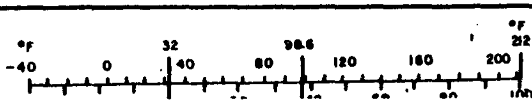
Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
	AREA			
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	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	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
	TEMPERATURE (exact)			
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

*1 in ≡ 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286.



Approximate Conversions from Metric Measures

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



DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

TECHNICAL SUMMARY

CONTRACTOR	Dunlap and Associates East, Inc. 17 Washington Street Norwalk CT 06854	CONTRACT NUMBER DOT-HS-4-00952
REPORT TITLE	Experimental Field Test of Proposed Pedestrian Safety Messages (3 Volumes)	REPORT DATE November 1983
REPORT AUTHOR(S)	Richard D. Blomberg, David F. Preusser, Allen Hale, William A. Leaf	

The overall objective of the project reported herein was to utilize the pedestrian accident data collected and analyzed on a previous NHTSA study (Snyder and Knoblauch, 1971) to structure the content, presentation and evaluation of public education messages designed to reduce specific types of pedestrian accidents. A predecessor study (Blomberg and Preusser, 1975) had shown that members of the population at risk for various accident types would adopt safer street crossing behaviors if these behaviors were simple and convenient and if the target audience understood the need for these safer behaviors. It was the task of the present effort to extend these findings to "real world" situations by actually executing the specific behavioral advice in a form suitable for mass media presentation, distributing the produced messages in test markets and assessing the results of the process.

In order to guide both the message development and the assessment activities, a model of the process by which public education produces an accident reduction was developed and followed. This model involves seven sequential steps beginning with knowledge of the problem and proceeding through development of a message content, media production, transmission, changes in knowledge or attitudes and behavioral change to the achievement of accident reduction. To accomplish the steps of the model with minimum losses between steps, this project utilized a multi-disciplinary team of researchers, advertising specialists and media producers, all of whom were guided by the in-depth accident data of Snyder and Knoblauch (1971).

By grouping accident cases with similar precipitating and predisposing factors, Snyder and Knoblauch (1971) were able to define and name over 30 specific accident types. Since these types were defined as involving specific behavioral errors on the part of drivers and pedestrians, it seemed reasonable and potentially effective to attempt to combat specific pedestrian accident types by altering their identified unsafe behaviors. It was also reasoned that the accident types themselves described situations, e.g., crossing in front of a car which had stopped to allow the pedestrian to cross, with which the population at risk could relate and during which they might be convinced to substitute safer behaviors or omit unsafe actions.

The accident types with the greatest frequency of occurrence appeared to be the logical candidates from which to choose initial countermeasure targets. The types selected as targets for this study from among the types with the greatest frequency were:

(Continue on additional pages)

"PREPARED FOR THE DEPARTMENT OF TRANSPORTATION, NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION UNDER CONTRACT NO.: DOT-HS-4-00952. THE OPINIONS, FINDINGS, AND CONCLUSIONS EXPRESSED IN THIS PUBLICATION ARE THOSE OF THE AUTHORS AND NOT NECESSARILY THOSE OF THE NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION."

HS Form 321
July 1974

- o Dart-Out, First Half--in which the pedestrian, typically a child aged nine or less, is struck in the first half of a non-intersection (midblock) crossing and in which there was a short time exposure, i.e., the driver and pedestrian had insufficient preview time of each other to avoid an accident.

- o Dart-Out, Second Half--same as Dart-Out, First Half except the pedestrian was struck in the second half of the roadway being crossed.

- o Vehicle Turn-Merge with Attention Conflict (VTM)--in which the driver is making a turn, is distracted by factors other than the pedestrian and strikes the pedestrian who generally assumes he or she has been seen and will be yielded to. The pedestrian is typically an adult.

- o Multiple Threat (MT)--which involves a pedestrian, usually an adult, crossing in front of a vehicle (which has yielded to him or her) being struck by an overtaking vehicle whose driver's vision was blocked by the stopped car.

Dart-Outs represent about 39% of all pedestrian accidents. VTM crashes account for about another 13% and Multiple Threats, though highly variable in incidence from city-to-city, can account for up to 10% of a locale's pedestrian crashes.

The great differences between adult and child media consumption patterns, learning abilities and types of pedestrian accident involvements as well as the somewhat different measurement techniques used for the assessment of the child and adult materials suggest the need to separate the discussions devoted to children and adults. Hence, this summary will focus first upon the details of the field test of the materials directed to children and then on the details of the assessment of adult materials.

Child Messages

The child anti-Dart-Out messages, which included a 6-7 minute classroom film, three 30 second and three 60 second TV spots and a poster, all employed an original animated character named "Willy Whistle" as the spokesperson. The six TV spots covered each of the behavioral messages contained in the classroom film.

The three 60 second spots covered:

- o "The Whole Story"--stopping at the curb and looking left-right-left (L-R-L) before crossing; stopping at the edge of a parked car and looking L-R-L before crossing; and reinitiation, i.e., beginning the L-R-L all over again if interrupted.

- o "Reinitiation"--beginning the stop and L-R-L sequence all over again if interrupted so that you obtain a "clean" L-R-L before crossing.

- o "Curbs and Parked Cars"--the stop (at the curb or edge of the parked car) and look L-R-L message with particular emphasis on the stop part of the advice.

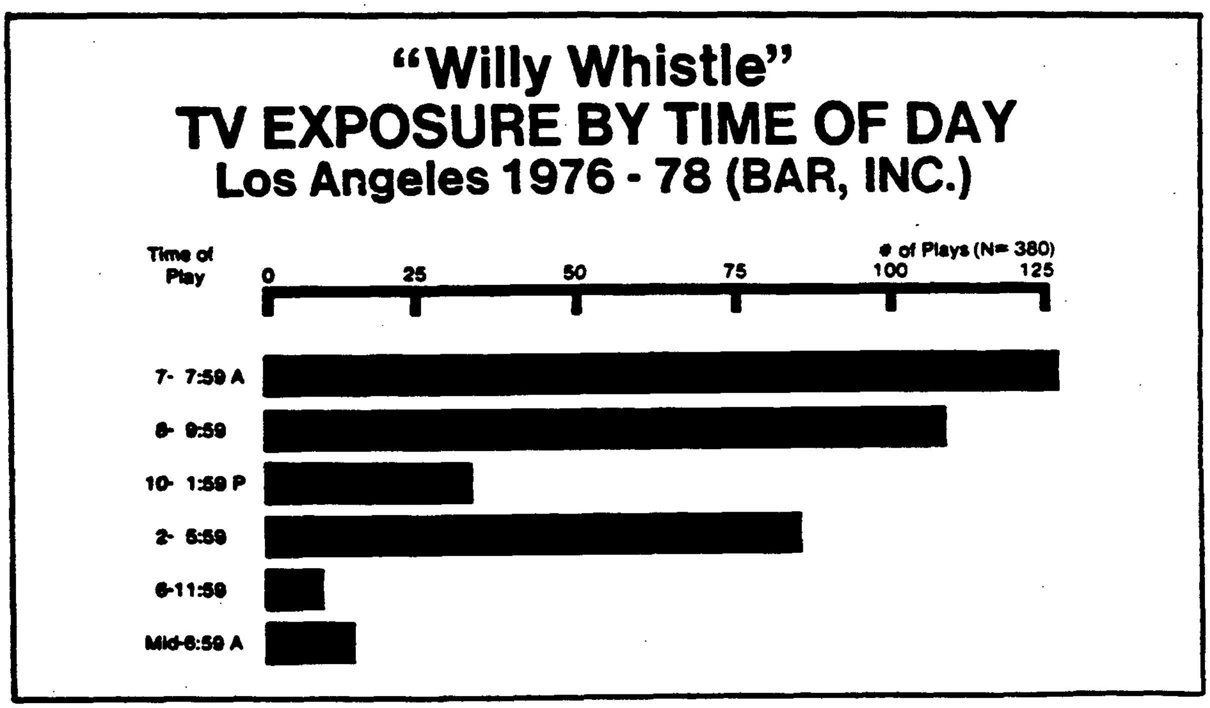
The three 30 second spots were essentially abbreviated versions of the 60 second materials and were titled:

- "Search"
- "Curbs"
- "Parked Cars"

Field Test of Child Materials

A field test was undertaken to determine if the Willy Whistle messages were effective countermeasures for Dart-Out accidents among young children. The materials were distributed to television stations and schools in Los Angeles, California, Columbus, Ohio and Milwaukee, Wisconsin during 1976 and 1977. Pedestrian accidents were examined in detail for at least three years prior to introducing the materials and for two years after their introduction. In addition, as a means of learning more about the process by which Willy Whistle might impact pedestrian accidents, careful measures were taken of: the exposure of the children in each city to the TV and classroom materials; recall of the materials and their contents by the children; safe street crossing knowledge; and actual street crossing behavior. Each of these measures was taken at least three times in each city--before distribution of Willy Whistle, several months after distribution and at the end of the study period.

The results of all the measures were highly encouraging. Exposure, whether through TV (380 plays valued at $150,000 in Los Angeles alone) or in the classroom (at least 113,000 children in Los Angeles saw the film), appeared good. It was particularly noteworthy that the television stations seemed to play the Willy Whistle materials at particularly opportune or "prime" times for the target age group. For example, the Figure below shows the distribution of plays by time of day for Willy Whistle in Los Angeles, the only one of the test cities for which full time monitoring was available through Broadcast Advertisers Reports, Inc.,



(BAR). The vast majority of the plays were logged in the morning and after school hours when children typically watch TV. Relatively few plays were received in the post-midnight time period which is the traditional "graveyard" for public service announcements. Anecdotal reports from TV station public service directors indicated that they played Willy more than most other PSAs because they liked the quality of the material and because there was very limited competition for public service time during the hours when children were the primary audience.

An in-school survey was conducted to assess changes in child knowledge of safe street crossing practices and to examine recall of the Willy Whistle messages. The survey in each test city showed that over 70 percent of the school children in kindergarten through sixth grade knew who Willy Whistle was after the materials had been available for approximately one year. Their expressed knowledge of safe street crossing behaviors also increased dramatically as shown in the Table below. This Table shows the percent of child respondents who gave the correct answers for: search at the curb (L-R-L); course at the curb (stop at the curb); search near parked cars (L-R-L); course near parked cars (stop at the outside edge of the parked car); and reinitiation (let car pass and look L-R-L until no cars are coming). It is interesting to notice that the largest knowledge gains were for the more novel parts of the behavioral sequence. A left-right-left search pattern, advice on crossing near parked cars and reinitiation were topics that had not typically been covered in the major pedestrian safety materials available prior to Willy Whistle.

CHILD PERCENT CORRECT KNOWLEDGE

	Los Angeles		Columbus		Milwaukee	
	Pre	Post	Pre	Post	Pre	Post
N=	357	301	329	293	453	423
Search - Curb	11%	44%	3%	42%	6%	61%
Course - Curb	3	3	4	10	7	18
Search - Parked Cars	5	41	2	38	4	57
Course - Parked Cars	8	41	20	76	4	60
Reinitiation	6	37	2	28	2	36

The actual street crossing behavior of elementary school students was also measured in the three test cities. In order to amass a sufficient sample of observed crossings, children were viewed after school dismissals as they dispersed for home and in the neighborhoods immediately surrounding the school. These were not the typical conditions for occurrence of Dart-Out accidents, but there was no other reasonable means of obtaining a large sample of observed crossings. Therefore, the results of the behavior observations shown below likely understate correct behaviors. Children in groups or under the protective umbrella of the trip home from school may be expected to feel safer than when they are alone. This could easily result in poorer street crossing behavior due to a reliance on "external" protection.

CHILD
PERCENT CORRECT BEHAVIOR

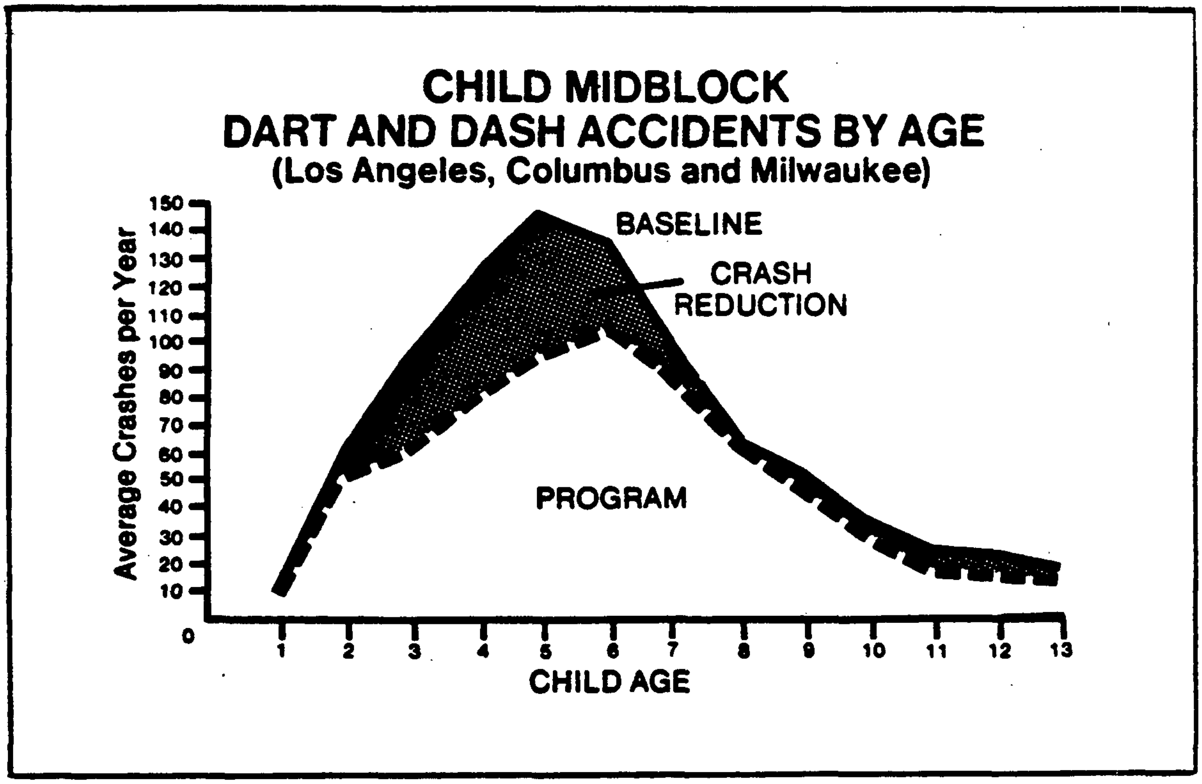
	Los Angeles Pre	Los Angeles Post	Columbus Pre	Columbus Post	Milwaukee Pre	Milwaukee Post
N=	4096	5692	1148	1126	3502	2261
Search (L-R-L)	5%	11%	5%	7%	3%	9%
Course (Full Stop)	20	16	15	12	12	17

The behavioral data show a statistically significant improvement in L-R-L search in each of the three test cities. Totally correct stopping behavior showed an improvement in Milwaukee and a slight decline in the other two cities. Overall, however, it could be concluded that, within the measurement sensitivity of behavioral observations using human observers, the general trend was toward better behaviors. It must, nevertheless, be noted that the measured child behaviors in the after school hours either before or after introduction of Willy Whistle were quite poor.

The ultimate measure of the effectiveness of the Willy Whistle messages in the three test cities was their impact on Dart-Out accidents. In each city, every police pedestrian accident report for a baseline period of at least three years and for the Willy Whistle program years was obtained, read and assigned an accident type. In each city, a significant reduction of Dart-Out accidents was observed. Across the three cities, Dart-Outs involving pedestrians 14 years of age and under declined by an average of over 20 percent. This relates to about a 12 percent reduction in <u>all</u> pedestrian crashes involving this age group. There was a statistically significant drop in child Dart-Out accidents in <u>each</u> of the three cities when measured using time series techniques. The crash reduction results were not, however, uniformly distributed by age.

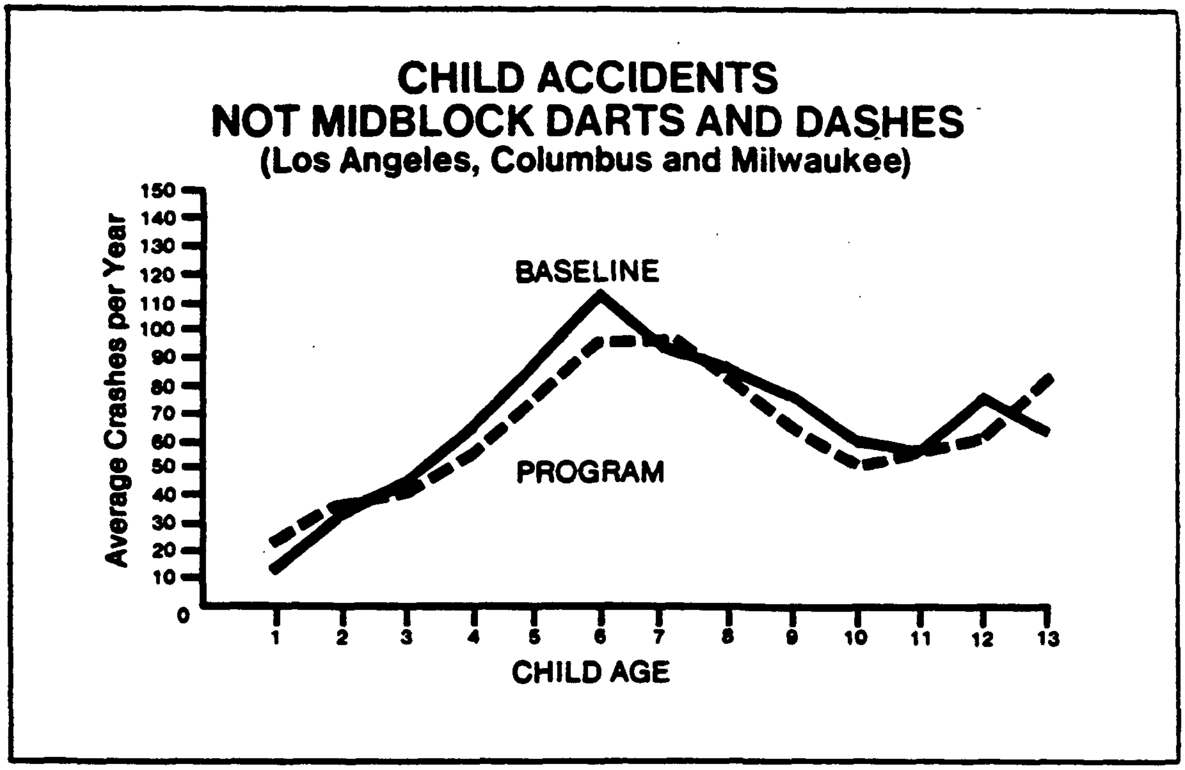
The Figure below shows the distribution of the average annual number of Dart-Out accidents by age for the three test cities combined, separated into the baseline and program periods. From this Figure, one can clearly observe that the great majority of the crash reduction took place among four to six year olds.

Overall, Dart-Outs for four, five and six year olds declined over 30 percent from the baseline to the program period. This large impact of Willy in the pre-school years strongly suggests that television exposure to this audience was effective as they were not exposed to the classroom materials.



In order to place the accident reduction results in perspective, it is interesting to examine what happened to accidents other than midblock Dart-Outs during the same period when the decline in Dart-Outs was observed. Shown below is a plot similar to the one presented above but for all accidents which were <u>not</u> of the midblock Dart-Out types. The shape of the baseline and program curves presented below show a striking similarity suggesting that the decline in Dart-Outs was likely not the result of a general trend toward lower child pedestrian accidents in the test cities.

Another way to look at the effectiveness of the Willy Whistle messages is in terms of crashes reduced or avoided. The time series analysis projected that 48, 96 and 150 pedestrian accidents to children between the ages of three and eight did <u>not</u> occur in Columbus, Milwaukee and Los Angeles, respectively, during the two year test period because of the introduction of Willy Whistle. If each of these crashes would have entailed an average cost to society of $10,000 (a sum which is not unreasonable for an injury accident involving a youth), Willy Whistle saved society almost $3 million while it was being tested. Thus, the child message package produced for this study was proved to be both an effective and a cost-effective pedestrian accident countermeasure.



Adult Messages

Each adult accident type (VTM and MT) was addressed with two 60 second and two 30 second TV spots and 60 and 30 second radio spots. The VTM messages included:

- 60 and 30 second TV and radio spots addressed to drivers to remind them to take a last look for pedestrians before making turns at intersections ("search" message). Both right and left turns are depicted and the heavy demands on the driver in a turning situation are discussed (i.e., "all the things a driver has to watch out for").

- 60 and 30 second TV spots addressed to pedestrians telling them that drivers making turns have a lot to watch out for and may sometimes forget to look for pedestrians. Specifically, the spots give a "search" message and tell pedestrians to "look at the driver not just the car" in an effort to overcome the erroneous assumption on the part of the pedestrian that he or she has been seen and will be permitted to cross.

The VTM materials were also produced in a Spanish language version to meet the market needs in the test cities and to provide insights into the potential benefits of multi-lingual production.

The Multiple Threat package was similar in construction to the VTM messages except that only an English language version was produced. The specific materials included:

- 60 and 30 second TV and radio spots to drivers telling them to look ("search") for cars stopped in travelled lanes, slow down ("course" message) and ask themselves why the car was stopped. The audience is then told and/or shown that the stopped car could be hiding a pedestrian.

- 60 and 30 second pedestrian-oriented spots presented the messages to stop at the edge of any car that stops to allow a crossing ("course" message) and to look around it for any cars coming in the next lane ("search" message).

Field Test of Adult Messages

The VTM messages were tested in both Los Angeles and San Diego, California. The MT messages were tested only in Los Angeles. For both sets of messages, the years 1973, 1974 and 1975 constituted the accident baseline. Messages were distributed early in 1976 and were actively promoted for two years. Thus, 1976 and 1977 were established as the "program" years during which accident reduction, if achieved, would have been observed. As in the test of the Willy Whistle messages, exposure, recall, knowledge and behavior data were collected in each city as intermediate measures of program effectiveness.

Television exposure was measured by BAR in Los Angeles and through direct access to station logs in San Diego. These data showed that the adult messages received significantly fewer plays than did Willy Whistle. For example, the MT messages in Los Angeles were logged only 58 times by BAR in 1976 and 1977, and the VTM spots were tallied only 43 times during the same period. Follow-up discussions with the station public affairs directors indicated that the primary reason for the relatively smaller exposure of the adult materials was the intense competition for free (public service) advertising directed at adults. In fact, the stations in Los Angeles mentioned that the VTM and MT messages competed with each other, thereby suppressing the exposure of the individual messages.

In addition to measuring exposure through post hoc monitoring, it was useful to examine actual audience unaided recall of the messages. This provided data for segments of the population, e.g., Spanish speaking families, which could not be obtained from monitoring reports. Unaided recall was measured using open-ended questions on a telephone survey conducted in both English and Spanish. The resulting data, as summarized below, showed significantly higher recall among Spanish-speaking residents of the test sites than among those whose primary language was English. The difference was particularly noteworthy for the VTM messages in Los Angeles where there was little (3% maximum) recall of the messages among the English-speaking survey sample but significant recall among Spanish language respondents (38%).

MAXIMUM PERCENT SPECIFIC RECALL OF ADULT MESSAGES (TV OR RADIO)

		Los Angeles	San Diego
VTM	ENGLISH	3%	24%
	SPANISH	38%	28%
MT	ENGLISH	4%	N/A
	SPANISH	8%	N/A

As part of the same telephone survey which measured recall, the respondent's knowledge of the correct way to behave in VTM and MT situations was assessed. The results for knowledge of what a pedestrian should do in the VTM and MT situations are shown in the table below.

ADULT PERCENT CORRECT PEDESTRIAN KNOWLEDGE

		Los Angeles		San Diego	
		PRE	POST	PRE	POST
	N=	658	657	548	564
VTM	SEARCH	4%	7%	1%	9%
MT	SEARCH	18%	30%	14%	25%
	COURSE	9%	16%	11%	9%

These data, presented as a percent of the respondents giving the correct information, generally show an improvement in pedestrian knowledge. Detailed analyses of the survey data indicated that much of the observed improvement came from the Spanish language sample.

The knowledge of correct driver actions in the VTM and MT situations was measured with survey questions directed only to the licensed drivers in the survey sample. Slight improvements were observed in San Diego, but Los Angeles respondents showed no significant improvements. The data are summarized below.

ADULT
PERCENT CORRECT
DRIVER KNOWLEDGE

		Los Angeles PRE	Los Angeles POST	San Diego PRE	San Diego POST
	N=	508	542	452	468
VTM	SEARCH	27%	28%	21%	31%
MT	SEARCH	21%	14%	7%	14%
	COURSE	80%	75%	78%	79%

Observations of pedestrian and driver behaviors in the VTM and MT situations were collected. Correct pedestrian behavior improved as shown in the Table below. In the VTM situation, there was a significant improvement in both Los Angeles and San Diego. This improvement was most pronounced if a turning vehicle was present but also was observed in the absence of a vehicular threat. Multiple Threat observations, which were only taken in Los Angeles, showed increases in both correct search ("Look around a car that stops for you") and course ("Stop at the outside edge of a car that stops for you") behavior.

ADULT
PERCENT CORRECT
PEDESTRIAN BEHAVIOR

		Los Angeles PRE	Los Angeles POST	San Diego PRE	San Diego POST
VTM SEARCH					
	VEHICLE PRESENT	8% (3,076)	20% (2,186)	9% (812)	26% (1,289)
	VEHICLE ABSENT	3 (3,244)	10 (2,329)	10 (1,438)	20 (1,225)
MT					
	SEARCH	73 (2,653)	80 (3,113)	N/A	
	COURSE	13 (2,661)	41 (3,113)	N/A	

Measurement of driver behavior was also undertaken in both the VTM and MT situations. Unfortunately observation of driver search patterns through tinted windshields, sun glare, etc., in the VTM situation, proved extremely difficult and unreliable. Also, inter- and intra-rater reliability of the slowing behavior of motorists in the MT situation proved to be poor. These measurement problems are considered to be the reason for the equivocal and even negative driver behavioral results summarized below.

ADULT
PERCENT CORRECT DRIVER BEHAVIOR

	Los Angeles PRE	Los Angeles POST	San Diego PRE	San Diego POST
VTM - SEARCH				
LEFT TURNING	41% (1,802)	42% (1,943)	48% (1,395)	36% (1,533)
RIGHT TURNING	46 (2,931)	43 (2,682)	59 (2,000)	49 (2,463)
MT - COURSE	74 (1,951)	61 (2,658)	N/A	
(N)				

Accident data for the VTM and MT types in Los Angeles and VTM accidents in San Diego were analyzed using time series techniques. No significant decrease in either type was detected. The percent of the relevant types by year and the total numbers of all pedestrian accidents by year in each city are shown below.

PERCENT VTM AND MT ACCIDENTS

LOS ANGELES (PROGRAM: 1976–1977)

	1973	1974	1975	1976	1977	1978
N ALL ACC. TYPES	3062	3082	3141	3310	3239	3549
VTM	14.0%	13.0%	13.4%	13.7%	13.2%	15.2%
MT	6.6	6.8	7.0	7.4	6.9	7.7

No change by Time Series

SAN DIEGO (PROGRAM: 1976–1977)

	1973	1974	1975	1976	1977	1978
N ALL ACC. TYPES	531	514	512	545	539	622
VTM	11.5%	15.0%	12.1%	12.1%	16.0%	19.0%

Even though no overall decrease in VTM accidents was observed, the relatively high recall and knowledge measured among Spanish-speaking residents of the test cities suggested the need to examine separately accidents among this group. Fortunately, data coded on the Los Angeles police accident report (but not coded in San Diego) made such an analysis possible. The resulting time series of VTM accidents involving either a Spanish-speaking pedestrian (10 years or older) or driver, as shown below, yielded a statistically significant accident reduction. The analysis indicated that VTM accidents to this group declined by 18 percent or about 24 crashes per year during the program years when the developed messages were being aired.

PERCENT VTM ACCIDENTS SPANISH PEDESTRIAN (10+ YEARS OLD) OR DRIVER

LOS ANGELES	1973	1974	1975	1976 (PROGRAM)	1977 (PROGRAM)	1978
N ALL TYPES	663	684	712	760	758	960
VTM	18%	19%	17%	15%	14%	17%

−18% (~ 24 per year)
BY TIME SERIES

Conclusions

The success of the Willy Whistle and Spanish VTM messages leads to the specific conclusion that they are effective. The demonstrated benefits of these messages also leads to the conclusion that public information and education (PI&E) can be a viable countermeasure. The overall pattern of results suggests that message effectiveness increases with increased exposure. Thus, for example, the Willy Whistle campaign benefitted from having both a classroom and a TV component. Achieving sufficient exposure for PI&E materials is, however, difficult, especially for adult audiences. Personal contacts with stations, multi-lingual messages and local sponsorship are some of the ways in which additional air time may be secured.

In addition to proving the effectiveness of the modality and the specific countermeasures, this study also developed and validated a process for PI&E generation which coupled research, advertising and media development skills with detailed accident data serving as the cohesive force. The demonstrated success of this process leads to the conclusion that it should be given serious consideration whenever PI&E countermeasures are to be produced.

FOREWORD

This report is the third volume of the Final Report of Contract No. DOT-HS-4-00952 between the U.S. Department of Transportation, National Highway Traffic Safety Administration and Dunlap and Associates East, Inc. (formerly the Eastern Division of Dunlap and Associates, Inc.). The objectives of the study were to produce and field test public education messages designed to reduce pedestrian accidents.

This volume is devoted to a description of the field test of the messages directed to adult audiences. Volume I describes the theory behind the development of the messages and details the development processes. Volume II presents the methods and results of the field test of the messages directed to children.

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Among all of the individuals who provided support for field test operations in the three test cities (Los Angeles, CA; Milwaukee, WI; and Columbus, OH), the following (listed alphabetically) are singled out for our particular thanks:

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- Michele Burger
  Project Coordinator in Los Angeles
- Bruce Herms
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I. INTRODUCTION

Pedestrian accidents are a major cause of death and injury in the United States. The 1977 edition of Accident Facts (National Safety Council) indicates that the number of deaths due to pedestrian accidents ranks third as a cause of accidental death behind other types of motor vehicle accidents and falls. Although children represent a large proportion of pedestrian victims, adults still predominate in the accident statistics. Therefore, it was essential that the "Experimental Field Test of Proposed Pedestrian Safety Messages," performed by Dunlap and Associates East, Inc., for the U.S. Department of Transportation, National Highway Traffic Safety Administration (NHTSA), address countermeasures to the adult pedestrian accident problem.

The overall objective of the project reported herein was to utilize the accident data collected and analyzed on a previous NHTSA study (Snyder and Knoblauch, 1971) to structure the content, presentation and evaluation of public education messages designed to reduce specific types of pedestrian accidents. A predecessor study (Blomberg and Preusser, 1975) had shown that members of the population at risk for various accident types could be convinced to alter their behavior if presented with an appropriate message in a controlled environment. It was the task of the present effort to extend these findings to "real world" situations by actually executing the specific behavioral advice in a form suitable for mass media presentation, distributing the produced messages in test markets and assessing the results of the process.

The detailed theoretical background to the development and testing of pedestrian safety messages utilized in this study is presented in Volume I of this report. A model of public education as a safety countermeasure was developed to guide both the message development and field test activities. Underlying the entire effort was the conscious desire to remain faithful to the pedestrian accident type concept developed by Snyder and Knoblauch (1971). In their examination of pedestrian accident causation, these researchers adopted a behavioral view of accident occurrence. Simply, both parties to the accident, the driver and the pedestrian, had to commit (or suffer from since there is no requirement for conscious action) a behavioral "error" or "failure" in order for a pedestrian accident to occur. These failures were termed "precipitating factors" in the Snyder and Knoblauch (1971) research. Further, there are conditions (termed "predisposing factors") e.g., in the environment, weather or lighting, or in the condition of the parties, e.g., fatigue or intoxication, or in the vehicle, e.g., a mechanical malfunction, which can make a precipitating factor more likely to occur.

By grouping accident cases with similar precipitating and predisposing factors, Snyder and Knoblauch (1971) were able to define and name over 30 specific accident types. Since these types were defined as involving specific behavioral errors on the part of drivers and pedestrians, it seemed totally logical and potentially effective to attempt to combat pedestrian accidents by altering the identified unsafe behaviors in particular accident types. It was reasoned that the accident types themselves described situations, e.g., crossing in front of a car which had stopped to allow the pedestrian to cross, with which the population at risk could relate and during which they might be convinced to substitute safer behaviors or omit unsafe actions.

The accident types with the greatest frequency of occurrence appeared to be the logical candidates from which to choose initial countermeasure targets. Among the types with the greatest frequency were:

- Dart-Out, First Half--in which the pedestrian is struck in the first half of the non-intersection (midblock) crossing and in which there was a short time exposure, i.e., the driver and pedestrian had insufficient preview time of each other to avoid an accident.

- Dart-Out, Second Half--same as Dart-Out, First Half except the pedestrian was struck in the second half of the roadway being crossed.

- Vehicle Turn-Merge with Attention Conflict (VTM)--in which the driver is making a turn, is distracted by factors other than the pedestrian, and strikes the pedestrian who generally assumes he or she has been seen and will be yielded to.

- Multiple Threat (MT)--which involves a pedestrian crossing in front of a vehicle (which has yielded to him or her) being struck by an overtaking vehicle whose driver's vision was blocked by the stopped car.

These were selected as the countermeasure targets for the study.

Pedestrians involved in the Dart-Out accident types tend to be quite young. Data presented later in Volume II show that well over half of the pedestrian accidents to people 9 years old or younger are Dart-Outs. Further, the data collected by Snyder and Knoblauch (1971) show that well over 70% of all Dart-Outs involved children 9 or younger. Hence, it is reasonable to regard Dart-Outs as primarily a problem among children.

The VTM and Multiple Threat accidents, on the other hand, are predominantly an adult problem. Snyder and Knoblauch (1971) showed that only about 20% of Multiple Threats involved pedestrians 9 or younger, and less than 10% of the VTMs in their data base involved a pedestrian under 16 years old. Thus, the VTM and Multiple Threat problems could realistically be viewed as an "adult" problem.

The Multiple Threat accident may also be viewed as primarily a west coast event. In the typical and "classic" case of this accident type, a pedestrian begins to make a legal crossing, usually in a marked or unmarked crosswalk which has no additional controls such as a signal. A driver observes the pedestrian and stops to yield the right-of-way. In so doing, the yielding driver has set up a screen for overtaking motorists thereby putting the pedestrian at risk. While the laws of most states are similar in requiring the first motorist to stop and yield, the rate of compliance with the law varies greatly. In the western states, particularly California, Washington and Oregon, there is widespread adherence to the rule. Thus, it is not surprising to find a large incidence of Multiple Threat accidents in these states. In fact, data from Snyder and Knoblauch (1971) and elsewhere indicate that the Multiple Threat type may constitute as much as 10% of all pedestrian accidents in urban areas in these western states. In the balance of the country, compliance with the basic "yield to pedestrians" rule is poor and, hence, Multiple Threats represent on the order of only 1-2% of all urban pedestrian accidents in these areas.

It should also be noted that there are qualitative as well as quantitative differences between the typical eastern and western Multiple Threat accident. The western event tends to involve the driver acknowledging his or her duty and yielding to a pedestrian who is usually in a crosswalk (marked or unmarked). The eastern accident more typically involves the pedestrian: forcing the driver to yield by crossing in front of the moving car; taking advantage of the "spillback" from a red signal at an intersection to cross between a line of standing traffic; or crossing in front of a car stopped for a red light and having the light turn green for the overtaking traffic whose vision of the pedestrian is blocked.

The great differences between adult and child media consumption patterns, learning abilities and types of pedestrian accident involvements as well as the different measurement techniques used for the assessment of the child and adult materials suggested the separation of the report presentations devoted to children and adults. Hence, the balance of this report volume focuses only upon the details of the field test of the materials directed to adults. Volume II presents similar information for the test of the child-oriented messages.

Each accident type (VTM and MT) was addressed with two 60 second and two 30 second TV spots and 60 and 30 second radio transcriptions. In addition, as discussed in Chapter II, "live" copy radio announcements were also distributed to keep the campaign going. These were intended to be read by the regular station announcer whenever time permitted. The VTM messages included:

- o 60 and 30 second TV and radio spots addressed to drivers to remind them to take a last look for pedestrians before making turns at intersections. Both right and left turns are depicted and the heavy driver loading in a turning situation is discussed.

- o 60 and 30 second TV spots addressed to pedestrians telling them that drivers making turns have a lot to watch out for and may sometimes forget to look for pedestrians. Specifically, the spots tell pedestrians to "look at the driver not just the car" in an effort to overcome the erroneous assumption on the part of the pedestrian that he or she has been seen and will be permitted to cross.

The VTM materials were also produced in a Spanish language version to meet the market needs in the test cities and to provide insights into the potential benefits of multi-lingual production.

The Multiple Threat package was similar in construction to the VTM messages except that only an English language version was produced. The specific materials included:

- o 60 and 30 second TV and radio spots to drivers telling them to look for cars stopped in travelled lanes, slow down and ask themselves why the car was stopped. The audience is then told and/or shown that the stopped car could be hiding a pedestrian.

- 60 and 30 second pedestrian-oriented spots presented the messages to stop at the edge of any car that stops to allow a crossing and to look around it for any cars coming in the next lane.

Scripts for the Multiple Threat and VTM TV and radio spots (in English) are contained in Appendix A. The remaining chapters of this volume address the distribution of the materials (Chapter II), results of the assessment of knowledge changes (Chapter III), behavioral change findings (Chapter IV), accident impact analyses (Chapter V) and conclusions (Chapter VI). Volume I of this Final report addresses the process by which the messages, both for adults and children, were conceived and executed. Volume II, which is structured similarly to this volume, discusses the child message test results.

II. SITE SELECTION, MESSAGE DISTRIBUTION AND MESSAGE EXPOSURE

This chapter discusses how the experimental sites were selected, the procedures and techniques utilized to distribute the materials and the amount of exposure that the materials achieved. As referenced above, the test of the adult messages was part of a larger study to test messages targeted for both children and adults. In one of the test cities (San Diego) only the Vehicle/ Turn Merge (VTM) messages were shown. In the other test city (Los Angeles), the VTM messages were distributed along with the Multiple Threat (MT) messages and the child messages. As discussed in the volume of this report dealing with the child messages, it was apparent that the child messages received a sizable amount of exposure in Los Angeles. It is probable that these child messages did, in fact, have some impact on adults and thus on the test of the VTM and MT messages in Los Angeles. In other words, the San Diego test looked at the VTM message alone while the Los Angeles test was intended to examine VTM and MT and any interactive or synergistic effects associated with both adult and child messages being tested at the same time.

A. Site Selection

The adult messages were each tested on a city-wide basis with the primary evaluation design being a test of knowledge, behavior and accidents prior to the introduction of the messages as compared with identical measures taken after message introduction. The design utilized two cities; one would receive only the VTM materials while the other would receive VTM, MT and child materials. The basic site selection criteria were as follows:

- Be able to provide pedestrian accident data in sufficient detail to permit a determination of accident type.

- Have an established and self-contained media system, i.e., not draw significant TV or radio input from other cities.

Los Angeles (population 2,816,061 in the 1970 census) met the above criteria and was certainly a large enough city to support tests of all three sets of message materials. Further, it is one of only a few cities with a substantial number of Multiple Threat accidents. San Diego (population 696,769 in the 1970 census) met the above criteria and was selected for the test of the VTM materials. San Diego did have a substantial number of VTM accidents and was part of the NHTSA/FHWA data base thus accident data were readily available for the period of interest.

B. Distribution of Materials

The Multiple Threat (MT) messages consist of two 60 second television spots, two 30 second television spots, one 60 second transcribed radio spot, one 30 second transcribed radio spot and 10 and 30 second live copy radio announcements (distributed during the summer of 1976). Together, the messages tell drivers to slow down when overtaking a stopped vehicle (since the stopped vehicle may be hiding a crossing pedestrian) and tell crossing pedestrians to stop at the outside edge of a stopped vehicle and look to see what's coming in the next lane before proceeding to cross the street. A more specific description of these materials is given in Volume I. In February, 1976, the television spots were distributed to approximately half of the Los Angeles television stations. As discussed below, the remaining half of the stations got the VTM materials. The stations receiving the MT messages were as follows:

KCOP	KNXT	KTLA	KTTV

The radio spots for these messages were distributed to the following stations:

KABC	KAFJ	KMET	KBCA-FM
KHJ	KMPC	KBIG	KIEV
KNX-AM/FM	KBRT-FM	KIIS	KOST
KFAC-AM/FM	KIQQ-FM	KFI	KPOL-AM/FM
KJOI	KRTH-FM	KFWB	KLAC
KRTH-FM	KGBS-AM/FM		KLOS-FM

All distribution in February was through personal visits to the stations. Live radio copy was distributed by mail during the summer of 1976.

The VTM messages (described in Volume I) consisted of 60 second and 30 second radio and TV spots in both English and Spanish, as well as 10 and 30 second live copy for radio. The television spots were distributed to approximately half of the Los Angeles TV stations. This was necessary since there were so many TV spots, (VTM, Multiple Threat and Child) that distribution of all spots to all stations would have unduly burdened station managers and probably resulted in less total air-time. The remaining half of the stations received the Multiple Threat messages and, as discussed elsewhere, all stations received the Child messages. Thus, in February, 1976, the following Los Angeles television stations received the VTM messages:

KABC	KTLA (Spanish only)
KNBC	KWHY (Spanish only)
KBSC	KMEX (Spanish only)
KHJ	

The radio spots for these messages were distributed to the following stations:

KABC	KAFJ	KLVE-FM (Spanish only)
KBCA-FM	KHJ	KMET
KBIG	KIEV	KMPC
KBRT-FM	KIIS	KNX-AM/FM
KFAC-AM/FM	KIQQ-FM	KOST
KFI	KJOI	KPOL-AM/FM
KFWB	KLAC	KRTH-FM
KGBS-AM/FM	KLOS-FM	KUST

All distribution in February was through personal visits to the stations. Live radio copy was distributed by mail during the summer of 1976.

During the Fall of 1976, the VTM materials were distributed to those Los Angeles television stations which had earlier received only the child and MT materials. Similarly, the MT materials were distributed to those stations receiving only the VTM materials.

In San Diego, the VTM television and radio spots were distributed in February, 1976. The following television stations serving the San Diego market received both English and Spanish versions:

KCST	KFMB	KGTV	XETV	XEWT

The radio spots for (English and Spanish) for these messages were distributed to the radio stations listed below:

KCBQ	KFSD-FM	KOGO
KDEO	KGB-AM/FM	KOZN-FM
KDIG-FM	KYXY-FM	KPRI-FM
KEZL-FM	KITT	KSDO
KFMB-AM/FM	KLRO-FM	KSON-AM/FM

Spanish language versions of the VTM television and radio spots were also made available to Spanish broadcasting stations in the Tijuana area which beam into San Diego. As in Los Angeles, all distribution was through a personal visit to each radio and television station, and live radio copy was distributed by mail during the Summer of 1976.

C. Exposure

1. Los Angeles

Television exposure in Los Angeles was monitored by an independent television monitoring service. This service, Broadcast Advertisers Reports, Inc., reported on activity beginning 2 February 1976. Their reports for the MT spots are summarized in Table 1. The figures indicate that the MT messages were aired only twice during the first four months (exclusive of very late night and UHF programming). Therefore, an effort was made to re-contact each station and request additional air-time. The result was increased exposure through the Summer and early Fall of 1976. In all, the MT spots were aired 58 times on the monitored stations, exclusive of late night programming, through December, 1977.

In many ways, however, the dollar figures shown in Table 1 are more instructive than the total number of plays since dollars are a better measure of the total audience. Two late night spots, for instance, might have a commercial value of only $100 each whereas an early evening spot might have a value of $1,000. The one early evening spot will reach far more people than two, three, four, etc., late night spots. In this regard, the total dollar value figure of $14,200 must be considered as very low. For comparison, the child messages in the same market over the same time period generated $148,513 worth of donated air-time (see Volume II). Either there is less competition for child oriented public service air-time in Los Angeles (most likely) or stations are more interested in child materials or the present child materials were seen by the stations as much better than other spots competing for the same donated air-time.

Table 2 shows a summary of the Broadcast Advertisers Reports for the VTM television spots in Los Angeles. In general, the results parallel those found for MT. The spots were shown only 43 times with an estimated commercial value of only $12,340. As with the MT spots, the 30 second

Table 1. Television Exposure for Multiple Threat Messages in the Los Angeles Market

	Ped or Driver 60 sec. spot		Ped or Driver 30 sec. spot		Total	
Month	Number of Plays	Estimated* Commercial Value	Number of Plays	Estimated Commercial Value	Number of Plays	Estimated Commercial Value
1976						
February	—	—	—	—	—	—
March	—	—	—	—	—	—
April	—	—	—	—	—	—
May	—	—	2	$ 275	2	$ 275
June	—	—	—	—	—	—
July	—	—	1	1000	1	1000
August	—	—	3	450	3	450
September	—	—	1	200	1	200
October	3	$ 750	5	725	8	1475
November	2	200	8	2200	10	2400
December	1	150	5	975	6	1125
1977						
January	2	150	10	4350	12	4500
February	—	—	2	175	2	175
March	1	100	3	225	4	325
April	—	—	3	600	3	600
May	—	—	1	600	1	600
June	—	—	1	25	1	25
July	—	—	1	200	1	200
August	—	—	—	—	—	—
September	—	—	—	—	—	—
October	1	50	1	250	2	300
November	—	—	—	—	—	—
December	—	—	1	550	1	550
Total	10	$1400	48	$12,800	58	$14.200

*Based on commercial rates for the given station and the given time period.

Note: Monitoring does not include very early morning (before 7 a.m.) and late night exposure.

Stations were monitored through 1978. No activity was reported for 1978.

Table 2. Television Exposure for Vehicle Turn/Merge Messages in the Los Angeles Market

Month	Ped or Driver 60 sec. spot: Number of Plays	Ped or Driver 60 sec. spot: Estimated* Commercial Value	Ped or Driver 30 sec. spot: Number of Plays	Ped or Driver 30 sec. spot: Estimated Commercial Value	Total: Number of Plays	Total: Estimated Commercial Value
1976						
February	1	$ 150	—	—	1	$ 150
March	—	—	—	—	—	—
April	1	390	1	$ 125	2	515
May	—	—	—	—	—	—
June	2	1050	1	200	3	1250
July	2	500	9	3200	11	3700
August	2	300	2	400	4	700
September	2	300	—	—	2	300
October	—	—	2	400	2	400
November	—	—	3	150	3	150
December	—	—	1	50	1	50
1977						
January	—	—	—	—	—	—
February	—	—	3	600	3	600
March	—	—	3	1700	3	1700
April	—	—	—	—	—	—
May	1	100	1	50	2	150
June	—	—	6	475	6	475
July	—	—	5	1050	5	1050
August	—	—	4	1000	4	1000
September	—	—	—	—	—	—
October	—	—	1	150	1	150
November	—	—	—	—	—	—
December	—	—	—	—	—	—
Total	11	$2790	32	$9550	43	$12,340

*Based on commercial rates for the given station and the given time period.

Note: Monitoring does not include UHF, very early morning (before 7 a.m.), late night and Spanish exposure.

Stations were monitored through 1978. No activity was reported for 1978.

versions were played far more than the 60 second versions though none of the materials were aired very often. Nevertheless, it is important to note that the Broadcast Advertisers data do not cover use of the Spanish versions of the material and, as will be shown later, there is reason to believe that air-time for the Spanish VTM materials was substantial.

Independent monitoring is not available for radio broadcasts. Thus, individual Los Angeles radio stations were asked to provide feedback on the number of times each spot was aired. Unfortunately, this is relatively difficult for radio stations to do and thus very little feedback was actually received. In all, only three stations provided any reports, even these reports covered only brief time periods and it was not possible to determine whether the VTM spots or the Multiple Threat spots were being aired. KABC reported a "schedule" of broadcasts for the week 21-27 November 1976. Station KIQQ reported one airing every 36 hours for the period 15 August through 15 November 1976. And, station KFWB reported airing the spots eight times per day for the period 1 February through 22 February 1976. Nevertheless, field reports and the few station reports received suggest that radio exposure was quite good. There was probably much more exposure on radio than on television.

2. San Diego

The San Diego messages were not monitored by an independent television monitoring service as was done in Los Angeles because no service maintains full-time monitoring in San Diego. Rather, individual television and radio stations were asked to record the date each spot was aired and forward the information to our office in Connecticut. In general, radio stations were not able to comply with this request. Only two of the fifteen stations in San Diego provided any information (KFSD and KOZN). Nevertheless, it is felt that radio exposure for these messages was probably quite good. The two reporting stations alone listed a combined total of 58 plays during the first six months and field reports suggest that the radio messages were heard. No reports were received beyond the first six months.

Television stations, on the other hand, were apparently better able to provide exposure data. Of the five stations in the San Diego market, four provided reports covering varying time periods. Table 3 shows the submitting stations, the time periods covered by their reports and the dates on which the spots were aired. This Table begins with February 1, 1976, the scheduled start of the test, and continues for six months. No reports were received beyond this period. In all, the stations reported airing the spots a total of 121 times. It is felt, however, that the actual number of airings was substantially higher since one station did not report, the remainder reported for only a few months and no information was received concerning airing of the Spanish language spots by stations in Tijuana which serve San Diego. Based on these reports, it is estimated that nearly 1-1/2 hours of television air-time was received, most of it from the 30 second spots. This level of exposure was apparently substantially higher than that achieved in Los Angeles.

D. Summary

The MT (English only) and VTM (English and Spanish) messages were distributed in Los Angeles in February, 1976. The campaign, however, got off to a very slow start and for practical purposes did not begin until the

Table 3. Reported Plays of Vehicle Turn/Merge Messages by San Diego Television

Station	2/1/76	3/1/76	4/1/76	5/1/76	6/1/76	7/1/76	Total Plays Reported
KCST		(no report of individual spots)					35
KFMB							12
KGTV							39
XETV**							35
XEWT**			(no report)				0
			All stations reporting				121

▬ time period covered by station reports
' individual spot report

*actual total number of plays is probably somewhat higher due to non-reporting

**Mexican station

Summer of 1976. Television monitoring suggested that exposure of the TV spots in Los Angeles was poor. Monitoring did not cover the Spanish language versions of the VTM spots and thus no information is available on those materials. Radio exposure of the materials was difficult to assess, however it was felt to be more extensive than television exposure.

The VTM materials (English and Spanish) were distributed in San Diego in February, 1976. Television exposure, as reported by San Diego stations, was apparently greater than that achieved in Los Angeles, but still not very high compared to commercial advertising or even the time given the child-oriented messages in this study. Radio exposure, though again difficult to assess, was apparently good.

III. KNOWLEDGE AND RECALL OF EXPOSURE

The preceding chapter discussed the extent to which the spots were aired. The results were not strong though there remained the possibility that the Spanish language VTM materials did achieve significant air time. The present chapter will examine the exposure question through a telephone survey of English and Spanish speaking adults in Los Angeles and San Diego. More importantly, this survey was also designed to measure adult knowledge of safe crossing and safe driving procedures in the VTM and MT situations.

A. Method

A questionnaire was prepared for administration via telephone to samples of adults (16 years of age or older) in San Diego and Los Angeles. The purpose of this instrument was to:

- Measure the knowledge of safe crossing behavior for the situations addressed by the media materials;
- Measure the exposure to media materials via radio and television.

The street crossing knowledge developed by the television and radio spots relates to the following situations:

- Potential vehicle/pedestrian conflict engendered by a pedestrian crossing with a light at an intersection and a vehicle turning with a light into the pedestrian's pathway. This has been termed the Vehicle Turn Merge accident type. (San Diego and Los Angeles)
- A car stopping in one lane of a multi-lane highway to let a pedestrian cross and thereby screening the view which a motorist approaching in an adjacent lane and the crossing pedestrian may have of one another. This has been termed the Multiple Threat accident type. (Los Angeles test only)

A single questionnaire was developed for use in San Diego and Los Angeles and prepared in English and Spanish versions. Use of the same instrument offered a certain degree of comparability between the cities despite the fact that Multiple Threat related questions would only be marginally relevant in San Diego. The actual English questionnaire is shown in Figure 1. The wording and sequencing of items on this form were coordinated with the survey research firm of Herbert Epstein, Inc., to tailor the forms to the telephone survey modality.

Both the Los Angeles and San Diego surveys were conducted by Herbert Epstein, Inc., a firm which specializes in survey research. Both cities were surveyed prior to the distribution of any VTM or MT materials (baseline); again about midway through the campaign (interim); and again near the end of the scheduled exposure. Originally, baseline, interim and final surveys in the two cities were to be conducted at the same times. However, as referenced in the previous chapter, the campaign in Los Angeles got off to a very slow start; thus, the interim and final Los Angeles measures had to be delayed.

HERBERT EPSTEIN, INCORPORATED
635 Madison Avenue
New York, New York
(212) 758-8366/7547

Study #1499
January, 1976

TRAFFIC PEDESTRIAN SAFETY
WAVE I (1)
(WHITE - ENGLISH SPEAKING)

DO NOT WRITE IN THIS SPACE

Interviewer (2-3) ______________ Date ______________ City (4) ______________

State ______________

(INTRODUCTION:) Hello! This is ______ from Epstein Research. We are conducting a survey about traffic situations. (IF PERSON DOES NOT UNDERSTAND, GO TO BLUE[SPANISH] QUESTIONNAIRE. PER INSTRUCTIONS/QUOTA, ASK FOR PROPER RESPONDENT)

(INDICATE RESPONDENT'S SEX:)

Male .... 1 -(5)
Female 2

1. Would you tell me which language is most often spoken in your home?

(PRIOR TO CONTINUING, CHECK QUOTAS)

English (CONTINUE WITH Q.2 BELOW) .... 1 -(6)
Spanish (GO TO Q.2 OF BLUE QUESTIONNAIRE). 2
Other (IF FLUENT IN ENGLISH, CONTINUE WITH Q.2 BELOW. OTHERWISE, TERMINATE). 3

2. How long have you been a licensed driver?

# of years __________ (7-8)
Not licensed driver 00

3. Into which of the following age groups do you fall? (READ LIST)

Under 16 (TERMINATE. DO NOT COUNT TOWARDS QUOTA)
16-17 1
18-20 2
21-25 3
26-30 .... 4 -(9)
31-40 5
41-50 6
51-60 7
61 or over 8

REFER TO Q.2. IF NOT LICENSED DRIVER (CODE "00"), SKIP TO Q.6. | 10

4. Here is a possible traffic situation. I'd like your reaction. Suppose you're driving on a street that has several lanes going in each direction. You're approaching a car headed in the same direction as you. It has stopped in the next traffic lane and you're coming up on it. What, if anything, should you do in this situation? (MULTIPLE ANSWERS ACCEPTED)

Any mention of slowing down, stopping, preparing to slow/stop .... 1 -(11)
Mention of looking for pedestrians.................. 2 -(12)
Keep going .... 3 -(13)
Other: (SPECIFY) ______________________ -(14)

Nothing .... 0 -(15)
Don't know .... x -(16)

5. Another situation. Now, you're driving up to an intersection. You want to make a turn. You check for cars in all directions and no cars are coming. What else, if anything, should you do in this situation? (MULTIPLE ANSWERS ACCEPTED)

Any Mention of:
Looking for pedestrians, making sure no pedestrians . 1 -(17)
Yielding/giving way to pedestrians .... 2 -(18)
Turning/go ahead with turn .... 3 -(19)
Other: (SPECIFY) ______________________ -(20)

Nothing .... 0 -(21)
Don't know.. x -(22)

FOR FIELD USE:
Resp. #

Figure 1. English Version of Adult Telephone Interview Questionnaire

6. Now, suppose you are walking along a city sidewalk. You're about to cross a wide street with several traffic lanes going in each direction. You're at a marked crosswalk, but there is no traffic lights or policemen there to help you cross. A car stops in the traffic lane nearest you to let you cross. What, if anything, should you do when you cross in this situation? (MULTIPLE ANSWERS ACCEPTED)

Any Mention of:

Stop (ASK:) Where?			
	Curb	1	-(23)
	Edge of stopped car	2	-(24)
	Other	3	-(25)
Look for cars (ASK:) How?			
	Around stopped car	5	-(26)
	In both directions	6	-(27)
	Other	7	-(28)
Cross directly/go ahead		8	-(29)
Other: (SPECIFY) ______			-(30)
Nothing		0	-(31)
Don't know		x	-(32)

7. Another situation. Now, you're standing on a busy corner and about to cross the street. You've got a green light to cross. What, if anything, should you do in this situation? (MULTIPLE ANSWERS ACCEPTED)

Any Mention of:

Look out for cars (ASK:) Cars from where? How?			
	Turning/cars from around corner	1	-(33)
	All directions	2	-(34)
	Other	3	-(35)
Look at driver (not just at car)		4	-(36)
Cross directly/go ahead		5	-(37)
Other: (SPECIFY) ______			-(38)
Nothing		0	-(39)
Don't know		x	-(40)

8. Have you seen any TV commercials about the safety of people crossing the street?

Yes (ASK Q.9a)	1	-(41)
No (SKIP TO Q.11)	0	

9a. What kind or kinds of situations did these commercials show? (TAKE VERBATIM ANSWERS., PROBE WITH:) What other safety situations about people crossing the street have you seen in TV commercials?

DO NOT WRITE IN THIS BLOCK

______ (42)
______ (43)
______ (44)
______ (45)
______ (46)

9b. (REFER TO FIRST SITUATION DESCRIBED IN Q.9a. SAY:) The situation that was about people (MENTION ANSWER FROM Q.9a). Would you say that showing this type of commercial is: (READ LIST)

A very necessary thing to get through to everybody	4	-(47)
A fairly necessary thing	3	
Not very necessary	2	
Not at all necessary	1	

Figure 1. (Continued) English Version of Adult Telephone Interview Questionnaire

9c. (REFER TO SECOND SITUATION DESCRIBED IN Q.9a. SAY:) The situation that was about people (MENTION ANSWER FROM Q.9a). Would you say that showing this type of commercial is: (READ LIST)

A very necessary thing to get through to everybody...... 4 -(48)
A fairly necessary thing........................... 3
Not very necessary................................ 2
Not at all necessary.............................. 1

10. Did you see any of these TV commercials about the safety of people crossing the street in Spanish?

No/all English............... 1 -(49)
Some English, some Spanish... 2
All Spanish.................. 3

11. Have you heard any radio commercials about the safety of people crossing the street?

Yes (ASK Q.12a)................................. 1 -(50)
No (TERMINATE. FILL IN RESPONDENT'S NAME/ ADDRESS/TELEPHONE NUMBER BELOW)........ 0

12a. What kind or kinds of situations did these commercials describe? (TAKE VERBATIM ANSWERS. PROBE WITH:) What other safety situations about people crossing the street have you heard on radio commercials?

DO NOT WRITE IN THIS BLOCK

____

______________________________ (51)

______________________________ (52)

______________________________ (53)

______________________________ (54)

____

12b. (REFER TO FIRST SITUATION DESCRIBED IN Q.12a. SAY:) The situation that was about people (MENTION ANSWER FROM Q.12a). Would you say that playing this type of commercial is: (READ LIST)

A very necessary thing to get through to everybody..... 4 -(55)
A fairly necessary thing........................... 3
Not very necessary................................ 2
Not at all necessary.............................. 1

13. Did you hear any of these radio commercials about the safety of people crossing the street in Spanish?

No/all English............... 1 -(56)
Some English, some Spanish... 2
All Spanish.................. 3

FILL IN BEFORE TERMINATING:

Respondent's Name______________________

Street Address______________________

Telephone Number______________________

Figure 1. (Continued) English Version of Adult Telephone Interview Questionnaire

The timing and sample sizes for each survey in each city were as follows:

	Los Angeles			San Diego		
	Baseline 1/76	Interim 11/76	Final 11/77	Baseline 1/76	Interim 6/76	Final 6/77
Spanish N =	151	153	154	150	150	157
Non-Spanish N =	507	493	503	398	400	407

(Spanish vs. Non-Spanish determined from "Language most often spoken in your home.")

All telephone interviewers employed for the project were professional survey personnel. The names of each potential respondent in the city were acquired via random selection from current telephone directories. All interviewing was done during the evening hours (6:00 - 9:00 p.m.) and within the toll-free areas of Los Angeles and San Diego. Suburban interviewing was also included on a basis proportional to the ratio of urban versus suburban population in each metropolitan area. Sampling was conducted such that approximately one half of the respondents were women and one half men. Each survey wave, baseline, interim and final, took approximately two weeks to complete.

The age and sex distributions of the sampled adults in each wave in each city are shown in Table 4. In general, these distributions are relatively flat across the three waves of measurement in the two cities. The one discrepancy occurs in San Diego between the baseline and interim measure. Here, there is a drop in the number of respondents in the age category of 16-25 and a rise in the number for the category 26-40. The reason for this difference is not known. While it could represent a normal random fluctuation, it could also be a true bias caused by seasonal differences in who is and who is not likely to be home between the hours of 6:00 p.m. and 9:00 p.m.

B. Results

The adult survey asks questions concerned with safe driving and safe crossing knowledge as well as recall of exposure to the test messages. The knowledge questions are numbers four through seven on the form as shown in Figure 1. Each question establishes a driving or street crossing situation and asks the respondent what he/she would do. Respondents were free to mention any behavior they felt was appropriate and multiple responses were both acceptable and common. For instance, a driver might respond by saying that he would slow down and look for pedestrians that might be crossing. Both of these responses would be coded on the interview form. Data analysis consisted of examining the "number of mentions" for particular responses during the baseline as compared with the interim and final surveys.

1. Knowledge - Multiple Threat

The first knowledge question establishes the Multiple Threat situation from the driver's point of view. As such, this question was not asked of individuals not licensed to drive. The behaviors advocated by the Multiple Threat messages are to slow down, and essentially, watch for pedestrians who may be crossing in front of the stopped vehicle. This message is part of the Los Angeles test and was prepared for both radio and television. The Multiple

Table 4. Adult Telephone Survey Demographics

		Los Angeles			San Diego		
		Base	Interim	Final	Base	Interim	Final
	N =	658	646	657	548	550	564
Respondent Sex							
	Male	49%	51%	51%	50%	50%	49%
	Female	51	49	49	50	50	51
Age							
	16 - 25	18%	18%	17%	25%	15%	19%
	26 - 40	30	31	32	28	34	31
	41 - 60	32	29	28	29	30	31
	61 +	20	23	23	18	20	18
Years Licensed to Drive							
	Not Licensed	23%	19%	18%	18%	15%	17%
	1 - 5	11	15	14	15	15	14
	6 - 10	16	14	13	15	13	14
	11 - 20	18	20	19	21	22	21
	21 +	33	33	37	32	35	34

Threat messages were not distributed in San Diego although some Los Angeles media do penetrate the San Diego market. The distribution of responses to this question in Los Angeles may be seen in Table 5. The results are hardly encouraging. The two correct responses, "slow down" and "look for pedestrians," both increase between the baseline and interim measure (80% to 85% and 21% to 37%). However, both of these responses fall back to below the baseline measure during the final measure. Further, the incorrect response of keep going steadily increases from the baseline to the final measure. Thus, if there was a knowledge gain, it was neither lasting nor powerful and did not reduce the number of incorrect responses. Table 5 also shows these data for San Diego. As in Los Angeles, the San Diego results show an increase in correct responses between the baseline and interim measures (78% to 86% and 7% to 19%). Both of these responses fall back toward baseline in the final measure. Surprisingly, the incorrect response of "keep going" dropped in San Diego from baseline to the interim measure and remained below baseline for the final measure.

Question #6 establishes the Multiple Threat situation from the pedestrian's point of view. This question was asked of all respondents (not just drivers); and again, multiple responses were accepted. The distribution of responses to this question for the baseline, interim and final surveys is shown in Table 6. The correct answer is to stop at the edge of the stopped car and look around the car to see what might be coming in the next lane. In Los Angeles, the results showed increases in the correct answers between the baseline and interim measures (9% to 16% and 18% to 23%). These increases either held or improved through the final measure. The incorrect response, "cross directly," remained relatively consistent across all three measurement waves. San Diego showed quite a different pattern of results. The incorrect response dropped precipitously across the three measurement waves (35% to 14% to 12%); the first correct response (to stop) dropped baseline to interim (11% to 6%); and the second correct response (to look) increased across the three waves (14% to 17% to 25%).

While these Multiple Threat knowledge results are, for the most part, statistically significant, their interpretation is not immediately apparent. The San Diego driver results show a clear increase in "slowing" and "looking for peds" while the Los Angeles results suggest some effect between the baseline and interim measures only and a marked decrease in the final measure. For pedestrian knowledge, the results are more positive. In Los Angeles, there is a general increase in knowledge and the same is true in San Diego. The total Multiple Threat results, driver and pedestrian, suggest a general increase in awareness of pedestrian safety. The only "correct" response which did not increase dealt with stopping at the edge of the stopped car. This behavior was not covered in the VTM materials distributed in San Diego while looking for cars and looking for peds was covered. The Los Angeles results were disappointing with respect to drivers, yet positive with respect to pedestrian knowledge. Nevertheless, the results were not powerful and would not suggest the likelihood of finding major changes in behavior.

2. <u>Knowledge - VTM</u>

The VTM spots were distributed in both Los Angeles and San Diego. Question #5 establishes the VTM situation from the driver's point of view. Again, respondents were free to mention as many, or as few, behaviors as they felt were appropriate. The specific behavior advocated by the VTM

Table 5. Question #4--Results for Multiple Threat Driver

	Los Angeles						
	Baseline		Interim		Final		
	N	%	N	%	N	%	χ^2 (with 2 d.f.)
Question #4 Multiple Threat-Driver							
Slow down (correct)	404	80%	446	85%	407	75%	16.70 p<.001
Look for peds (correct)	107	21%	192	37%	76	14%	78.30 p<.001
Keep going (incorrect)	47	9%	65	12%	97	18%	17.50 p<.001
Other	113	22%	106	20%	66	12%	20.30 p<.001
Total Drivers Responding	508	100%	524	100%	542	100%	

	San Diego						
	Baseline		Interim		Final		
	N	%	N	%	N	%	χ^2 (with 2 d.f.)
Question #4 Multiple Threat-Driver							
Slow down (correct)	354	78%	401	86%	368	79%	10.02 p<.01
Look for peds (correct)	33	7%	87	19%	67	14%	25.32 p<.001
Keep going (incorrect)	79	17%	40	9%	62	13%	16.39 p<.001
Other	112	25%	51	11%	68	15%	34.47 p<.001
Total Drivers Responding	452	100%	469	100%	468	100%	

Note: Driver questions exclude non-drivers. Entries are number of mentions, multiple responses allowed for each question. Each χ^2 value computed from the 2x3 table, mention-no mention vs. baseline-interim-final.

Table 6. Question #6--Results for Multiple Threat Pedestrian

Los Angeles

	Baseline N	Baseline %	Interim N	Interim %	Final N	Final %	χ^2 (with 2 d.f.)
Question #6 Multiple Threat-Ped							
Stop at curb	122	19%	192	30%	76	12%	68.50 p<.001
Stop edge of car (correct)	57	9%	106	16%	102	16%	20.20 p<.001
Stop—other	25	4%	11	2%	8	1%	11.30 p<.01
Look around car (correct)	120	18%	151	23%	198	30%	25.70 p<.001
Look both directions	411	62%	362	56%	359	55%	9.40 p<.01
Look—other	72	11%	100	15%	22	3%	55.00 p<.001
Cross directly (incorrect)	135	21%	144	22%	142	22%	0.60 N.S.
Other	82	12%	86	13%	87	13%	0.30 N.S.
Total Pedestrians Responding	658	100%	646	100%	657	100%	

San Diego

	Baseline N	Baseline %	Interim N	Interim %	Final N	Final %	χ^2 (with 2 d.f.)
Question #6 Multiple Threat-Ped							
Stop at curb	132	24%	123	22%	118	21%	1.60 N.S.
Stop edge of car (correct)	62	11%	32	6%	49	9%	10.55 p<.01
Stop—other	29	5%	21	4%	2	—	23.64 p<.001
Look around car (correct)	79	14%	94	17%	142	25%	22.81 p<.001
Look both directions	277	51%	340	62%	345	61%	18.42 p<.001
Look—other	83	15%	32	6%	22	4%	52.86 p<.001
Cross directly (incorrect)	194	35%	76	14%	67	12%	116.34 p<.001
Other	67	12%	50	9%	58	10%	2.92 N.S.
Total Pedestrians Responding	548	100%	549	100%	564	100%	

driver message is to take a last look for pedestrians before turning. As shown in Table 7, Los Angeles results showed a sharp increase in driver knowledge between the baseline and interim measure followed by a return to baseline in the final measure (27% correct to 48% back to 28%). A similar pattern of results was seen in San Diego (21% to 43% to 31%) as displayed in the same table. Clearly, both cities showed positive changes with respect to driver knowledge, but these changes were not lasting.

The last knowledge question (#7) establishes the VTM situation from the pedestrian's point of view. Multiple responses were accepted and the question was asked of all respondents. The specific pedestrian behavior advocated in the VTM message is for the pedestrian to look at the driver, not just the car. The Los Angeles results showed a strong increase, baseline to interim, across most of the "looking" responses including the specifically correct response (4% correct to 11%) followed by a return, at least partially, to baseline during the final measure (see Table 8). Similarly, in San Diego, Table 8 shows that most "looking" responses increased. Further, in San Diego, the specifically correct response continued to increase through the final measure (1% to 6% to 9%) and there was a precipitous drop in the specifically incorrect response (48% to 22% to 21%). Clearly, both cities showed positive changes with respect to pedestrian VTM knowledge and these changes persisted in San Diego through the final measure.

In summary, the VTM driver and pedestrian results show positive knowledge gains in both cities. The gains were substantial and were accompanied by decreases in incorrect responses. The Los Angeles gains dissipated by the final measure while the positive San Diego results tended to persist.

3. <u>Exposure</u>

As mentioned above, the VTM spots were aired in English and in Spanish in Los Angeles and San Diego. The Multiple Threat spots were aired in English only and only in Los Angeles. The knowledge results suggested more exposure in Los Angeles, and of course, in San Diego for the VTM materials. Questions #8 through #13 of the questionnaire asked respondents to recall their exposure to the VTM and Multiple Threat materials. While these questions were free recall items as opposed to aided recall, they were asked after the knowledge items; thus the respondents at least had a general idea of what we were looking for.

Question #8 asked respondents if they had seen any TV commercials about pedestrian safety. In Los Angeles, the percentage of respondents saying "yes" was 12%, 27% and 26% ($\chi^2 = 53.2$, $p<.001$ with 2 d.f.) across the three waves for a clear increase. In San Diego, the percentages were 27%, 27% and 40% ($\chi^2 = 31.4$, $p<.001$ with 2 d.f.) for a clear increase during the final measure. Question #9 asked respondents to identify what they had seen on television. Table 9 shows the number of respondents who specifically identified our materials in a free recall situation. As shown in the Table, the TV spots least recalled were the Multiple Threat spots. In Los Angeles, only 4% of the respondents recalled these materials during the interim measure and only 1% during the final measure. The best recall was achieved with the VTM materials. Here, 8% (interim) and 10% (final) of the respondents in Los Angeles and 10% (interim) and 23% (final) of the respondents in San Diego recalled these spots. It should also be noted that the Willy Whistle child

Table 7. Question #5--Results for Vehicle Turn/Merge Driver

	Los Angeles						
	Baseline		Interim		Final		
	N	%	N	%	N	%	χ^2 (with 2 d.f.)
Question #5 VTM-Driver							
Look for peds (correct)	136	27%	252	48%	150	28%	67.70 p<.001
Yield for peds	54	11%	67	13%	54	10%	2.30 N.S.
Go ahead with turn (incorrect)	238	47%	185	35%	290	54%	36.30 p<.001
Other	273	54%	253	48%	221	41%	17.90 p<.001
Total Drivers Responding	508	100%	524	100%	542	100%	

	San Diego						
	Baseline		Interim		Final		
	N	%	N	%	N	%	χ^2 (with 2 d.f.)
Question #5 VTM-Driver							
Look for peds (correct)	94	21%	197	42%	146	31%	47.69 p<.001
Yield for Peds	33	7%	49	10%	50	11%	3.77 N.S.
Go ahead with turn (incorrect)	225	50%	170	36%	209	45%	17.19 p<.001
Other	259	57%	202	43%	192	41%	29.01 p<.001
Total Drivers Responding	452	100%	469	100%	468	100%	

Table 8. Question #7--Results for Vehicle Turn/Merge Pedestrian

	Los Angeles						
	Baseline		Interim		Final		
	N	%	N	%	N	%	χ^2 (with 2 d.f.)
Question #7 VTM-Ped							
Look turn cars	192	29%	237	37%	204	31%	9.10 p<.05
Look all directions	360	55%	348	54%	339	52%	1.40 N.S.
Look—other	53	8%	93	14%	17	3%	59.70 p<.001
Look driver (correct)	29	4%	71	11%	43	7%	21.70 p<.001
Cross directly (incorrect)	213	32%	121	19%	190	29%	33.40 p<.001
Other	81	12%	92	14%	67	10%	5.00 N.S.
Total Pedestrians Responding	658	100%	646	100%	657	100%	

	San Diego						
	Baseline		Interim		Final		
	N	%	N	%	N	%	χ^2 (with 2 d.f.)
Question #7 VTM-Ped							
Look turn cars	144	26%	167	30%	217	38%	19.83 p<.001
Look all directions	249	45%	294	54%	297	53%	8.83 p<.05
Look—other	48	9%	18	3%	12	2%	31.03 p<.001
Look driver (correct)	6	1%	31	6%	50	9%	34.10 p<.001
Cross directly (incorrect)	265	48%	121	22%	118	21%	125.98 p<.001
Other	64	12%	46	8%	27	5%	17.47 p<.001
Total Pedestrians Responding	548	100%	549	100%	564	100%	

Table 9. Specific Recall of TV and Radio Spots

Media	Material	Wave	Los Angeles N	Los Angeles %	San Diego N	San Diego %
TV	Multiple Threat	base	0	0%	0	0%
		interim	27	4%	4	1%
		final	4	1%	6	1%
	VTM	base	0	0%	0	0%
		interim	52	8%	56	10%
		final	65	10%	131	23%
	Willy Whistle	base	1	0%	0	0%
		interim	24	4%	1	0%
		final	30	5%	1	0%
Radio	Multiple Threat	base	0	0%	0	0%
		interim	6	1%	1	0%
		final	3	0%	2	0%
	VTM	base	0	0%	0	0%
		interim	5	1%	17	3%
		final	5	1%	15	3%

materials were recalled by 4% and 5% of the Los Angeles respondents during the interim and final waves. In other words, the Willy TV materials targeted for children were recalled more often by adults than the Multiple Threat materials. While the exposure of the Willy Whistle messages was high (see Volume II), it is still interesting and encouraging that adults would recall them.

Question #11 asked respondents if they had heard any radio commercials about pedestrian safety. In Los Angeles, the percentage of respondents saying "yes" was 9%, 13% and 9% ($\chi^2 = 5.9$, N.S. with 2 d.f.) across the three waves. In San Diego, the percentages were 13%, 11% and 13% ($\chi^2 = 1.3$, N.S. with 2 d.f.). Question #12 asked respondents to identify what they had heard. Table 9 shows the number of respondents who specifically recalled the Multiple Threat and VTM spots. The results show very little recall. This likely means that the radio spots were not aired sufficiently and that they were not memorable as measured by a free recall questionnaire item.

In summary, television exposures were recalled far more often than radio exposures in both cities. In Los Angeles, the VTM TV spots were recalled more often than the Multiple Threat spots. In San Diego, the VTM spots were recalled and recall was greatest during the final wave of measurement. At first glance, the recall data appears low (roughly 10% recall for VTM) and insufficient to support the knowledge changes reported earlier in this chapter. However, free recall is the most restrictive form of exposure measurement and it is likely that several more respondents actually saw or heard these materials and learned from them but were unable to describe them to our interviewers such that it was clear that they saw our materials. In fact, 10% free recall of specific spots can be considered as relatively good for public service campaigns.

4. Respondent Characteristics

Several separate analyses were conducted examining respondent sex, age and language most often spoken in the home with the various knowledge and exposure questions. With respect to sex, there was a slight tendency for males in both cities to provide more correct answers to the knowledge items than females. However, males and females were exposed relatively equally to the safety materials as indicated by the exposure recall items. With respect to age, younger respondents in both cities recalled exposure to the VTM materials more often and generally offered more correct answers to the VTM knowledge questions. Also in both cities, it was generally true that respondents who recalled exposure to the VTM materials gave far more correct answers to the VTM knowledge items. The same effect was not found for Multiple Threat items primarily because so few respondents recalled Multiple Threat exposures.

The most interesting results, however, were seen with respect to respondent language. Simply, in Los Angeles, the Spanish language versions of the VTM materials were apparently aired frequently, seen or heard by the Spanish population and recalled during our interview. The same was probably true in San Diego though to a lesser extent. Table 10 shows the free recall data for Spanish and Non-Spanish respondents. The data show that in Los Angeles the VTM materials were recalled far more often than the Multiple Threat materials, but the effect was due almost entirely to Spanish recall.

Table 10. Spanish and Non-Spanish Recall of VTM and Multiple Threat Spots

	Los Angeles			San Diego		
	Base	Interim	Final	Base	Interim	Final
Any recall, TV or radio, of VTM spots						
Spanish	0%	27%	38%	0%	19%	28%
Non-Spanish	0%	3%	2%	0%	10%	24%
Any recall, TV or radio, of MT spots						
Spanish	0%	8%	3%	0%	2%	1%
Non-Spanish	0%	4%	0%	0%	0%	2%

Note 1: Spanish vs. Non-Spanish determined from "Language most often spoken in your home?" (Question #1)

Note 2: Entry is % of respondents recalling the spots. N's underlying each percentage were shown earlier on page 17.

Note 3: The VTM materials were aired in Spanish and in English; the Multiple Threat materials were aired only in English and only in Los Angeles.

Further analysis of the Los Angeles data showed that the Spanish language versions of the spots were reported frequently (Question #10 of the interview). And, most importantly, Spanish respondents were generally better able to provide correct answers to the VTM knowledge questions. Similar results were seen in San Diego though to a much smaller extent.

Clearly, the Spanish VTM materials were aired in Los Angeles while the English language adult materials were less able to secure Los Angeles air time. Fully 38% of the Los Angeles Spanish respondents recalled the VTM materials in response to a free recall questionnaire item during the final measurement. This is an exceptionally high rate of recall, particularly for a free recall measurement of a public service campaign.

C. Summary

Adults in Los Angeles and San Diego were interviewed by telephone prior to the distribution of any media materials, again during the mid-point of the campaign and again near the end of the campaign. A total of 915 Spanish and 2,708 Non-Spanish respondents were asked about their driving and street crossing knowledge in the VTM and Multiple Threat situations and their exposure to campaign materials. The results showed little impact of the English language Multiple Threat materials which were aired in Los Angeles. Recall of exposure was low; driver knowledge did not improve; pedestrian knowledge did improve but the results were not strong. The VTM materials were aired in English and in Spanish in both Los Angeles and San Diego. Strong recall of exposure and knowledge improvements were found for the Los Angeles Spanish sample. Less strong, but still very positive, results were seen for the Spanish followed by the English samples in San Diego. Marginal results were seen with respect to the English sample in Los Angeles. It was concluded that the Spanish language spots produced a significant impact particularly in Los Angeles. Apparently, and again particularly in Los Angeles, the English language materials were less able to gain sufficient air time to influence the target audience. Competition for adult English language public service air time is intense and the current materials were likely submerged by the many competing public service appeals. Anecdotal reports from station public service directors indicated a preference for the Spanish materials because of demands to serve the minority communities. There was also some interest expressed in showing the English and Spanish 30 second versions one after the other to convey the bi-lingual concern of the station.

IV. DRIVER AND PEDESTRIAN BEHAVIOR

Previous chapters discussed site selection, message distribution, exposure and knowledge gain. The next question was whether or not the gains in street crossing and safe driving knowledge were translated into positive changes in on-street behavior. This question was addressed through unobtrusive behavioral observations of drivers and pedestrians in the turning vehicle situation in Los Angeles and San Diego and the Multiple Threat situation in Los Angeles. All observations were conducted prior to the distribution of the materials (baseline) again during the midpoint of the campaign (interim) and again at the conclusion of the campaign (final).

A. Method--VTM Observations

1. Observation Scales

The behavioral advice to the pedestrian was to look at the driver, not just the car. This behavior was observed by stationing an observer on the curb, at an intersection, and having him view pedestrians on the opposite side of the street. These behaviors were not observed during the pre-test phase of this research (see Blomberg and Preusser, 1975), thus a new measurement scale had to be developed and pre-tested. The first conclusion from pretesting efforts was that pedestrian behavior varied quantitatively and qualitatively as a function of whether or not a turning vehicle was present. Thus, each observation had to be specific as to the presence or absence of a turning vehicle entering the first half of the roadway the pedestrian is about to cross. The specific scale developed was as follows:

<u>Turning Vehicle Present</u>

1. No look (pedestrian does not search for turning vehicle)
2. Half-way only (pedestrian conducts partial search to the left)
   a. did not achieve eye contact with left turning driver
   b. did achieve eye contact with left turning driver
3. Full search (pedestrian clearly looks all the way to the left)
   a. did not achieve eye contact with left or right turning vehicle
   b. did achieve eye contact with left or right turning vehicle

<u>Turning Vehicle Absent</u>

1. No look
2. Half-way only
3. Full search

The behavioral advice to the driver in the vehicle turn/merge situation is to take one last look for pedestrians. During the pre-test phase of this research effort (see Blomberg and Preusser, 1975), a five point scale was used to measure this behavior among drivers making a turn in an urban situation. While this scale worked reasonably well for the purposes of the pre-test, it was felt that a more direct approach would be more appropriate. Therefore, the following four point scale was used for the current effort:

1. Driver looked in the direction of the turn only (i.e., not at pedestrian)

2. Driver looked in the general direction of the pedestrian

3. Driver may have had eye contact with pedestrian

4. Driver and pedestrian eye contact

The observer, using this scale to rate driver or skill search behavior, would be located at an intersection in a position where he might be crossing the street.

Both the driver and the pedestrian scales were pretested and the results suggested that they could be applied reliably in on-street situations. However, there was concern over the concept of "eye contact" both from the driver's and pedestrian's point of view as being measured by an observer. Moreover, initial results from Los Angeles and San Diego confirmed that "eye contact" could not be measured with a reliability similar to that for the more general head and eye movements. Specifically, for the driver measure, eye contact was extremely difficult to measure when the driver was wearing sun glasses and difficult to measure under any glare conditions. For the pedestrian measure, eye contact was difficult to measure since the observer was a third party to the situation viewing pedestrians and drivers on the opposite side of the intersection. Therefore, for the purposes of data analysis, the above scales were collapsed to delete all reference to eye contact. The observers were not informed of this intended change in the data collection scales.

2. <u>Design</u>

The first step in developing an experimental design for these observations was to review available accident data to determine when and where the Vehicle Turn/Merge accident situation is likely to occur. At that time (Fall, 1975) the best available data was from the original "ORI" study of Snyder and Knoblauch (1971) and the then ongoing work on the NHTSA/FHWA data base (see Knoblauch, 1975 and Knoblauch and Knoblauch, 1976). The results from both studies showed that the VTM accident typically occurs at signalized intersections, in commercial districts, on weekdays and during the afternoon and early evening hours. Therefore, the experimental design which follows provides for observations at signalized intersections on weekday afternoons.

Ideally, each driver in each target city would be observed making one turn during the baseline period, one turn during the interim measurement and one turn during the post measurement. Further, each pedestrian would be observed making one crossing in the presence of a turning vehicle. Of course, this ideal could not be achieved and thus the behaviors had to be sampled. The sampling involved taking a few major intersections and viewing turns and pedestrian crossings in several directions. The intersections were in busy commercial districts and were situated such that drivers using one intersection would not be likely to use another of the sampled intersections on the same trip. The specific procedure for selecting intersections was as follows:

- o The city traffic engineer (or other knowledgeable official) was asked to identify approximately ten signalized four-leg intersections in commercial areas of the city that had both high vehicle and high pedestrian traffic.

- o Each intersection was screened by a member of the project staff to ensure that all of the requirements were met. In addition, no intersection was chosen having atypical traffic control patterns or obstructions to the views from potential observer locations.

- o Five intersections were selected from those that remained.

- o These five intersections formed the sampling locations. At each intersection, there were eight possible turns that could be observed. Four of these were selected for observation in such a way that the same motorist was not observed should he/she go to and come back from his/her destination over the same route. The four selected turns at each intersection involved two left turns and two right turns. Likewise, at each intersection, there are eight potential pedestrian crossings. Four of these were selected for observation.

Data were collected over a two week period. Each week involved sampling at the same five intersections, however, no intersection was sampled during the second week on the same day of week as during the first week. For instance, intersection #1 was sampled on Monday during the first week and on Wednesday during the second week. Data collection occurred between the hours of 1:00 p.m. and 5:00 p.m. Two observers were assigned to each site for the four hour period. One observer viewed pedestrians plus one left turn and the second observer viewed pedestrians plus one right turn selected such that a single pedestrian or motorist traveling to and from a specific destination over the same route would not be observed by both individuals or the same individual twice. During the second week, different left and right turns were observed. In addition, a third observer was assigned to view a specified right turn on red, act as site coordinator and fill-in during periods when one of the other two observers took short breaks.

Thus, each day an observer was assigned to view one turn at one intersection for a four hour period. At the same time, he viewed pedestrians crossing in one direction. Data were collected Monday through Friday for two weeks. Each observer was trained to stand one to two feet back from the curb in a position where he might be about to cross the street. However, at no time did the observer actually enter the roadway. The data collection form for these measurements is shown in Figure 2. All motorists making the specified turn were observed and tabulated as well as pedestrians crossing in the specified direction. This entire design was replicated once for the baseline measure, once for the interim measure and again for the final measure. Each replication was identical with respect to location, turn observed, time of day and day of week.

Data Collection Form--VTM Behavioral Characteristics

Dunlap and Associates, Inc., --Job No. 106

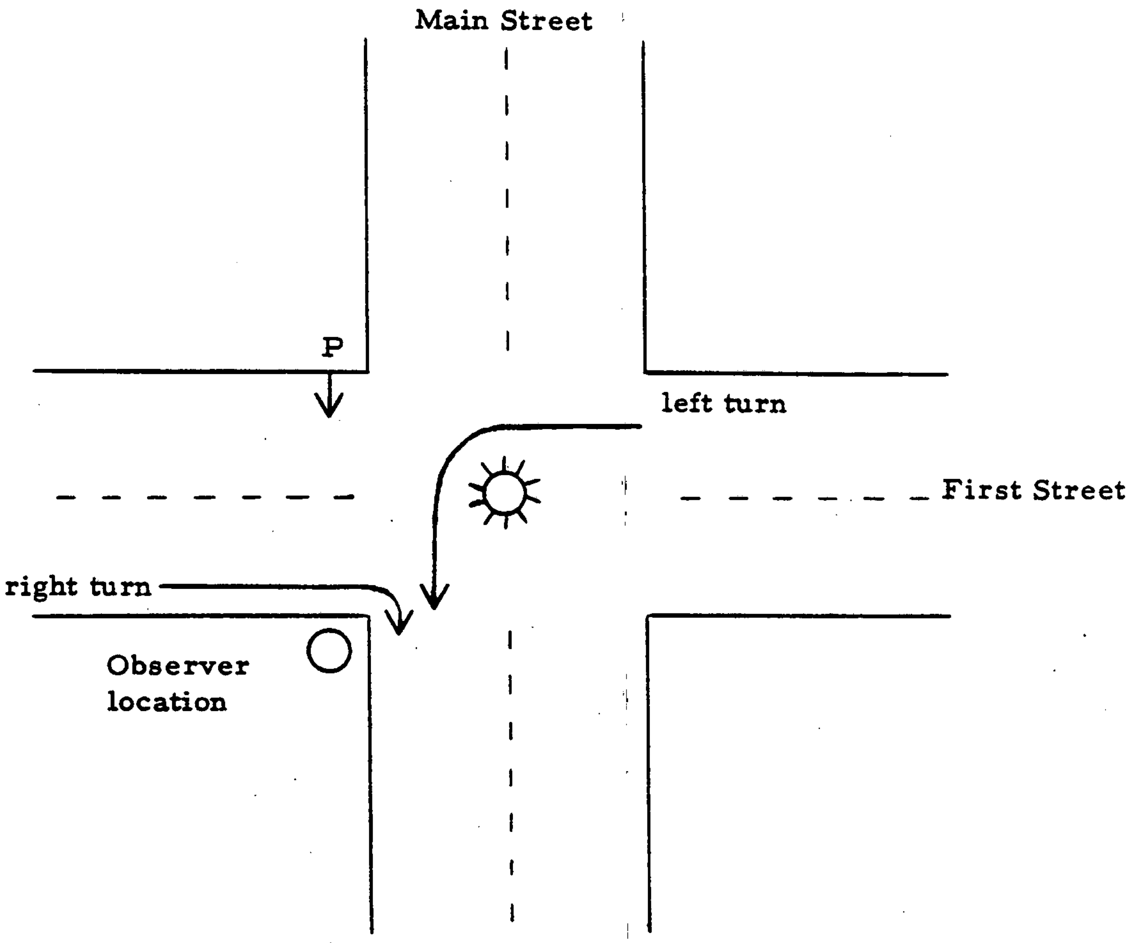
Driver Search

Direction of Turn only (i.e., over hood)	Your General Direction	Possible Eye Contact	Eye Contact
Total:			

Pedestrian Search

Turning Vehicle Present					Turning Vehicle Absent		
1 no look	2 half way only		3 full search		1 no look	2 half way only	3 full search
	no eye contact	eye contact	no eye contact	eye contact			
Total:							

Figure 2. Front Page of Data Collection Form for Vehicle Turn/Merge Behavioral Observations



When light is green for traffic on First Street, Observe left turn (or right turn)

When light is green for traffic on Main Street, Observe pedestrian crossing P →

Figure 2. Continued. Back Page of Data Collection Form for Vehicle Turn/Merge Behavioral Observations

It should be noted that it is quite possible for one observer to record both pedestrian and driver search behavior. Simply, observations of left turning vehicles are appropriate only when the light is green in that direction. Observations of pedestrians are appropriate when the light is green in the opposite direction. Thus, vehicles were observed until the light changed, then pedestrians, then vehicles again. The diagram shown in Figure 2 indicates what would be observed and where.

B. Method--Multiple Threat Behaviors

The Multiple Threat accident develops as the result of three concurrent events. First, a pedestrian decides to cross the street. Second, a driver decides to stop his vehicle in a traffic lane in order to let the pedestrian cross. Third, another driver going in the same direction, not knowing why the first driver has stopped, overtakes the first vehicle thus jeopardizing the crossing pedestrian. Behavioral observations with respect to this accident type are meaningful only when at least two of the above events have occurred. For instance, observation of pedestrian behavior is possible only when the pedestrian attempts to cross and a vehicle stops to let him cross. Observation of driver behavior is possible only after the first vehicle stops and the oncoming vehicle will overtake unless it slows and/or stops. Thus, any observation scheme utilized had to be prepared to have observers wait for these specific circumstances to develop. They could not be staged since staging would create undue risk for both drivers and pedestrians.

The advice to the pedestrian is to stop at the edge of the standing vehicle and look for cars that might be coming. This is essentially a stop and search message very similar to the stop and search advice for the dart and dash messages. Thus, it was felt that the course negotiation rating scale used in the dart and dash messages for children discussed in Volume II could be directly applied here. The scale is as follows:

5 = full stop (pedestrian stops at the outside edge of the standing vehicle for a period of time sufficient to allow for an adequate search)

4 = pause or momentary stop (less than a full stop)

3 = hesitation (pedestrian breaks stride as he/she passes the outside edge of the standing vehicle but does not stop)

2 = slows (pedestrian does not break stride but does slow down)

1 = no change (pedestrian continues at the same pace as he/she crosses in front of the standing vehicle)

The search behavior advocated by this message is similar to the search behavior for the dart and dash messages but is somewhat less complete. Here, the pedestrian need only look around the stopped vehicle as opposed to looking left-right-left. Therefore, the search rating scale need not be quite as detailed. The specific scale was as follows:

3 = looked around stopped car (i.e., pedestrian conducted full search advocated by message)

2 = maybe looked (less than full search)

1 = did not look

Driver behaviors were rated on the basis of the speed of the overtaking vehicle. After the first vehicle stops, the observer viewed the lead vehicle in the next lane. The observer was particularly interested in the speed of this oncoming vehicle which he rated according to the following scale:

1. Vehicle did not slow down

2. Vehicle did slow down (could not have stopped if necessary)

3. Vehicle did slow down (could have stopped if necessary)

4. Vehicle came to a full stop

Of course, this scale was applied only when there was an overtaking vehicle in the next lane, and thus the sample size for this driver behavior was less than the sample size for the pedestrian behavior.

2. Design

As before, accident data covering the MT accident were available from the ORI study and the NHTSA/FHWA data base. It was concluded that these were daylight events (particularly afternoon to early evening), they occurred on weekdays (plus Saturday) and in commercial neighborhoods. The accidents may be midblock or intersection and often involve a marked crosswalk. By definition, accidents occur where there is at least two traveled lanes going in the same direction.

Observer locations were selected on the basis of the frequency of the behaviors of interest. As discussed above, the Multiple Threat situation involves the joint occurrence of both pedestrian and driver behaviors. These behaviors occur more or less often at some locations as compared with others, depending not only on the physical parameters of the location but the pedestrian and vehicle traffic patterns. In short, some locations would produce several observable events per hour while others may produce none regardless of the physical configuration of the roadway. Thus, the basic approach to location selection was on-site observation followed by selection of those locations with the highest frequency of the behavior of interest. Several locations, each having the appropriate site characteristics, were screened in this manner and six were selected as the sampling locations. All six were in the City of Los Angeles.

Data were collected over a two-week period. Each location was sampled twice during the first week and twice during the second week for a total of four observation periods per location on four different days of the week. Each observation period ran from noon to 5:00 p.m. for a total of five hours. All pedestrians crossing at that location in front of a stopped vehicle were observed and rated. The "lead" overtaking vehicle was also observed and rated at the same time. The data collection form is shown in Figure 3.

Pedestrian Course

5 = full stop
4 = momentary stop
3 = hesitation
2 = slowed
1 = no change

Pedestrian Search

3 = looked around stopped car
2 = maybe looked
1 = did not look

Vehicle Course

4 = stopped
3 = slowed, could stop
2 = slowed, couldn't stop
1 = not slow down

Pedestrian								Overtaking Vehicle				
Course					Search			Course				
1	2	3	4	5	1	2	3	(none)	1	2	3	4

Figure 3. Front Page of Data Collection Form for Multiple Threat Behavioral Observations

In general, all procedures were identical for the baseline, interim and final measures. The one exception was that one location used in the baseline measure was unsuitable due to construction for the interim measure (only) and had to be replaced.

C. Method--Training and Scheduling

Two teams of observers were recruited and trained. The San Diego team consisted of three college students, two of whom participated in all three waves of measurement. The Los Angeles team consisted of college students and part-time employees from our Los Angeles office and was part of the larger team observing both the child dart and dash behaviors as well as the VTM and MT behaviors. The Los Angeles team was subject to greater turnover with only one observer participating in all three VTM waves of measurement and no single observer participating in all three MT waves of measurement. Training of observers was conducted prior to each wave of measurement in each city. It consisted of two to three hours of presentation, discussion and practice in a classroom type setting; followed by one to two hours of on-street "training to criterion;" followed by debriefing, questions and answers.

Obviously, the reliability of the behavioral observations is of concern when interpreting the results which follow. Reliability is relevant with respect to observers as well as to observation locations. Specific reliability estimates were not generated for any of the scales utilized here. However, separate calculations were performed both with respect to observers and observation locations. Any effects which were not consistent across observers will be noted below. In general, the same observer was assigned to the same location for each wave of measurement thus, observer and location reliability are identical operationally.

As mentioned earlier, observations were conducted prior to the distribution of materials (baseline) again at the midpoint of the campaign (interim) and again near the end of the campaign (final). In Los Angeles, for the VTM and MT observations, the dates were January 1976 (baseline), November 1976 (interim) and November 1977 (final). In San Diego, for the VTM observations, the dates were January 1976 (baseline), June 1976 (interim) and June 1977 (final). These dates correspond exactly to the times of the adult knowledge survey reported in the last chapter.

D. Results--VTM

The results for the driver search observations in the VTM situation are shown in Table 11. The first part of the Table shows left turns in Los Angeles and the data indicate that there was no change in the search behavior of these drivers across the three waves of measurement. Only 41% of these drivers looked in the direction of the pedestrian (i.e., our observer) during the baseline measure followed by 41% during the interim measure and 42% during the final measure.

The second part of the Table shows right turns (excluding right-on-red) in Los Angeles. Here, and in San Diego, more drivers looked in the direction of the pedestrian than did the left turning drivers. Further, there was a small increase (46% to 49%) in drivers who searched between the baseline and

Table 11. Observed Driver Search Behavior in VTM Situation

		Driver Search: Direction of Turn (only)	Driver Search: Driver looked at Pedestrian	N
Los Angeles				
Left turn	Baseline	59%	41%	1,802
	Interim	59%	41%	2,393
	Final	58%	42%	1,943
Right turn *	Baseline	54%	46%	2,931
	Interim	51%	49%	3,286
	Final	57%	43%	2,682
San Diego				
Left turn	Baseline	52%	48%	1,395
	Interim	52%	48%	1,351
	Final	64%	36%	1,533
Right turn*	Baseline	41%	59%	2,000
	Interim	36%	64%	1,713
	Final	51%	49%	2,463

*Right turn on green only.

interim measures. However, this was followed by a small decrease between the baseline and final measure (46% to 43%). While both of these changes were statistically significant (χ^2 = 7.57 p<.01 with 1 d.f. and χ^2 = 4.37 p<.05 with 1 d.f.) the effects were not replicated across observers and probably indicate little or no change in the search behavior of right turning Los Angeles drivers.

The third part of Table 11 shows left turning drivers in San Diego. The data show no change in driver search behavior between the baseline and interim measures (48% to 48%) followed by a sharp drop to the final measure (48% to 36%). This drop was statistically significant (χ^2 = 39.56 p<.001 with 1 d.f.) and was replicated across observers. There is no apparent reason why driver search should remain stable during the campaign and then drop.

The last part of the Table shows right turns (excluding right-on-red) in San Diego. Here, searching for pedestrians increased between the baseline and interim measure (59% to 64%), then decreased for the final measure (59% to 49%). The increase was replicated across observers and was statistically significant (χ^2 = 10.71 p<.01 with 1 d.f.). The decrease was also statistically significant (χ^2 = 37.38 p<.001 with 1 d.f.) but was not replicated across observers. However, a decrease back to baseline was replicated across observers. In other words, right turn search behavior appears to have improved to the interim measure, then fell back to baseline or below during the final measure.

Taken together, these results provide little evidence for a positive change in search behavior among San Diego or Los Angeles drivers. Left turn behavior did not improve. Right turn behavior improved slightly between the baseline and interim measures, but fell back to baseline or below during the final measure.

Unlike with drivers, pedestrian search behavior in the VTM situation shows clear increases which were all replicated across observers. These results are shown in Table 12. The first part of the Table shows pedestrian search in Los Angeles for situations in which a turning vehicle was present. The results show an increase from 8% full search to 25% between the baseline and interim measures followed by 20% full search during the final measure. These changes (8% to 25% and 8% to 20%) were both statistically significant (χ^2 = 544.7 p<.001 with 2 d.f. and χ^2 = 234.53 p<.001 with 2 d.f.) and were replicated.

The second part of the Table shows pedestrian search in Los Angeles when there was no turning vehicle. In general, in San Diego and in Los Angeles, pedestrians tended to search less when there is no turning vehicle. Nevertheless, full search increased in Los Angeles from 3% to 12% during the interim measure followed by 10% during the final measure. The interim distribution as compared with the baseline distribution and the final distribution as compared with the baseline were both statistically significant (χ^2 = 382.12 p<.001 with 2 d.f. and χ^2 = 165.96 p<.001 with 2 d.f.) and were replicated.

The third part of Table 12 shows pedestrian search in San Diego when a turning vehicle was present. The results show increases in full search which were replicated across observers. However, these increases were not accompanied by steady decreases in the "no look" category. Rather, the

Table 12. Observed Pedestrian Search Behavior in the VTM Situation

		Pedestrian Search			
		No Look	Half-way only	Full Search	N
Los Angeles					
Turning Vehicle Present	Baseline	76%	16%	8%	3,076
	Interim	45%	30%	25%	2,208
	Final	55%	22%	20%	2,186
Turning Vehicle Absent	Baseline	83%	14%	3%	3,244
	Interim	63%	25%	12%	2,898
	Final	71%	19%	10%	2,329
San Diego					
Turning Vehicle Present	Baseline	65%	26%	9%	812
	Interim	52%	30%	18%	676
	Final	58%	15%	26%	1,289
Turning Vehicle Absent	Baseline	69%	21%	10%	1,438
	Interim	57%	31%	12%	1,488
	Final	69%	11%	20%	1,225

percentage of pedestrians who did not look at all dropped from 65% baseline to 52% interim back to 58% final. The interim distribution as compared to the baseline distribution and the final distribution as compared to baseline were both statistically significant (χ^2 = 30.42 p<.001 with 2 d.f. and χ^2 = 106.57 p<.001 with 2 d.f.).

The last part of Table 12 shows pedestrian search in San Diego when there was no turning vehicle. The data are very similar to the San Diego "turning vehicle present" results in that full search, replicated across observers, continues to rise from the baseline to the final measure (10% to 12% to 20%) while the "no look" category drops and then increases again (69% to 57% to 69%). The interim distribution as compared with the baseline distribution and the final distribution as compared to baseline were both statistically significant (χ^2 = 45.80 p<.001 with 2 d.f. and χ^2 = 87.21 p<.001 with 2 d.f.).

Taken together, these results indicate that pedestrian search in the VTM situation improved during the campaign. In Los Angeles, the improvement was greatest during the interim measure. In San Diego, improvement was greatest during the interim measure when considering the drop in the number of people who did not look at all. Improvement was greatest in the final measure when considering the increase in the number of people who conducted a full search.

The interpretability and, hence, the utility of the VTM behavioral data suffers from obvious problems with the paradigm employed for measuring driver search. Tinted windshields, sun glare and the widespread use of sunglasses by drivers made it difficult for the observers to see a driver's face and eyes. Moreover, some drivers likely search for pedestrians at intersections with only a shift in gaze or a barely perceptible eye movement. It was therefore decided to examine other potential driver behavior measures to determine the viability of alternative measurement approaches in the event that a further test of the VTM messages was taken.

Task analytic methods were utilized to examine the sequence of events surrounding a left turn at a signalized intersection. An operational sequence diagram highlighted the status of the driver and vehicle at critical points in the maneuver. The results, as discussed in detail in Appendix B, indicated that there would likely be little opportunity for a valid and reliable covert driver measure. The analytic approach adopted and the results are, however, germane to any attempt to measure driver behavior in this situation in a controlled experiment.

E. Results--MT

The results for the MT observations in Los Angeles are shown in Table 13. The first part of the Table shows pedestrian search in the MT situation at the outside edge of the stopped vehicle. The data indicate a gradual improvement in search behavior from 73% looking around the stopped car during baseline to 77% interim to 80% during the final measure. The interim distribution as compared with the baseline distribution and the final distribution as compared to baseline were both statistically significant (χ^2 = 26.82 p<.001 with 2 d.f. and χ^2 = 50.97 p<.001 with 2 d.f.). The baseline to

Table 13. Observed Pedestrian and Driver Behavior in the Multiple Threat Situation

Pedestrian Search	% not look	% maybe looked	% looked around car	N
Baseline	10%	17%	73%	2,653
Interim	7%	16%	77%	2,926
Final	6%	14%	80%	3,113

Pedestrian Course	% change	% slowed	% hesitate	% momentary stop	% stop	N
Baseline	39%	23%	15%	10%	13%	2,661
Interim	46%	26%	11%	9%	9%	2,941
Final	16%	12%	15%	16%	41%	3,113

Driver Course	% did not slow	% slowed-couldn't stop	% slowed hold stop	% stopped	N
Baseline	6%	2%	17%	74%	1,951
Interim	6%	2%	16%	77%	2,220
Final	6%	6%	27%	61%	2,658

interim comparison was replicated across observers while the baseline to final comparison could not be replicated due to observer turnover.

The second part of the Table shows pedestrian course behavior at the outside edge of the stopped car in the MT situation. The safe behavior is to stop or at least come to a momentary stop before walking beyond the car. This behavior drops slightly between the baseline and interim measures, then improves dramatically during the final measure. The interim distribution as compared with the baseline distribution and the final distribution as compared with the baseline distribution were both statistically significant (χ^2 = 52.65 p<.001 with 4 d.f. and χ^2 = 844.10 p<.001 with 4 d.f.). However, the baseline versus interim comparison did not replicate across observers. In fact, the two observers who participated in both the baseline and interim efforts both showed small baseline to interim increases, not decreases in the percentage of pedestrians who came to a full stop. The baseline to final comparison which shows a large improvement in behavior is also suspect since most, though not all, of the increase can be traced to one observer who participated only in the final wave. Therefore, it is felt that the results for pedestrian course are equivocal and that neither the baseline to interim decrease nor the large final measure increase can be fully substantiated.

The third part of the Table shows the results for overtaking vehicle course. In one sense, these results are absolutely flat. Specifically, the percentage of vehicles that "did not slow" remained at 6% for the baseline, interim and final measures. The interim distribution as compared with the baseline was not significantly different. The final distribution was significantly different (χ^2 = 126.48 p<.001 with 3 d.f.), however much of this difference was simply a shift between the categories of "slowed, could stop" and "stopped" both of which are potentially safe.

F. Summary

On-street observation of drivers and pedestrians in busy commercial areas can be difficult under the best of circumstances. This is particularly true when the primary measures are head and eye movements, speed of walking and changes in speed for pedestrians and vehicles. In addition, since data collection took place at discrete intervals in more than a year's time, observer turnover was inevitable. Nevertheless, despite obvious problems in measurement reliability these results do provide an indication of the behavioral effects achieved by these messages.

First, it appears that pedestrian search behavior was influenced. In the VTM situation, pedestrian search improved in both Los Angeles and San Diego. Pedestrian search also improved in the Los Angeles MT observations. The VTM gains are particularly impressive since they were replicated across observers, within two cities and the size of the gain was typically ten percentage points or more.

Second, there is little evidence for positive change in driver behavior. Driver search in the VTM situation did not improve in Los Angeles or San Diego for left turning drivers and probably didn't improve for right turning drivers. There was also little evidence for an improvement of driver behavior in the Multiple Threat situation.

It should also be mentioned that the behavioral data presented here contain no information concerning Spanish versus non-Spanish pedestrians or drivers. The knowledge and exposure results presented earlier showed, particularly in Los Angeles, that Spanish speaking populations received far greater exposure to the VTM materials. It is not known whether the present behavioral results contain Spanish versus non-Spanish differences.

V. ACCIDENT REDUCTION

Previous chapters of this report showed that there was some modest exposure of the target audiences to the messages, their knowledge of safe street crossing behavior may have improved, and the actual, naturally occurring, behaviors were somewhat improved, at least for pedestrians. However, knowledge gain and positive behavioral change are only intermediate objectives of this study. The ultimate objective, and the focus of this Chapter, is accident reduction. Clearly, the knowledge and behavioral results do not suggest that an accident reduction of any meaningful magnitude was achieved. Nevertheless, it was important to examine accidents in detail both to learn if the messages were effective and to shed further light on the process through which public education works to reduce accidents. The following paragraphs will describe how relevant accident data were accessed, coded and processed. The results will show that the number of VTM and Multiple Threat accidents were not generally reduced but that there were some promising findings which yielded significant insights on the effectiveness of the messages.

The analyses which follow are based on pedestrian accident reports for each city which were accessed, read and coded with respect to "accident type." Statewide data were obtained in the form of computer tapes with a plan to examine overall trends in adult pedestrian accidents both in areas surrounding the test cities and in distant areas of each state in the event that significant accident reductions were found in the test cities. These data proved to be of value in assessing the results of the child-oriented materials (see Volume II), but, for reasons which will become obvious as the reader peruses the results which follow, provided no additional insights on the impact of the adult messages.

As discussed earlier, the adult materials are designed to reduce (Vehicle Turn/Merge (VTM) and Multiple Threat accidents. The accident types of interest were (from Knoblauch, 1975):

- o VTM--Driver turning and attending to traffic, not pedestrian
- o Turning Vehicle--Pedestrian struck by a turning vehicle (not a documented VTM, i.e., the pedestrian was definitely struck by a vehicle making a turn but the presence of an attention conflict could not be documented)
- o Multiple Threat--Pedestrian struck by vehicle traveling in same direction as other car(s) that had stopped for pedestrian

The Turning Vehicle type, although not part of the original Snyder and Knoblauch (1971) typology, was later included by Knoblauch (1975) in order to provide a classification for those accidents which were VTM's in all respects except for the documentation of an attention conflict. Since these accidents appeared to be identical to the VTM type, it was assumed by Knoblauch (1975) that the only differences related to reporting and not the dynamics of the crash. This view is also held by the authors who, after reviewing hundreds of accident reports involving turning vehicles striking pedestrians, could not find any substantive differences between those cases in which the police officer recorded the presence of an attention conflict on the part of the driver and those in which no such report was made.

A positive impact of the VTM and MT materials might be evidenced by an overall reduction in adult pedestrian accidents. However, the VTM (including Turning Vehicle) and MT types only represent, respectively, 13.5% and 6.8% of all pedestrian accidents in Los Angeles (one of the test cities) during the years 1973 through 1975 (the study baseline). Therefore, any accident reduction present would be much more likely to be seen in the accident data broken down by specific types. It is also possible that, for the VTM messages which were available in both English and Spanish, there might have been a differential accident reduction among English and Spanish speaking members of the target audience. Lastly, any reductions should be related in time to the exposure of the message materials if a cause and effect relationship is to be established. The results which follow will show little evidence that would support the attribution of a meaningful accident reduction, either total or by type, to the VTM or MT messages. There is, however, some evidence that Spanish speaking audiences did experience accident reduction.

The data presented below are based on police accident reports from the two cities. Obviously, the process of police investigation of crashes, preparing reports, processing reports, etc., can become quite complex particularly when the number of pedestrian crashes within the two cities over the time period of interest totals many thousands. For this reason, relatively elaborate procedures were utilized to access these reports. The next two sections of this Chapter detail the procedures utilized in Los Angeles and San Diego, respectively. Results relative to reduction of accidents appear in the third section.

A. Method--Los Angeles

Officials of the Los Angeles Police Department (LAPD) were approached during late 1975 and early 1976 as to the possibility of accessing pedestrian accident data held by the City. As a result of these discussions, Los Angeles provided to Dunlap a listing of all crashes which involved a collision with a pedestrian. The accident report number for each case with identified pedestrian involvement was printed and the full list of all such crashes was provided to records personnel of LAPD. These individuals pulled each report from the files and made them available to Dunlap personnel for reading and coding at LAPD headquarters. Coding was accomplished during a ten day period by six individuals--three senior staff members familiar with pedestrian accident coding and three assistants locally recruited and trained. This coding effort took place during the late Spring of 1976 and provided the Los Angeles baseline data.

The original plan called for a replication of this access and coding strategy to provide accident data for the period 1976-1978 covering the test of the both the adult and child messages. Unfortunately, the computer tape obtained from Los Angeles for this period indicated many accident report numbers for which no information was entered. This problem necessitated the manual screening of all reports for which information was not keypunched. Reports whose computer records existed and showed only involved vehicles (no pedestrians) were excluded. All other reports--those for which no computer records existed ("unidentifieds") or whose computer records referenced pedestrians--were manually screened and those with actual pedestrian involvement were read and coded if they involved a pedestrian.

This procedure accessed a more complete set of pedestrian accident reports than had been reviewed in the baseline coding. In particular, the earlier coding had not included reports for which no computer records existed or those which involved a secondary pedestrian, as in cases when a car hits another car, leaves the roadway, and then strikes a pedestrian. To make the accident tabulations comparable from 1973 through 1978, the "overlooked" pedestrian accidents from 1973-1975 were similarly accessed and coded in this second coding wave.

Coding for the 1976-1978 period was accomplished during the late Spring of 1979 by the same six individuals each coding roughly the same proportion of reports as during the baseline coding effort. In addition, a fourth senior coder participated. This seventh individual (fourth senior coder) coded most of the secondary involvements, 1973-1975 and 1976-1978; most of the pedestrian "unidentifieds" from 1973-1975; and an equivalent number of "unidentifieds" from 1976-1978. The remaining "unidentifieds" and secondary involvements were distributed across the other senior coders. This coding effort was monitored, insofar as possible, to ensure that each of the seven coders read and coded an equivalent proportion, baseline (1973-1975) to program (1976-1978), of "involved with pedestrian," "unidentified" and "secondary impact" reports. While proportions varied markedly among individual coders, it was generally true each coder did approximately the same proportion of each type of report for the baseline and program periods.

The first step in the coding of any report was a determination of whether or not the event represented a pedestrian/motor vehicle crash. For the purposes of this study, the following definitions were adopted:

- Pedestrian Victim - Any person involved in a motor vehicle accident who was not in or upon a motor vehicle or bicycle or tricycle in transit and whose injuries did not result from falling from a motor vehicle.
- Motor Vehicle Accident - Any accident involving a motor vehicle in transport. That is, in motion, in readiness for motion or on a roadway, but not parked.

Specifically included in this study were individuals riding skateboards, carts, wagons, etc., when involved in a motor vehicle accident. Also included were off-road events where the involved vehicle was in "transport," situations involving debris falling from or propelled by a motor vehicle, as well as situations in which the motor vehicle hit a building and people inside the building were injured. Specifically excluded were bicycle riders, tricycle riders and individuals whose injuries resulted solely from falling from a motor vehicle as opposed to being struck by a motor vehicle.

The coding format utilized for the Los Angeles accident data is shown in Figure 4. Second and third pedestrians for the same crash were coded by changing the card number (shown as "1" in the Figure) to "9" and completing the appropriate information for each additional pedestrian. The first pedestrian coded in a multiple pedestrian crash was taken as the "lead" pedestrian in a

DUNLAP AND ASSOCIATES, INC. - Project 106

Los Angeles Pedestrian Accident Coding Form

Keypunched ☐

Card Number	1	(1)
City	0 9	(2-3)
DRIVER SPANISH SURNAME . . . . 1. yes; 2. no	☐	(9)
PEDESTRIAN SPANISH SURNAME . . . . . 1. yes; 2. no	☐	(10)
DATE . . . . month/day/year	☐☐☐☐☐☐	(11-16)
TIME	☐☐☐☐	(18-21)
DAY OF WEEK . . . . 1. Su; 2. M; 3. Tu; 4. W; 5. Th; 6. F; 7. Sa	☐	(22)
DRIVER AGE	☐☐	(23-24)
DRIVER SEX . . . . . 1. m; 2. f; 3. h&r	☐	(25)
PEDESTRIAN AGE	☐☐	(26-27)
PEDESTRIAN SEX . . 1. m; 2. f	☐	(28)
INJURY SEVERITY . . 1. K; 2. A; 3. B; 4. C; 5. none	☐	(30)
LIGHTING	☐	(31)
WEATHER CONDITIONS	☐	(32)
ROAD CONDITIONS	☐	(33)
VEHICLE TYPE . . . 1. car; 2. taxi; 3. bus; 4. truck; 5. other	☐	(34)
TYPE OF ROAD . . . 1. two-way; 2. one-way; 3. divided; 4. expressway; 5. other . .	☐	(35)
LOCALE	☐	(36)
TRAFFIC CONTROL . 1. RGA; 2. stop/yield; 3. none; 4. other	☐	(37)
VEHICLE ACTION	☐☐	(39-40)
ACCIDENT OCCURRED . . . . 1. intersection; 2. not at intersection	☐	(41)
. . . 1. in marked crosswalk; 2. in unmarked crosswalk; 3. not in crosswalk . .	☐	(42)
. . . 1. street lights on; 2. ped. signal present; 3. both	☐	(43)
ACCIDENT TYPE . . . 01 DO1 . . . . 10 Wierd	☐☐	(76-77)

01 DO1	10 Wierd
02 DO2	11 Dis V
03 ID	12 A-A
04 VTM	13 Mid
05 PStV	14 Trap
06 MT	15 Turn V
07 Bus	16 PNR
08 Bk	17 Other
09 Vend	18 NC

CULPABILITY . . . . . 1. driver; 2. pedestrian; 3. both; 4. neither	☐	(78)
SECOND ACCIDENT TYPE . . . . 1 Non Ped AR (not 7)	☐	(79)

2 FE exit
3 FE cross
4 Ped exit
5 Ped walk
6 PNA
7 Rd Wk Site

CODER	☐	(80)

Figure 4. Los Angeles Accident Coding Form

group or, if none, the first pedestrian struck, or if unknown, the most seriously injured, or if equal, the first pedestrian coded by the officer. The first vehicle coded, with its driver, was taken as the striking vehicle unless that vehicle was not in transport (e.g., parked car). Most of the data coded were lifted directly, without change, from the police accident report. Driver and Pedestrian Spanish surnames were judged based on the names of the parties and the officer's designation of "descent." "Type of Road," "Traffic Control," "Intersection" and "Crosswalk" were also judged by the coder. A crash was coded as an intersection event if either or both parties, immediately prior to the crash, were influenced by or should have been influenced by the rights, duties, controls, etc., associated with an intersection. In practice, crashes occurring within an intersection or any of its marked or unmarked crosswalks were coded as intersection events. Similarly, crashes occurring just outside the intersection or involving a pedestrian path which did or would have contacted any part of the intersection were also coded as intersection events. Beyond this was a gray area from about 15 or 20 feet outside the intersection to as far as about 50 feet. These events were coded as "intersection" if, in the judgement of the coder, the intersection and/or its controls influenced either or both parties immediately prior to the crash. For example, the pedestrian may have referenced watching and following the pedestrian signals at the intersection even though clearly outside a defined crosswalk. Similarly, the judgement of "Traffic Control" followed the intersection judgement and was often dependent on it. "Crosswalk," marked or unmarked, was coded if the pedestrian was hit while in a crosswalk.

The next, and in many ways the most important, judgmental code was for "Accident Type." The specific types and their definitions were taken directly from the work of Knoblauch (1975). These definitions are reproduced in Table 14. As discussed elsewhere, the adult materials were designed to impact Vehicle Turn/Merge, Turning Vehicle and Multiple Threat accidents.

Obviously, there is both a certain amount of overlap and similarity among these accident type definitions as well as a hierarchical structure relating one to the other. Consider, for instance, the situation where an adult is struck by an overtaking vehicle after running out midblock in front of a car that saw the adult and stopped for him. This event might be considered as a Midblock Dash, however, short-time exposure can probably be documented thus the "higher" accident type Dart-Out First (or Second) is more appropriate. Moreover, with the screening vehicle which had stopped for the pedestrian, the still "higher" Multiple Threat accident type is appropriate and would be coded. In general, the typical Multiple Threat accident is also an Intersection Dash or Dart-Out and the typical Backing accident may also be Ped Not in Road. Therefore, some precedence or ordering of the accident types had to be established to allow for consistent coding. The precedence established for the purposes of this effort was as follows:

Highest	-	Auto-Auto
		Backing
		Bus Stop
		Disabled Vehicle
Second	-	Ped Not in Road

Table 14. Accident Type Definitions

Symbol	Code #	Definition
DO1	01	DART-OUT, FIRST HALF: Midblock, short-time exposure, crossed less than halfway
DO2	02	DART-OUT, SECOND HALF: Same as 01 except, crossed more than halfway
ID	03	INTERSECTION DASH: At intersection, short time exposure or running
VTM	04	VEHICLE TURN/MERGE WITH ATTENTION CONFLICT: Driver turning and attending to traffic, not pedestrian
PStV	05	PED STRIKES VEHICLE: Ped walked or ran into vehicle and not other type
MT	06	MULTIPLE THREAT: Ped struck by vehicle traveling in same direction as other cars that had stopped for ped
Bus	07	BUS STOP RELATED: Ped struck while crossing in front of bus standing at a bus stop
Bk	08	BACKING-UP: Ped struck by backing-up vehicle but ped not clearly aware of the vehicle movement
Vend	09	VENDOR--ICE CREAM TRUCK: Ped struck going to or from a vendor in a vehicle on the street
Weird	10	WEIRD: Unusual circumstances, not countermeasure corrective
DisV	11	DISABLED VEHICLE RELATED: Ped struck while working on or next to a disabled vehicle
A-A	12	RESULT OF AN AUTO-AUTO CRASH: Ped struck by vehicle(s) or debris as a result of an auto-auto or single vehicle accident (i.e., secondary impact
Mid	13	MIDBLOCK DASH: Not at intersection, ped running but not short-time exposure (i.e., not 01)
Trap	14	TRAPPED: At signalized intersection, ped hit when light changed and traffic started moving (not 06)
TurnV	15	TURNING VEHICLE: Ped struck by turning vehicle (not 04)
PNR	16	PED NOT IN ROADWAY: Ped struck while not in roadway, includes cases where vehicle went out of control (not 07, 08, 11, 12)
Other	17	OTHER: Defined situation as accident type not covered above (e.g., Rear Wheel Truck or Bus, Alphonse-Gaston, Gas Station Related, Rear-view Mirror, Hot Pursuit, Illegal or Anti-Social Act or any of the second Accident Types shown in Table 15).
NC	18	NOT CLASSIFIABLE: Insufficient data to permit a classification, or undefined situation (not 10)

Third	-	Multiple Threat Vendor Vehicle-Turn-Merge Turning Vehicle
Fourth	-	Dart-out First Dart-out Second Intersection Dash Trapped
Fifth	-	Midblock Dash
Sixth	-	Ped Strikes Vehicle
Seventh	-	Weird Other Not Classifiable

An accident event satisfying two or more accident type definitions was coded with the definition having the highest precedence.

The next judgment code (shown below Accident Type on Figure 4) was for Culpability. Culpability was not determined on legal grounds but rather in behavioral terms. It was defined as: "The commission of a behavioral error, the elimination of which would likely have resulted in crash avoidance." Judged culpability could have been assigned to the pedestrian, the driver, both or (in rare instances) neither.

The last coder judgment was for Second Accident Type. This judgment was added because certain special situations, not covered in the main accident type list, were of current interest. Table 15 provides the definitions for each of these second accident types. In general, any Second Accident Type could be coded in conjunction with any main Accident Type though there were certain logical relationships. The Right-Turn-On-Red types, for instance, were invariably Turning Vehicle or Vehicle Turn/Merge from the main list and many of the remaining Second Types were often associated with the "Other" category on the main list. Second Accident Type was coded only when the crash event satisfied one of the Second Accident Type definitions.

For the purposes of this study, coding of primary or main accident type was the most important single coder judgment. This was often a complicated judgment to make and each individual coder could be expected to have had his or her own set of biases or idiosyncracies in approaching this task. As discussed earlier, the first defense against the possibility that coder bias might influence resulting distributions of accident type across the years of this study was to ensure that each coder coded an equivalent number of accident reports from both the baseline period (1973-1975) and program period (1976-1978). In this way, any individual coder idiosyncracies would be equally represented in both periods. The actual percentages of reports coded, baseline (N=9,285) vs. program (N=10,098), for the senior coders were: 17% vs. 17%, 22% vs. 21%, 19% vs. 22% and, for the fourth senior coder added in the Spring of 1979, it was 10% vs. 10%. The comparable figures for the three junior coders were: 13% vs. 13%, 9% vs. 8% and 10% vs. 10%. Thus, there was

Table 15. Second Accident Type Definitions

Symbol	Los Angeles	Milwaukee	Definition
Non Ped AR	1	1	NON-PEDESTRIAN ACTIVITY IN ROADWAY: (e.g., sleeping, laying down, etc.; but not other defined type)
Start Gun	2	n.a.	STARTING GUN or DRIVER TRAPPED: Driver enters intersection late, typically on an amber signal. Far side pedestrian leaves the curb immediately upon obtaining a green or walk signal
FE Exit	n.a.	2	FREEWAY/EXPRESSWAY EXITING: Pedestrian struck after or while exiting a vehicle on a freeway
FE Cross	3	3	FREEWAY/EXPRESSWAY CROSSING: Pedestrian struck while attempting to cross a freeway but <u>not</u> after exiting a vehicle
Ped Exit	4	4	PEDESTRIAN EXITING: Pedestrian hit while exiting a vehicle <u>not</u> on a freeway
Ped Walk	5	5	PEDESTRIAN WALKING IN ROADWAY: Pedestrian hit while walking in but not crossing a roadway <u>not</u> a freeway
PNA	6	6	PROBABLE NON-ACCIDENT: An intentional crash or Police judgment that no accident occurred
Rd Wk Site	7	n.a.	ROAD WORK SITE: Pedestrian hit while working on, over or under the roadway
School Bus	n.a.	7	SCHOOL BUS: The pedestrian is struck while going to or from a school bus or school bus stop
RTR Left	8	8	RIGHT TURN ON RED-LEFT: Pedestrian crossing from left to right in front of a driver turning right on red
RTR Right	9	9	RIGHT TURN ON RED-RIGHT: Pedestrian crossing right to left in front of a driver turning right on red
RTR Across	0	0	RIGHT TURN ON RED-ACROSS: Pedestrian crossing parallel to driver's original path before he made a right on red, i.e., ped struck crossing street driver turned into

essentially baseline versus program equivalence and the senior coders coded approximately 69% of the reports.

Of course, this "equivalence" only suggests that any error or bias is equivalently present in baseline and program periods. It is also of interest to estimate the size or magnitude of these potential idiosyncratic factors. In other words, it is of interest to estimate the reliability of the coding process relative to determination of accident type. One measure of this reliability is the correlation between the accident type distributions generated by the individual coders. While each coder read different reports, the set of reports read by each coder did represent, for the most part, a random sample of reports drawn from the same population of reports (i.e., all reported pedestrian crashes in Los Angeles, 1973-1978). Thus, if accident type determination was 100% reliable, each coder should have produced exactly the same distribution of accidents by type. This would not be true for the fourth senior coder whose sample of reports was selectively drawn, and all calculated correlations would be depressed due to sampling error associated with randomly drawing each coder's set of reports. Nevertheless, the correlations among coders, across the 18 possible accident type codes, are estimates of coding reliability. These correlations were computed by first converting the raw data to percentage distributions across accident type for each coder. These percentages were transformed using the arcsin transformation and product-moment correlations were calculated. Between the three junior coders, the intercorrelations were .76, .89 and .90. The three senior coders produced intercorrelations of .94, .95 and .99. Further, the correlation between the summed distribution for the three senior coders and the summed distribution for the three junior coders was .94. Clearly, accident type was coded from Los Angeles police accident reports with a relatively high degree of reliability.

B. Method--San Diego

San Diego was part of the NHTSA/FHWA Data Base system. This Data Base and its associated data collection format have been described elsewhere (e.g., Knoblauch and Knoblauch, 1976). Essentially, the data items of interest from this data base are identical to the items shown in Figure 4 (Los Angeles Accident Coding Form) as the Los Angeles format was patterned directly from the NHTSA/FHWA forms. The only difference of interest was that the San Diego effort did not include coding for "Culpability" and "Second Accident Type."

The NHTSA/FHWA Data Base provided this study with coded, machine readable data for San Diego covering the years 1973 to 1978. These data were received and processed. However, as the study progressed, it became clear that an assessment of the ethnicity (English or Spanish) of the involved parties would be of significant importance. Therefore, the original San Diego accident reports were obtained from the NHTSA/FHWA Data Base contractor and a judgment on pedestrian and driver surname was made. These additional codes were merged with the report data already provided by the Data Base to arrive at the final data set for analysis. Unfortunately, San Diego was a much smaller data base than Los Angeles and ethnicity was more difficult to code from the San Diego reports. Therefore, these data did not prove instructive and are not reported in this Chapter.

Coding reliability estimates for the San Diego effort were not calculated. The Data Base contractor employed only one coder for virtually the entire period of interest in San Diego. The only major quality control concern would therefore be pre/post reliability rather than inter-rater reliability. The staff of this project reviewed the type assignments of many of the accident cases after they were received from the data base. It was concluded that the quality of the San Diego data was comparable to that obtained for the Los Angeles data.

C. Accident Reduction

Accident data are obviously the most important aspect of this evaluation. However, as documented in previous Chapters, problems related to gaining exposure for the VTM and Multiple Threat materials made it unlikely that accident reduction would be achieved. The one clear exception was Spanish speaking people in Los Angeles as demonstrated through the telephone survey. The sections which follow will first present the overall distributions of pedestrian accidents by accident type in Los Angeles and San Diego. These results are of experimental interest irrespective of the present evaluation. The next section will examine the VTM accident involvement of Spanish surname pedestrians and drivers in Los Angeles. This will be followed by the results of time series analyses, the primary analytical technique used.

1. Accident Type Results

Table 16 shows the distribution of pedestrian accidents in Los Angeles by accident type for each year, baseline and program, covered by this study. The total number of accidents in this data base is 19,383. Of this, 3,062 occurred in 1973 which was the first baseline year. The number of crashes increased steadily in every year except 1977 to a total of 3,549 in 1978. The remainder of the Table shows the percentage of these accidents accounted for by each accident type. In general, these percentages are extremely stable from year to year which is not surprising given the relatively large N.

A quick review of Table 16 shows that there are four or five accident types which account for much of the pedestrian accident problem. One of these is "Ped Not in Road" which is a catch-all category for a variety of off-road events, and another is "Dart-out First" which typically involves children and was discussed in Volume II. Another important type is "Intersection Dash" which often does involve adult pedestrians and is the focus of a subsequent public information effort (Contract No. DTNH22-80-R-07475).

The accident types which were the focus of the current effort are shown on the first two lines of the Table. The first line shows the combination of Vehicle Turn/Merge and Turning Vehicle. These accidents varied between a low of 13.0% of Los Angeles Accidents in 1974 to a high of 15.2% in 1978. This variation is only 2.2 percentage points and shows little evidence of being associated with the public education effort. As discussed in Chapter II, the VTM TV spots were shown from the Spring of 1976 through most of 1977. The accident data show a slight rise in 1976, a slight drop in 1977 and a larger rise in 1978 though none of these differences are very large. Multiple Threat accidents, shown on the second line of the Table, also show only slight year to year variation. They ranged from a low of 6.6% of all Los Angeles accidents in 1973 to a high of 7.7% in 1978. These data trended constantly upward with a

Table 16. Los Angeles Percent Distribution of Accidents by Type and Year

	Year					
				Media Program		
	1973	1974	1975	1976	1977	1978
N =	3,062	3,082	3,141	3,310	3,239	3,549
VTM/Turn Vehicle	14.0%	13.0%	13.4%	13.7%	13.2%	15.2%
Multiple Threat	6.6	6.8	7.0	7.4	6.9	7.7
Intersection Dash	8.5	10.2	9.5	9.0	9.5	9.2
Dart-out First	14.6	13.3	15.2	12.4	10.9	11.4
Dart-out Second	7.0	7.6	5.4	6.0	5.4	4.8
Midblock Dash	4.0	3.7	3.8	3.9	4.3	3.5
Bus Stop	0.5	0.5	0.4	0.5	0.6	0.6
Backing	4.3	4.9	5.0	5.8	6.4	6.4
Vendor	2.5	1.8	1.8	1.7	1.6	1.4
Ped Not in Road	8.5	9.4	9.8	9.5	10.3	10.0
Auto-Auto	5.6	4.3	4.7	5.6	4.9	4.3
Disabled Vehicle	1.2	1.2	0.8	1.5	0.7	1.5
Trapped	0.9	0.8	0.7	0.7	0.5	0.5
Ped Strikes Vehicle	1.2	0.7	1.1	1.4	1.2	0.9
Weird	2.3	0.8	1.4	1.0	1.4	0.8
Other	9.7	12.6	11.1	10.2	11.2	9.1
Not Classifiable	8.7	8.2	8.9	9.8	10.8	12.6
TOTAL	100	100	100	100	100	100

slight break in the trend during 1977. While this "break" might have been associated with the program, the year to year differences are relatively small. Thus, these overall results do not provide any clear evidence for program impact.

Table 17 shows the distribution of pedestrian accidents in San Diego for the years 1973 through 1978. The total number of accidents in this data base is 3,263 or about one-sixth the number in Los Angeles. These results show that the total number of crashes remained relatively stable from 1973 to 1977, followed by an increase in 1978. The remainder of this Table shows the percentage of these accidents accounted for by each accident type. These percentages are far less stable, year to year, than the similar percentages for Los Angeles. This difference is probably due to the fact that the total number of crashes in San Diego is substantially less than the total number in Los Angeles and, thus, San Diego is subject to greater sampling error.

The top line of Table 17 shows the combination of the Vehicle Turn/Merge and Turning Vehicle accident types. These were the only accident types addressed in San Diego. The results show variation from a low of 11.5% of all San Diego accidents in 1973 to a high of 19.0% in 1978. The VTM messages were aired in San Diego during 1976 and probably into 1977. However, the overall accident data do not suggest a reduction during this period. Rather, accidents remained flat in 1976, increased in 1977 and increased again, following the program in 1978.

Several analyses were conducted across the San Diego and Los Angeles data to determine if the character or circumstances surrounding VTM and Multiple Threat accidents varied despite the fact that the total number of crashes was little changed. Variables examined in these analyses included time of day, day of week, driver and pedestrian age and sex, traffic control and pedestrian injury severity. Consistent results were seen only with respect to weather conditions, suggesting more rain in 1977 and particularly in 1978.

2. Spanish Surname Analysis

The results presented earlier in this report suggested that an overall reduction in VTM or MT accidents would not have been likely. However, the VTM materials were produced in both English and Spanish. Accident reduction for Spanish speaking people was clearly possible given the results of the adult telephone survey and particularly those results from Los Angeles. Also, in Los Angeles, the police accident report form contained an ethnicity code including a "Latin" category which made the identification of Spanish speaking individuals relatively easy. Thus, this section will examine VTM accidents in Los Angeles for Hispanic pedestrians and drivers. A similar analysis in San Diego was unproductive due to a much lower sample, uncertain identification of "Latin" and survey results which were not as powerful as in Los Angeles. It should also be noted that MT accidents were examined with respect to Hispanic involvement and results showed no consistent changes.

Table 18 shows VTM (and Turning Vehicle) crashes in Los Angeles involving persons identified as Hispanic. The first group of figures shows all crashes involving Spanish surname pedestrians, the second those with Spanish surname drivers and the third shows crashes where the pedestrian or the driver or both were Hispanic. The last set of figures shows crashes where the

Table 17. San Diego Percent Distribution of Accidents by Type and Year

	Year					
				Media Program		
	1973	1974	1975	1976	1977	1978
N =	531	514	512	545	539	622
VTM/Turn Vehicle	11.5%	15.0%	12.1%	12.1%	16.0%	19.0%
Multiple Threat	1.7	0.2	0.5	1.5	0.6	1.3
Intersection Dash	16.4	23.9	21.2	27.3	29.1	22.8
Dart-out First	21.5	14.4	19.6	12.0	13.2	13.5
Dart-out Second	10.6	7.8	8.7	8.3	5.7	7.0
Midblock Dash	8.3	1.0	4.5	4.6	3.3	4.3
Bus Stop	1.4	0.8	1.1	0.6	0.8	0.9
Backing	1.8	2.2	2.5	1.4	3.0	1.7
Vendor	2.0	3.3	2.3	1.5	0.4	0.7
Ped Not in Road	3.0	6.8	3.5	4.2	4.3	5.6
Auto-Auto	1.7	1.3	0.7	0.6	1.2	0.7
Disabled Vehicle	1.4	0.8	0.5	1.2	1.4	3.0
Trapped	0.4	--	1.0	0.4	0.2	1.3
Ped Strikes Vehicle	2.9	3.5	4.1	2.9	3.7	3.5
Weird	0.8	3.8	1.4	1.9	1.8	1.7
Not Classifiable	15.9	15.6	15.9	17.0	18.9	21.5
TOTAL	100	100	100	100	100	100

Table 18. Los Angeles VTM and Turning Vehicle Crashes Involving Persons of Spanish Surname

		Year					
					Media Program		
		1973	1974	1975	1976	1977	1978
Spanish Pedestrian							
VTM/TV	N	89	101	99	98	87	125
All Sp. Ped	N	702	779	808	913	913	1108
% VTM/TV of all		13%	13%	12%	11%	10%	11%
Spanish Driver							
VTM/TM	N	69	65	72	50	56	97
All Sp. Driver	N	533	520	521	562	605	753
% VTM/TV of All		13%	12%	14%	9%	9%	13%
Spanish Ped or Driver							
VTM/TV	N	135	139	136	123	121	178
All Spanish	N	978	1026	1061	1141	1152	1418
% VTM/TV of all		14%	14%	13%	11%	11%	13%
10-99* Spanish Ped or Driver							
VTM/TV	N	120	132	120	114	108	161
All Spanish	N	663	684	712	760	758	960
% VTM/TV of all		18%	19%	17%	15%	14%	17%

*Only those crashes involving a pedestrian age 10 or older are included.

pedestrian was at least 10 years old. These data are presented since the various Los Angeles time series shown in the next section exclude child pedestrians because they were the focus of a concurrent countermeasures effort (Willy Whistle in English only). Three lines of data are shown in Table 18 for each data set or group. The first line shows the number of VTM plus Turning Vehicle crashes in any year involving Spanish pedestrians, drivers, etc. The second line shows the total number of crashes involving Spanish pedestrians, drivers, etc., regardless of crash type. The last line is the VTM total (first line) divided by "All" (second line) to provide percent VTM.

The first conclusion from this Table is that Hispanic accident involvement increased steadily from 1973 to 1978 which probably reflects an influx of Hispanics into the region over the period. Specifically, total accidents involving a Spanish ped or driver increased from 978 in 1973 to 1,418 in 1978. However, the percentage of these accidents which were VTM remained relatively stable throughout the 1973-1975 baseline. Then, they apparently dropped during the 1976-1977 program period and apparently returned to their baseline levels during 1978. During baseline, whether looking at pedestrians, drivers or both, VTM accidents ranged from 12-14% of Hispanic involvements. During the program period, the comparable figures ranged only from 9-11% suggesting that the Spanish language messages were effective.

The Chi-Square test was applied to the above results to test the statistical significance of the observed drop in accidents during the program period. Three 2 x 2 tables were constructed corresponding to Spanish pedestrians or drivers. Each table consisted of baseline (1973-1975) vs. program (1976-1977) and VTM vs. all other pedestrian/vehicle crashes. All three were statistically significant (χ^2 = 6.20 p<.05 for pedestrians; χ^2 = 10.65 p<.01; and χ^2 p<.01 for peds or drivers).

3. Time Series Statistical Testing

In each of the two test cities, accident data were collected for three years prior to the safety campaign, for two years while the campaign was in effect, followed by one post year. This yielded a standard pre-program-post design. However, there might have been trends of increasing or decreasing accident rates through the whole study period. While these trends could translate into net differences between baseline and program periods, the differences would be more properly attributable to the underlying trend rather than the safety program. Accordingly, the statistical analyses covered in this section utilized month as the basic unit of measurement and emphasized time series analysis as the most appropriate procedure to isolate and quantify effects which could be attributed to the safety campaign. The analysis procedures followed two basic steps:

- Display the accident results as percent VTM and percent MT of all accidents per month, with monthly (i.e., seasonal) mean differences removed. This eliminated a frequently large source of variability which was unrelated to the test hypotheses but confounded with their evaluation. This display provided initial evidence of annual trend effects which could mask or exaggerate safety program results and also quantified the basic magnitude of baseline/program period differences uncorrected for the time-related factors dealt with below.

- Use Box-Jenkins time series analysis procedures to isolate specific time-sequence components of data variation and, within that framework, to determine the size and statistical significance of safety campaign-related effects. With all accident data, a best-fitting time series model was developed. In this modeling, a parallel time series representing the safety program was used as a transfer function (intervention analysis). Various coefficients could possibly relate the safety program series to the accident data series. The values and statistical significance of those coefficients lead directly to judgments about the type and extent of safety program influence on accident rates.

Several time series models were constructed for various aspects of the Los Angeles and San Diego data. Four of these will be introduced in this section: Percent MT in Los Angeles; Percent VTM in San Diego; Percent VTM in Los Angeles; and Percent Spanish Ped or Driver VTM in Los Angeles. These four and other models are shown in greater detail in Appendix C.

Table 19 shows Multiple Threat accidents by month and year for Los Angeles. Also shown for each month is the percentage of all Los Angeles pedestrian crashes which were MT and the value of the intervention or transfer series. The intervention series was assigned the value "0" from 1973 to January 1976 denoting the fact that the program materials had not been introduced into Los Angeles. A value of "1" was assigned for the next 23 months since materials were aired during that period. The value "0" was again assigned for the last 12 months (1978) since there was little or no evidence that any of the materials were aired during this period. This same intervention series was used for each of the data sets examined. It should also be noted that the data in this Table and each of the other Los Angeles Tables exclude crashes which involved a pedestrian under the age of 10. Child pedestrians were the subject of a concurrent countermeasure evaluation (see Volume II of this report) and their inclusion here would have been inappropriate.

Time series analysis in the present context may be thought of as a process whereby trends and time dependencies in a data set are stabilized and the variance accounted for by the intervention series (program present vs. absent) is assessed within the remaining stable or constant data set. In the equations which follow, the intervention series is denoted as X_t and the coefficient associated with X_t provides the strength and direction of any relationship between accidents and the presence of the countermeasure program. Time series also provides the confidence interval (95% interval in these analyses) associated with the X_t coefficient. When this interval includes the value 0.0, then it may not be concluded that the intervention series (i.e., the public education countermeasure) is significantly related to accident occurrence.

Table 19. Los Angeles Multiple Threat Accidents by Month (N and %) With Intervention Series for Pedestrian Ages 10 and Older

	J	F	M	A	M	J	J	A	S	O	N	D	Total
1973 N	17	8	19	13	17	15	10	12	13	13	16	12	165
N as % of all	8	4	11	8	11	10	6	8	7	7	7	6	7.7%
Intervention off/on*	0	0	0	0	0	0	0	0	0	0	0	0	
1974 N	21	16	10	18	11	14	16	15	4	10	14	18	167
N as % of all	9	9	6	11	7	8	11	8	3	6	6	8	7.6%
Intervention off/on	0	0	0	0	0	0	0	0	0	0	0	0	
1975 N	15	15	10	13	14	13	18	9	17	18	16	24	183
N as % of all	8	9	6	8	8	7	9	6	9	9	7	10	8.1%
Intervention off/on	0	0	0	0	0	0	0	0	0	0	0	0	
1976 N	18	15	17	15	15	15	20	19	14	14	30	15	207
N as % of all	8	7	8	8	9	8	11	10	7	6	14	6	8.4%
Intervention off/on	0	1	1	1	1	1	1	1	1	1	1	1	
1977 N	19	14	18	12	15	13	14	6	15	16	26	17	185
N as % of all	8	7	9	7	8	7	7	4	8	8	11	7	7.6%
Intervention off/on	1	1	1	1	1	1	1	1	1	1	1	1	
1978 N	26	28	16	21	11	11	19	10	14	23	29	25	233
N as % of all	9	11	7	10	5	6	10	5	6	10	11	10	8.6%
Intervention off/on	0	0	0	0	0	0	0	0	0	0	0	0	

*off = 0
on = 1

The developed time series model for the percentage data shown in Table 19, Los Angeles MT, was as follows:*

$$Y_t - 7.94 = .105X_t + a_t$$

The coefficient +.105 was not statistically significant and therefore it cannot be concluded that Multiple Threat accidents, as a percentage of all Los Angeles accidents, were either significantly increased or decreased by the public education program.

Table 20 shows VTM (and Turning Vehicle) accidents by month and year for San Diego. This Table is similar to Table 19 and was subjected to the same analyses. The resulting time series model was as follows:

$$(1-.24B)(1-.57B^{12})(Y_t-15.42) = -1.35X_t + a_t$$

The coefficient -1.35 was not statistically significant. Therefore, it cannot be concluded that the VTM materials in San Diego were associated with accident reduction.

Table 21 shows VTM (and Turning Vehicle) accidents by month and year for Los Angeles. Again, this Table was constructed similarly to the previous Tables and was subjected to the same analyses. The resulting time series model as was follows:

$$Y_t = -1.42X_t + \frac{a_t}{(1-B^{12})}$$

As before, the X_t coefficient (-1.42) was not statistically significant. Thus, it cannot be concluded that the VTM materials in Los Angeles produced any accident reduction among all VTM crashes.

*Where Y_t = the % accidents per month values at time t. The full series includes times t = 1 to t = 72 (1/1973 through 12/1978, of which t = 1-38 are baseline, t = 38-60 are program, and t = 61-72 are post).

X_t = the intervention series

a_t = the residuals, i.e., the actual frequency minus the value projected for time period t based on the equation and the frequencies for time periods 1 to t-1.

B is the backshift operator: $B(a_t) = a_{t-1}$, $B^2(Y_t) = Y_{t-2}$, etc.

For more detail of the theory and practice of time series analysis, see Box and Jenkins (1976) and McCleary and Hay (1980).

Table 20. San Diego VTM and Turning Vehicle Accidents by Month (N and %) With Intervention Series

		J	F	M	A	M	J	J	A	S	O	N	D	Total
1973	N	9	6	7	4	2	9	4	4	2	5	5	4	61
	N as % of all	23	13	13	7	4	22	10	10	5	10	15	9	11.5%
	Intervention off/on*	0	0	0	0	0	0	0	0	0	0	0	0	
1974	N	7	5	4	6	4	6	4	3	5	8	11	14	77
	N as % of all	22	12	10	15	10	14	11	8	14	15	17	29	15.0%
	Intervention off/on	0	0	0	0	0	0	0	0	0	0	0	0	
1975	N	7	4	3	6	2	3	6	1	7	7	7	9	62
	N as % of all	17	11	8	13	5	9	13	2	13	17	15	20	12.1%
	Intervention off/on	0	0	0	0	0	0	0	0	0	0	0	0	
1976	N	6	9	9	4	6	4	8	1	3	2	4	10	66
	N as % of all	20	18	19	8	13	10	16	2	7	4	11	18	12.1%
	Intervention off/on	0	1	1	1	1	1	1	1	1	1	1	1	
1977	N	7	9	8	6	6	9	6	3	5	6	9	12	86
	N as % of all	19	18	26	18	13	22	15	8	11	10	15	23	16.1%
	Intervention off/on	1	1	1	1	1	1	1	1	1	1	1	1	
1978	N	20	10	8	6	7	10	11	9	8	12	10	7	118
	N as % of all	33	16	15	15	13	21	25	17	15	24	16	17	19.0%
	Intervention off/on	0	0	0	0	0	0	0	0	0	0	0	0	

*off = 0
on = 1

Table 21. Los Angeles VTM and Turning Vehicle Accidents by Month (N and %) With Intervention Series for Pedestrian Ages 10 and Older

		J	F	M	A	M	J	J	A	S	O	N	D	Total
1973	N	60	36	40	34	17	18	24	20	25	40	42	37	393
N as % of all		30	20	22	20	11	12	15	12	14	20	19	20	18.5%
Intervention off/on*		0	0	0	0	0	0	0	0	0	0	0	0	
1974	N	49	33	30	23	21	32	22	26	22	28	40	43	369
N as % of all		20	19	17	14	14	17	14	15	16	16	18	19	16.8%
Intervention off/on		0	0	0	0	0	0	0	0	0	0	0	0	
1975	N	39	31	31	20	25	19	30	30	26	32	46	53	382
N as % of all		22	18	17	12	14	11	15	18	14	16	21	21	16.9%
Intervention off/on		0	0	0	0	0	0	0	0	0	0	0	0	
1976	N	65	40	30	26	26	22	22	28	26	38	35	58	416
N as % of all		29	20	15	14	16	12	12	14	13	16	16	24	17.0%
Intervention off/on		0	1	1	1	1	1	1	1	1	1	1	1	
1977	N	56	37	37	26	24	22	22	27	25	35	40	49	400
N as % of all		24	20	19	15	13	12	12	16	13	17	17	19	400
Intervention off/on		1	1	1	1	1	1	1	1	1	1	1	1	
1978	N	63	47	50	28	40	31	38	26	37	39	52	55	506
N as % of all		22	19	21	14	20	16	20	13	17	17	20	22	18.7%
Intervention off/on		0	0	0	0	0	0	0	0	0	0	0	0	

*off = 0
on = 1

Table 22 shows VTM (and Turning Vehicle) crashes for Spanish pedestrians and/or drivers in Los Angeles. For each year shown in this Table, the first line of data, denoted as "N," shows the monthly total number of VTM plus Turning Vehicle accidents involving a Spanish pedestrian and/or a Spanish driver. The second line shows this "N" expressed as a percentage of all accidents for that month involving a Spanish pedestrian and/or driver. The third line again shows the intervention series. Excluded from this Table are all crashes which did not involve a pedestrian who was less than 10 years old. The resulting time series model based on the percentage data was:

$$Y_t = -3.13X_t + \frac{(1-.91695B^{12})}{(1-B^{12})} a_t$$

Unlike previous models, the X_t coefficient in this model is statistically significant. It may be interpreted as a 3.06 percentage point reduction in Hispanic involvement in VTM accidents during the program period. In other words, the actual mean of 17.78% accidents without the program, dropped to 14.65% (17.78 - 3.13) with the program for almost an 18% accident reduction.

In summary, accident reduction for Multiple Threat accidents in Los Angeles was not expected based on the exposure and survey data reported earlier. Similarly, overall accident reduction for VTM accidents in San Diego and Los Angeles was not likely. Thus, it was not surprising to find that none of these data sites produced significant findings. However, accident reduction could reasonably have been expected for VTM crashes involving Hispanics in Los Angeles. The results for Hispanic pedestrian and driver VTM involvements in Los Angeles did show statistically significant crash reduction of approximately 18%.

Table 22. Los Angeles VTM and Turning Vehicle Accidents by Month (N and %) Involving a Spanish Surname Driver and/or Pedestrian for Pedestrian Ages 10 and Older

		J	F	M	A	M	J	J	A	S	O	N	D	Total
1973	N	15	10	14	8	3	6	8	7	6	16	13	14	120
N as % of all		28	20	29	16	6	14	18	14	11	21	16	23	18.1%
Intervention off/on*		0	0	0	0	0	0	0	0	0	0	0	0	
1974	N	18	13	9	8	6	12	12	10	7	11	15	11	132
N as % of all		24	24	17	17	16	20	25	18	17	18	21	14	19.3%
Intervention off/on		0	0	0	0	0	0	0	0	0	0	0	0	
1975	N	10	9	12	6	8	4	10	9	7	11	11	23	120
N as % of all		23	17	22	11	14	7	16	15	12	19	14	27	16.9%
Intervention off/on		0	0	0	0	0	0	0	0	0	0	0	0	
1976	N	18	14	10	9	9	8	2	6	7	10	8	13	114
N as % of all		28	24	18	14	20	12	4	11	10	14	11	16	15.0%
Intervention off/on		0	1	1	1	1	1	1	1	1	1	1	1	
1977	N	13	10	9	9	8	9	5	5	6	8	14	12	108
N as % of all		22	17	17	17	12	16	9	9	10	13	16	13	14.2%
Intervention off/on		1	1	1	1	1	1	1	1	1	1	1	1	
1978	N	20	20	14	8	8	9	15	6	14	9	19	19	161
N as % of all		21	24	19	12	12	15	19	9	16	12	21	19	16.8%
Intervention off/on		0	0	0	0	0	0	0	0	0	0	0	0	

*off = 0
on = 1

VI. CONCLUSIONS

The preceding chapters have presented a complete picture of the field test of the adult pedestrian safety messages directed at the Vehicle Turn/Merge and Multiple Threat accident types. The specific responses of the test audiences in terms of exposure, knowledge and behavioral change and accident reduction were examined. In addition, as reported in Volume II, a similar in-depth analysis was conducted of pedestrian safety messages aimed at young children (the "Willy Whistle" program). Taken together, these findings lead to several conclusions about the adult materials.

A. Exposure

It is generally agreed that TV and radio spot announcements ("commercials") must achieve a minimum amount of exposure before they can be expected to be effective. However, there is no widely accepted criterion for paid commercial advertising, and there certainly is no validated benchmark for public service announcements (PSAs) such as the ones tested in this study. As described in Chapter II, every attempt was made within this study to enhance the exposure the messages received by establishing and maintaining personal contacts with the media in the two test cities. It is believed that this "personalization" did, in fact, increase exposure significantly over what would have been obtained if the messages had been mailed to the stations. Nevertheless, the VTM and MT messages received poor exposure both when judged in absolute terms and when viewed relative to the response to the child-oriented materials. Moreover, much of the exposure received was likely for the Spanish language VTM materials, which, based on the results of the knowledge survey, clearly showed superior results to their English language counterparts.

Follow-up discussions with the public service directors of the television stations in the two test cities indicated several reasons for the exposure profile observed. First, contrary to popular belief, TV and radio stations do not have an absolute requirement placed on them by the Federal Communications Commission (FCC) to broadcast PSAs. Rather, they are under an obligation to provide significant services to their communities and to demonstrate their community service at the time they apply for a renewal of their license. Typically, stations "promise" the FCC that they will devote a certain amount of broadcast time to public service announcements. The FCC will then examine their "promise" versus their "performance" when their license is up for renewal.

Given the need to fulfill their pledge to present PSAs, stations will typically attempt to broadcast public service materials in ways which least reduce their advertising revenues and/or most promote their image in the local community. Thus, stations will attempt to air PSAs during times of the day when they cannot sell all of the available advertising time. This makes the early morning hours of children's programming "prime" time for PSAs and helps explain the greater exposure received by the Willy Whistle materials distributed during this study (see Volume II).

Stations will also give preference to local campaigns such as charity fund raising, promoting crisis intervention services or announcing local events. It must be remembered that it is very helpful to a station to have local citizens praise it at renewal time, and, conversely, local opposition can be extremely damaging. Clearly, the local citizens promoting these types of messages are of greater importance to the station's renewal chances than state or federal level distributors of public service materials.

A second factor which played a major role in determining the exposure the adult materials received was the availability of Spanish language versions. Surprisingly, these Spanish materials were requested and used by stations whose regular programming was in English as well as those which broadcast exclusively in Spanish. Again, the stated rationale related to serving the local community. Both San Diego and Los Angeles have large Spanish speaking populations. Therefore, even the English language stations want some Spanish language or, preferably, multi-lingual presentations. The 30 second VTM spots produced by this study were perfect for this use. Rather than playing one 60 second spot, several station public service directors said they would program the 30 second English and Spanish versions sequentially to obtain a bi-lingual presentation.

A third exposure factor related to the quality of the messages. Several stations admitted that, even with the personal delivery of the spots employed by this study, they would not have played the materials if they had not been of high quality. However, they found the VTM and MT materials to be equivalent in production values to many of the spots used by paid advertisers and certainly superior to much public service advertising which is usually produced on a low or non-existent budget.

Finally, the VTM and MT messages were not only competing with local PSAs directed at adults, but they also came up against other NHTSA materials, particularly on alcohol, which were distributed directly from Washington. Even though the stations were given data on the local pedestrian accident problem and the importance of the messages, they were only willing to allocate a limited amount of air-time to the global topic of highway safety. Therefore, any air-time given the alcohol spots and any materials received from other national sources of PSAs on highway safety detracted from the exposure of the VTM and MT materials.

From the data collected and the anecdotal information provided by the stations, it must be concluded that neither the VTM or Multiple Threat messages received sufficient exposure to constitute a "fair" test of their effectiveness. Even accounting for the likely understatement of the actual exposure because the monitoring service used did not monitor Spanish language materials and reporting from some TV and all radio stations was incomplete or missing, a relatively small percentage of the target population was likely exposed to the materials even once. Repeat exposures, which are generally desirable to convey a message were probably almost non-existent.

It may be argued that the ability of the materials to garner exposure was an inherent part of the field test. Hence, the inevitable conclusion would be that the materials were "ineffective" as pedestrian accident countermeasures. However, there was some encouraging evidence from the Los Angeles results among people with Spanish surnames that the messages were capable of reducing accidents if their exposure reached even modest levels. Thus, it seems reasonable to separate the assessments of the messages themselves from the evaluation of the total message system. Clearly, the VTM and MT messages as developed and produced in this study did not receive widespread exposure. It is concluded that this lack of exposure was instrumental in limiting the effectiveness of the messages in improving safety knowledge, altering behavior and reducing accidents. It is not, however, a necessary consequence of this conclusion that the messages would not be effective if given greater exposure nor that such exposure could not be obtained. Several methods of distribution which might enhance exposure include:

- "Localizing" the spots by obtaining a sponsor in each community who would promote exposure and might even pay for air-time
- Adding more materials in other media, e.g., print, to supplement the limited time available in the broadcast media and, perhaps, even create a "demand" for the spots
- Actually buying time on a pre-arranged basis--even if time were purchased at prevailing non-prime time rates, the messages might prove cost effective with a relatively small accident reduction given the relatively high cost to society of pedestrian injury accidents

Several of these approaches were tried with varying degrees of success in the Urban Pedestrian Safety Demonstration Project conducted in Dade County, Florida (c.f., Madiero, Thompson and Goodman, 1982).

B. Knowledge

The results with respect to exposure and the conclusions just presented suggest little possibility of major knowledge, behavior or accident changes attributable to the messages. There were, however, certain specific findings with respect to knowledge, behavior and accidents which were sufficiently unambiguous to lead to conclusions.

The results presented in Chapter III showed a greater knowledge gain and more specific recall of the materials among Spanish speaking respondents than among those whose primary language was English. This was not surprising given the exposure results previously presented. However, most of the knowledge gains were observed during the interim measure and had dissipated by the time of the final survey. From these results, it is reasonable to conclude that there was little reinforcement available to members of the target audience. The low exposure greatly limited the possibility of seeing any of the messages more than once. This, in turn, led to the rapid decay of recall of the specific information or of the spots themselves. Simply, without a reminder most people will forget specific advice heard only once, and, even if they remember the advice on a single exposure, they will likely forget its source.

C. Behaviors

The results with respect to behavioral change tend to strengthen the conclusion that there was some learning among target audience members despite limited exposure. While observed knowledge gains tended to dissipate by the time of the final measure, measured pedestrian behavior improvement did not. Thus, it is not unreasonable to conclude that pedestrians exposed to the messages understood them and added the suggested behaviors to their repertoire. It must be noted, however, that the absolute magnitude of observed pedestrian behavioral change was small and therefore not inconsistent with the limited exposure the messages received.

It must also be concluded that covert, in situ measures of driver behaviors in situations such as those which lead to VTM and MT accidents is extremely difficult. The measurement paradigm employed clearly did not work. Observers were simply not capable of discerning the subtle driver behaviors referenced by the messages. Moreover, the detailed analysis presented in Appendix B which attempted to uncover alternative measurement schemes failed to produce a viable substitute for the methods used. It would therefore seem reasonable to suggest that any future similar efforts avoid attempting to measure naturally occurring driver search behaviors. Unless a controlled experiment is possible, e.g, using an eye marker camera or similar apparatus, resources devoted to measuring driver behavior would likely be wasted. This is not to suggest, however, that all attempts to convey search messages to drivers be abandoned because of the inability to measure the driver's behavioral response. It simply means that other intermediate measures of effectiveness will have to be developed or, alternatively, the focus of evaluative attention will have to be placed primarily on accident data.

D. Accidents

The results presented in Chapter V lead to the inevitable conclusion that the VTM and Multiple Threat messages did not result in overall accident reductions in the two test cities. Certainly, no effect even approaching the reduction seen for the Willy Whistle child-oriented materials (see Volume II) was uncovered. Further, the failure of the materials to yield city-wide accident reductions in the target types must be attributed primarily to the poor exposure they received.

The accident findings were not, however, all negative. There was a statistically significant reduction of VTM accidents among individuals with Spanish surnames in Los Angeles. This result is considered to be "real," i.e., not a statistical artifact, because of the known greater exposure the Spanish materials received in the Los Angeles test market. It must therefore be concluded that the materials demonstrated potential effectiveness because a significant accident reduction was seen in the target audience which received the greatest exposure. Moreover, in spite of the absence of quantitative measures of the extent of the exposure received by the Spanish language materials, the survey results suggest that it was small in terms of absolute numbers of plays. To be sure, exposure of the VTM messages in Spanish must have been far greater than the exposure of the English versions. Nevertheless, the actual air-time was probably relatively small.

The fact that an accident reduction was obtained with relatively (compared to the child materials, for example) low exposure, is encouraging. Above all, it suggests that the problems of obtaining "sufficient" exposure for adult PSAs is not insurmountable. An increase in exposure of the English language materials to the level received by the Spanish versions might have been sufficient to yield a significant accident reduction. This relatively small degree of exposure improvement is almost certainly attainable within the resources of future public education programs. However, further research is clearly needed to uncover the most cost effective ways to promote such additional message exposure.

REFERENCES

Blomberg, R.D. and Preusser, D.F. Identification and Test of Pedestrian Safety Messages for Public Education Programs. Dunlap and Associates, Inc. Final report to the National Highway Traffic Safety Administration, March 1975. Available NTIS, DOT HS-801 457.

Box, George E.P. and Jenkins, G.M. Time Series Analysis: Forecasting and Control. San Francisco, CA: Holden-Day, Inc., 1976.

Knoblauch, R.L. Urban Pedestrian Accident Countermeasures Experimental Evaluation. Silver Springs, MD: Operations Research, Inc., 1975. U.S. Department of Transportation Contract DOT-HS-190-480.

Knoblauch, R.L. and Knoblauch, B.D. Urban Pedestrian Accident Data Base. BioTechnology, Inc. Final Report to the National Highway Traffic Safety Administration, July 1976, under Contract No. DOT-HS-190-2-480.

Madiero, E., Thompson, D. and Goodman, R. An Urban Pedestrian Safety Demonstration Project. Volume IV. Adult Analytic Report. Public Works Department, Miami, FL. Final Report to the National Highway Traffic Safety Administration, November 1982. Contract No. DOT-HS-8-018808.

McCleary, R. and Hay, R.A., Jr. Applied Time Series Analysis for the Social Sciences. Beverly Hills, CA: Sage Publications, Inc., 1980.

Snyder, M.B. and Knoblauch, R. Pedestrian Safety: The Identification of Precipitating Factors and Possible Countermeasures. Vols. I & II. Contract No. DOT-FH-11-7312, January 1971. PB 197 749.

APPENDIX A.

Message Scripts

PEDESTRIAN SAFETY TV SPOT #9
Turn/Merge - Pedestrian POV
Intersections :60 (Also translated into Spanish)

1.	CLOSE ON: AN AVERAGE-LOOKING MAN ON CRUTCHES.	MAN(SYNC): What could I do?
2.	EXT STREET CORNER. COMMERCIAL TYPE SETTING. MAN IS STANDING ON CORNER WAITING TO CROSS. HE LOOKS AROUND CAREFULLY, STEPS DOWN INTO THE STREET. A CAR, WAITING TO MAKE A RIGHT TURN, IS STOPPED.	MAN(VO): I waited to cross.
3.	POV MAN: AS THE CAR SWINGS AROUND THE CORNER, MAKING A RIGHT TURN. IT COMES UP TO FULL SCREEN. FREEZE. IT HITS HIM.	MAN(VO): I was sure he saw me. What could anyone do?
4.	CLOSE ON: ATTRACTIVE WOMAN IN A HOSPITAL BED. (TRACTION, FROM AN ORTHOPEDIC INJURY.)	WOMAN(SYNC): What would you have done?
5.	EXT. STREET CORNER. COMMERCIAL TYPE SETTING. FULL SHOT: WOMAN STANDING ON CORNER, WAITING TO CROSS. SHE LOOKS AROUND CAREFULLY, AND FROM WHAT SHE (AND THE CAMERA) CAN SEE, IT LOOKS LIKE A PERFECTLY SAFE SITUATION. A CAR, ABOUT TO MAKE A LEFT TURN, IS STOPPED. NO LIGHTS OR SIGNS VISIBLE.	WOMAN(VO): The car was stopped. I was standing there waiting to cross.
6.	POV WOMAN: AS THE CAR THAT HAD BEEN STOPPED MAKES A LEFT TURN AND COMES UP TO FILL THE SCREEN. FREEZE. IT HIT HER.	WOMAN(VO): I thought he would wait.
7.	CLOSE UP: WOMAN IN HOSPITAL BED.	WOMAN(SYNC): What would you have done?
8.	WILD EXT. STREET. LOW ANGLE PAN WITH A CAR APPROACHING CAMERA. HOLD AS IT COMES IN FULL (TO PUT THE CAMERA INSIDE).	NARR(VO): First, remember that drivers making turns have a lot to watch out for ...

9.	FLUTTER CUT: CUT TO ONCOMING TRAFFIC SEVERAL TIMES. TO SHOW SOME OF THE THINGS A DRIVER HAS ON HIS MIND WHEN MAKING A LEFT TURN: OTHER TRAFFIC, PEDESTRIANS, ETC. ESTABLISH GAP. INSERT: DRIVER'S FOOT MOVES FROM BRAKE TO GAS PEDAL. PEDESTRIAN'S FOOT LEAVING CURB.	NARR(VO): ... and they may not see you ...
10.	POV DRIVER: AS HE COMPLETES THE TURN (TYPICAL LEFT TURN MERGE) AND A PEDESTRIAN STEPS OUT IN FRONT OF HIM.	
11.	INSERT: DRIVER'S FOOT HITS THE BRAKES, <u>HARD</u>.	SOUND: SCREECH OF BRAKES.
12.	POV DRIVER: PEDESTRIAN HAS STEPPED OUT RIGHT IN FRONT OF THE CAR. CAR HITS PEDESTRIAN.	NARR(VO): ... until it's too late.
13.	POV CAMERA: FROM THE CURB, LOOKING AT A CAR THAT'S STARTING A TURN.	NARR(VO): ... when a car's headed your way, ask yourself if the driver sees you. Learn to ...
14.	LONG LENS CLOSE UP OF DRIVER: THE SHOT IS FRAMED SO THAT THE DRIVER IS FEATURED, NOT THE CAR. THE DRIVER IS NOT LOOKING AT THE PEDESTRIAN. ESTABLISH EYE CONTACT.	NARR(VO): ... look at the driver, not just the car.
15.	POV CAMERA: LOOKING AT THE DRIVER, AS THE CAR SLOWS DOWN AND STOPS AND THE CAMERA CROSSES THE STREET. ESTABLISH EYE CONTACT.	NARR(VO): The <u>car</u> won't stop unless the <u>driver sees</u> you.
16.	INT. CAR. POV DRIVER: AS HE STARTS UP TO THE TURN.	NARR(VO): When crossing at a corner, remember that ...

17. FLUTTER CUT: POV DRIVER: MUCH BUSY-NESS.	NARR(VO): ... a driver making a turn has a lot on his mind. So ...
18. POV PEDESTRIAN: CAR STARTING TO TURN RIGHT. DRIVER SEES THE PEDESTRIAN, STARTS TO SLOW DOWN.	NARR(VO): ... look at the driver, not just the car.
19. POV PEDESTRIAN: CENTERING ON THE DRIVER OF A CAR MAKING A LEFT TURN. HE SEES THE PEDESTRIAN, SLOWS DOWN AND STOPS.	NARR(VO): It's one good way to avoid accidents and you make it work.
20. D.O.T. LOGO.	

PEDESTRIAN SAFETY TV SPOT #9A
Turn/Merge
Intersections :30 (Also translated into Spanish)

1.	POV CAMERA: FROM THE CURB LOOKING AT A CAR THAT'S STARTING A LEFT TURN.	NARR(VO): When a car's headed your way, ask yourself ...
2.	POV CAMERA. NEW ANGLE: FROM POV PEDESTRIAN CROSSING THE STREET. THE CAR KEEPS COMING. ON CUE, MAN JUMPS BACK.	NARR(VO): ... if the driver sees you. Learn to ...
3.	POV CAMERA. LONG LENS CLOSE UP OF DRIVER, LOOKING AT ANOTHER CAR, MAKING THE SAME LEFT TURN (FROM AS FAR AWAY AS THE INSTRUCTION WILL MAKE SENSE). THE SHOT IS FRAMED SO THAT THE DRIVER IS <u>NOT</u> LOOKING AT THE CAMERA. THE CAMERA MOVES BACK AND THE CAR GOES BY.	NARR(VO): ... look at the <u>driver</u>, <u>not</u> <u>just</u> <u>the</u> <u>car</u>.
4.	FLUTTER CUT: INSIDE A CAR, DRIVER POV, TO SHOW ALL THE THINGS HE HAS TO THINK ABOUT (AND THAT CAN DISTRACT HIM) WHEN HE'S ABOUT TO MAKE A TURN.	NARR(VO): Remember that drivers making turns have a lot to watch out for and may not see you.
5.	POV CAMERA: LOOKING AT THE DRIVER AS THE CAR SLOWS DOWN AND STOPS. THE CAMERA CROSSES THE STREET. ESTABLISH EYE CONTACT.	NARR(VO): ... the <u>car</u> won't stop unless the <u>driver</u> <u>sees</u> you.
6.	FLUTTER CUT: DRIVER POV. LOTS OF BUSY-NESS.	NARR(VO): A driver making a turn has a lot on his mind. So ...
7.	CLOSE, POV PEDESTRIAN: CAR STARTING A LEFT TURN. THE DRIVER SEES THE PEDESTRIAN AND STARTS TO SLOW DOWN.	NARR(VO): ... look at the driver, not just the car.

8. POV PEDESTRIAN: AS THE CAR STOPS, AND THE PEDESTRIAN CROSSES, THEY EXCHANGE SMILES.

NARR(VO): It's one good way to avoid accidents and you make it work.

9. D.O.T. LOGO.

PEDESTRIAN SAFETY TV SPOT #10
Turn/Merge - Driver POV
Intersections :60 (Also translated into Spanish)

1. EXT. STREET NEAR INTERSECTION. LOW ANGLE. BODY ON STREET IN FRONT OF CAR.	#1: Why did he get hit? #2: Driver distraction ...
2. MODEL STREET. SHOWING AN INTERSECTION. SHIRT-SLEEVED ARM BRINGS IN A MODEL MAN, SETS IT ON THE CURB AND THEN MOVES IT OUT INTO THE STREET.	#1: Driver distraction? #2: He's here, at an intersection. Steps out to cross ...
OTHER HAND BRINGS IN A MODEL CAR, STOPS AND MAKES IT TURN AND CORNER (LEFT TURN) AND HITS THE MODEL MAN.	#2: Car makes a left turn. Hits him. #1: What distracted the driver?
3. FLUTTER CUT: ONCOMING TRAFFIC SHOWING ALL THE THINGS THAT CAN CONTRIBUTE TO A DRIVER'S DISTRACTION: CARS COMING, GOING STRAIGHT, TURNING, PRETTY GIRL CROSSING, OTHER PEDESTRIANS, ETC.	#2: All the things he had to look out for. He checked, but at the final second, forgot to take a last look ...
4. INTERIOR CAR. DRIVER'S POV. AS THE CAR TURNS LEFT, A PEDESTRIAN STEPS IN FRONT OF IT. (HASN'T A CHANCE.) FREEZE AND HOLD.	#2: ... for pedestrians.
5. EXT. STREET NEAR INTERSECTION. LOW ANGLE. A BODY LYING IN THE STREET. POSITION INDICATES THAT VICTIM WAS HIT DURING A RIGHT TURN. LEGS AND FEET OF PEOPLE STANDING AROUND.	#1: What happened here? #2: Driver distraction.

6. MODEL STREET. SHOWING AN INTERSECTION. HAND BRINGS IN A MODEL WOMAN, SETS IT ON THE CURB AND THEN MOVES IT OUT INTO THE STREET. OTHER HAND BRINGS IN A MODEL CAR, MAKES A RIGHT TURN, HITS WOMAN.	#2:	She's at an intersection. Steps out to cross. Car makes a right turn. Hits her.
7. FLUTTER CUT: SHOWING SOME OF THE THINGS THAT DISTRACT A DRIVER MAKING A RIGHT TURN. IT IS EASY TO SEE WHY HE IS DISTRACTED.	#1:	What distracted the driver?
	#2:	Everything. At the final second he forgot to take a last look ...
8. INTERIOR CAR. DRIVER'S POV. AS CAR COMPLETES HIS RIGHT TURN. A PEDESTRIAN STEPS OUT INTO THE STREET, RIGHT IN FRONT OF THE CAR. HE HASN'T A CHANCE. FREEZE AND HOLD.	#2:	... for pedestrians.
9. EXT. STREET: LOOKING TOWARD CURB, SEE CAR STOP TO LET A MALE PEDESTRIAN CROSS TO THE CAMERA. A CAR COMPLETES THE RIGHT TURN.	#1:	How come he didn't get hit?
	#2:	Simple. The driver checked, took a last look for pedestrians.
10. EXT. STREET. WOMAN AT CURB READY TO CROSS.	#1:	How about her?
11. FLUTTER CUT: SOME OF THE MANY THINGS THAT CAN DISTRACT A DRIVER MAKING A LEFT TURN.	#2:	The driver checked ...
12. INTERIOR CAR. DRIVER'S POV. HIS "LAST LOOK." SEES THE WOMAN AND STOPS, CLEARLY AVOIDING THE ACCIDENT.	#2:	... took a last look for pedestrians.
	#1:	How effective is that last look for pedestrians?

#2: Very. It's one good way ...

#2: ... to avoid accidents and you make it work.

13. MEDIUM CLOSE: THE DRIVER AND THE GIRL EXCHANGE SMILES.

13a. HE COMPLETES TURN.

14. D.O.T. LOGO.

PEDESTRIAN SAFETY TV SPOT #10A
Turn/Merge - Drive POV
Intersections :30 (Also translated into Spanish)

1.	EXT. STREET NEAR INTERSECTION. LOW ANGLE: BODY ON STREET NEAR A CAR. ZOOM IN FULL ON STRETCHER.	#1: Why did he get hit? #2: Driver distraction ...
2.	MODEL STREET. SHOWING AN INTERSECTION. SHIRT-SLEEVED ARM BRINGS IN A MODEL MAN, SETS IT ON THE CURB AND THEN MOVES IT OUT INTO THE STREET. OTHER HAND BRINGS IN MODEL CAR, MAKES IT TURN THE CORNER (LEFT TURN) AND HITS THE MODEL MAN.	#1: Driver distraction? #2: He's here, at an intersection. Steps out to cross ... #2: ... car makes a left turn. Hits him.
3.	FLUTTER CUT: CONCENTRATE ON GAP SHOWING ALL THE THINGS THAT CAN CONTRIBUTE TO A DRIVER'S DISTRACTION: CARS COMING, GOING STRAIGHT, TURNING, PRETTY GIRL CROSSING, OTHER PEDESTRIANS, ETC.	#1: What distracted the driver? #2: All the things he <u>had</u> to look out for. He checked, but at the final second, he forgot to take a last look ...
4.	INT. CAR DRIVER'S POV: AS THE CAR TURNS LEFT, A PEDESTRIAN STEPS RIGHT OUT IN FRONT OF IT. HASN'T A CHANCE. FREEZE AND HOLD.	#2: ... for pedestrians.
5.	INT. CAR. DRIVER'S POV: AS HE STARTS MAKING A LEFT TURN, A PRETTY GIRL STARTS TO CROSS.	#1: How about her? #2: The driver checked. Took a last look for pedestrians. #1: How effective is that last look for pedestrians? #2: Very. It's cne <u>good</u> way to ...

6. INT. CAR. DRIVER POV. HE COMPLETES THE TURN, SPOTS PRETTY GIRL AND STOPS JUST IN TIME TO AVOID HITTING HER.

7. MEDIUM CLOSE: THE DRIVER AND THE GIRL EXCHANGE SMILES.

8. D.O.T. LOGO.

#2: avoid accidents and you make it work.

PEDESTRIAN SAFETY TV SPOT #11
MULTIPLE THREAT - POV PEDESTRIAN :60

1. HIGH ANGLE: ACTION AROUND INJURED MAN LYING IN STREET.	#1:	Suppose <u>you</u> tell me why he got hit.
2. MODEL STREET: CROSSWALK MARKED. SHIRT-SLEEVED ARM BRINGS IN A MODEL FIGURE OF A MAN. SETS IT ON THE CURB.	#2:	Very simple. He's here. Here's a crosswalk.
SAME ARM BRINGS IN A MODEL CAR AND STOPS IT IN THE INSIDE LANE.	#2:	Car stops.
SAME ARM MOVES MODEL MAN OUT INTO STREET. OTHER HAND (SAME SHIRT) BRINGS IN A SECOND CAR IN THE SECOND LANE. HITS THE MODEL MAN AS HE CROSSES IN FRONT OF THE STOPPED CAR.	#2:	He steps out. Second driver doesn't see him. Hits him.
	#1:	Why couldn't the driver see him?
3. INT. MOVING CAR: AS IT COMES UP ON A CAR STOPPED IN A TRAFFIC LANE. A PEDESTRIAN BEHIND THE FIRST CAR IS COMPLETELY OBSCURED.	#2:	Could he see <u>you</u>, if you were <u>behind</u> the other car?
4. HIGH ANGLE (LIKE IN A POLICE PHOTO): INJURED WOMAN LYING IN THE STREET NEAR AN INTERSECTION WITH A TRAFFIC LIGHT. PURSE IS CRUMPLED NEAR BODY.	#1:	How did she get hit?
5. MODEL STREET: SHOWING AN INTERSECTION. SAME HAND BRINGS IN A MODEL OF A WOMAN AND PLACES IT ON THE CURB.	#2:	She's here.
SAME HAND PLACES A MODEL CAR AT THE STOP LINE IN THE INSIDE LANE.	#2:	Car is stopped. Traffic starts to move.
SAME HAND MOVES THE MODEL WOMAN OUT INTO THE STREET.	#2:	She steps out.

	OTHER HAND, SAME SHIRT, BRINGS IN MODEL CAR IN SECOND LANE AND HITS MODEL WOMAN.	#2: She doesn't see the second car. It hits her.
6.	CUTS LIVE ACTION, PEDESTRIAN POV: TO SHOW WHAT THE ACCIDENT LOOKED LIKE AS THE SECOND CAR COMES ROARING UP.	#1: Why couldn't she see it? #2: Could <u>you</u> if you were behind the stopped car?
7.	EXT. CROSSWALK: LOW ANGLE EFFECT SHOT: MAN STEPS UP ONTO THE SIDEWALK AFTER HAVING CROSSED THE STREET. TRAFFIC IS MOVING BEHIND HIM.	#1: He made it. #2: Sure.
8.	MODEL STREET CROSSWALK: SAME HAND PUTS MODEL MAN IN POSITION TO CROSS.	#2: He's here, at ...
	HAND INDICATES THE CROSSWALK.	#2: ... a crosswalk.
	HAND BRINGS IN A MODEL CAR AND STOPS IT INSIDE THE LANE, AT THE CROSSWALK.	#2: Car stops.
	HAND MOVES THE MODEL MAN OUT TO A POSITION IN FRONT OF THE STOPPED CAR.	#2: He steps out. Stops. Looks around the stopped car.
9.	CLOSE SHOT: POV PEDESTRIAN AS HE LOOKS AROUND THE CAR. A SECOND CAR WHIZZES PAST HIM. (THE SHOT SHOULD TELL THE WHOLE STORY - PARTS OF THE STOPPED CAR COMING IN HARD AND MAYBE EVEN A FLINCH).	#1: Can he see the other car coming? #2: Couldn't you?
10.	EXT INTERSECTION: A WOMAN LOOKS AROUND A CAR THAT IS STOPPED IN THE INSIDE LANE AND WAITS UNTIL A CAR IN THE OUTSIDE LANE PASSES BEFORE SHE STARTS TO CROSS.	#1: How about her? #2: O.K.

11.	MODEL STREET (INTERSECTION): SAME HAND BRINGS IN A MODEL OF A WOMAN AND SETS IT DOWN ON THE SIDEWALK.	#2: She's here. Car is stopped.
	SETS A MODEL CAR DOWN IN THE CORRECT POSITION FOR HAVING STOPPED AT A LIGHT.	#2: Traffic is about to move.
	HAND MOVES THE MODEL WOMAN OUT IN FRONT OF THE STOPPED CAR AND LEAVES IT THERE.	#2: She steps out. Stops. Looks around the stopped car.
12.	INTERSECTION: WOMAN FROM #10 IS ABOUT TO CROSS. CAR IS STOPPED IN THE INSIDE LANE. SHE GOES OUT IN FRONT OF IT, STOPS, LOOKS AROUND IT, SEES A CAR COMING, WAITS TILL IT PASSES AND THEN CROSSES.	#2: When you cross in front of a stopped car; you stop and look for what's coming in the next lane. It's one good way to avoid accidents and you make it work.
13.	D.O.T. LOGO.	

PEDESTRIAN SAFETY TV SPOT #11A
MULTIPLE THREAT - PEDESTRIAN POV
Crosswalk :30

1.	HIGH ANGLE: INJURED MAN LYING IN STREET, NEAR A CROSSWALK. ACTION AROUND BODY.	#1: Suppose you tell me why he got hit?
2.	MODEL STREET: CROSSWALK MARKED. SHIRT-SLEEVED ARM BRINGS IN A MODEL FIGURE. A MAN. SETS IT ON THE CURB.	#2: Very simple. He's here. Here's a crosswalk.
	SAME ARM BRINGS IN A MODEL CAR AND STOPS IT IN THE INSIDE LANE.	#2: Car stops.
	SAME ARM MOVES MODEL MAN OUT INTO STREET. OTHER HAND BRINGS IN A SECOND CAR IN THE SECOND LANE. HITS THE MODEL MAN AS HE CROSSES IN FRONT OF THE STOPPED CAR.	#2: He steps out. Second driver doesn't see him. Hits him. #1: Why couldn't the driver see him?
3.	INSIDE A MOVING CAR: AS IT COMES UP ON A CAR STOPPED IN THE FIRST TRAFFIC LANE. A PEDESTRIAN BEHIND THE FIRST CAR IS COMPLETELY OBSCURED.	#2: Could he see you?
4.	EXTERIOR INTERSECTION: A WOMAN PEERING AROUND A CAR THAT IS STOPPED IN THE INSIDE LANE.	#1: How about her? #2: Okay ...
5.	MODEL STREET INTERSECTION. HAND BRINGS IN A MODEL OF A WOMAN AND SETS IT DOWN ON THE SIDEWALK.	#2: ... She's here. Car is stopped ...
	HAND SETS A MODEL CAR DOWN IN THE CORRECT POSITION FOR HAVING STOPPED AT A LIGHT.	#2: ... traffic is about to move.
	HAND MOVES THE MODEL WOMAN OUT IN FRONT OF THE STOPPED CAR AND LEAVES IT THERE.	#2: She steps out. Stops. Looks around the stopped car.

6. INTERSECTION: THE WOMAN CONTINUING THE ACTION FROM SCENE 5. A SECOND CAR PASSES.	#2:	When you cross in front of a stopped car, stop and look for what's coming in the next lane.
	#2:	It's one good way to avoid accidents and you make it work.
7. D.O.T. LOGO.		

PEDESTRIAN SAFETY TV SPOT #12
MULTIPLE THREAT - POV DRIVER
Crosswalk :60

1.	TIGHT GROUP: CENTERED AROUND A DISTRAUGHT WOMAN. HER CAR HAS JUST STRUCK AND BADLY INJURED A PEDESTRIAN, BUT NOTHING OF THE ACCIDENT CAN BE SEEN. POLICEMAN IN FOREGROUND, BUT NOTHING CAN BE SEEN OF HIM EXCEPT UNIFORM OUTLINE - ENOUGH SO THE CAMERA KNOWS WHO HE IS.	WOMAN(SYNC): ... It was awful!
2.	POV DRIVER. INT. CAR. CAR IS APPROACHING CLEARLY-MARKED CROSSWALK IN THE SECOND LANE FROM THE CURB. ANOTHER CAR IS STOPPED AT THE CROSSWALK. NO TRAFFIC LIGHT IS VISIBLE.	WOMAN(VO): It was awful! I was driving along, and this car was stopped. I thought he was going to start up again ... and then ...
	ADULT PEDESTRIAN WALKS OUT FROM BEHIND THE STOPPED CAR. FREEZE ON MOVEMENT TO MAKE HIM A BLUR. SHOT IS SET UP SO THAT IT'S OBVIOUS HE HASN'T A CHANCE.	WOMAN(VO): ... all of a sudden ...
3.	TIGHT GROUP: CENTERED AROUND A HIGHLY OVERWROUGHT MAN WHO HAS JUST BADLY INJURED A PEDESTRIAN IN A CROSSWALK ACCIDENT. POLICEMAN IN FOREGROUND; NO DETAIL OF UNIFORM.	MAN(SYNC): Sorry, I didn't mean it. I ... it was terrible! I ...
4.	POV DRIVER. INT. CAR APPROACHING INTERSECTION: CAR IS STOPPED IN CURB LANE. THE LIGHT, WHICH CAN JUST BE SEEN, IS RED.	MAN(VO): There was this car, stopped at this light ...
5.	CLOSE SHOT POV DRIVER: TRAFFIC LIGHT CHANGES FROM RED TO GREEN.	MAN(VO): ... then the traffic started and ...
6.	POV DRIVE: CAR IS STILL MOVING, THE OTHER CAR STILL STOPPED AT CURB.	MAN(VO): I didn't see anybody coming, so I kept going.

6.	(CONTINUED)	
	A YOUNG WOMAN WALKS OUT FROM BEHIND THE STOPPED CAR. FREEZE HER IN MOTION, ZOOM IN FAST. DON'T HIT HER, BUT MAKE IT CLEAR THAT SHE'S GOING TO BE HIT.	SOUND: SCREECH OF BRAKES.
7.	BIG HEAD: THE WOMAN.	WOMAN(SYNC): What can you do about it?
8.	BIG HEAD: THE MAN.	MAN(SYNC): How can you avoid a thing like that?
9.	WILD EXT. STREET. PICK UP CAR COMING TOWARD THE CAMERA. PAN WITH IT AS IT COMES IN FULL, TO PUT THE CAMERA INSIDE IT.	NARR(VO): When you see a car stopped between you and the curb,
10.	INT. CAR. POV DRIVER: LOOKING AT A CAR THAT'S STOPPED IN THE INSIDE LANE. FROM FAR ENOUGH AWAY TO AVOID AN ACCIDENT.	NARR(VO): Ask yourself, "Why is he stopped?"
11.	THE CAR SLOWS DOWN AND PROBABLY WILL STOP.	NARR(VO): That car may be hiding a pedestrian who is crossing the street.
12.	CAMERA CAR STOPS, KIND OF SHORT, AND A YOUNG COUPLE WALK OUT FROM IN FRONT OF THE OTHER STOPPED CAR. IF THE DRIVER OF THE CAMERA CAR HADN'T STOPPED, THEY WOULD HAVE BEEN HIT.	NARR(VO): Make it a rule to slow down so you can stop if the car is hiding a pedestrian.
13.	INT CAR: SAME DRIVER, FULL PROFILE, BUT SEEING OUT FRONT AS THE CAR APPROACHES ANOTHER CAR THAT IS STOPPED ON THE INSIDE LANE AT A CROSSWALK AND SLOWS DOWN.	NARR(VO): ... especially at crosswalks ...

14. INT CAR: FULL PROFILE OF DRIVER BUT STILL SEEING OUT FRONT AS HE APPROACHES AN INTERSECTION WITH A RED LIGHT AND A CAR STOPPED ON THE INSIDE LANE. HE SLOWS DOWN.

NARR(VO): ... or near an intersection ...

15. EXT. INTERSECTION: ANGLE FEATURING THE STOPPED CAR AND THE TRAFFIC LIGHT AS IT CHANGES FROM RED TO GREEN.

NARR(VO): ... or when a light changes.

16. LOW FRONT ANGLE: PAST THE GRILL OF THE STOPPED CAR. ANOTHER CAR IN THE OUTSIDE LANE PULLS IN AND STOPS AS A WOMAN PASSES IN FRONT. IF THE SECOND CAR HADN'T STOPPED, SHE WOULD HAVE BEEN HIT.

NARR(VO): When passing a stopped car, slow down. Prepare to stop. It's one <u>good</u> way to avoid accidents and you make it work.

17. D.O.T. LOGO.

PEDESTRIAN SAFETY TV SPOT #12A
MULTIPLE THREAT - DRIVER'S POV
Crosswalk :30

1. INSIDE A CAR APPROACHING CROSS-WALK. ANOTHER CAR IS STOPPED ON THE INSIDE LANE. THE CAMERA CAR STOPS SHORT AND A YOUNG COUPLE WALK OUT FROM IN FRONT OF THE OTHER STOPPED CAR. IF WE HADN'T STOPPED, THEY WOULD HAVE BEEN HIT.	NARR: When you see a car stopped between you and the curb, ask yourself, "Why is he stopped?" The car may be hiding a pedestrian who is crossing the street.
2. YOUNG COUPLE CROSS THE STREET AT A CROSSWALK.	NARR: Make it a rule to slow down so you can stop if the car is hiding a pedestrian especially at crosswalks ...
3. YOUNG WOMAN CROSSES STREET AT INTERSECTION.	NARR: ... or near an inter-section ...
4. ANGLE FEATURING STOPPED CAR AND THE TRAFFIC LIGHT AS IT CHANGES FROM RED TO GREEN.	NARR: ... or when a light changes ...
5. A YOUNG WOMAN WALKS OUT FROM IN FRONT OF THE STOPPED CAR. IF THE CAR HADN'T STOPPED, IT WOULD HAVE HIT HER.	NARR: When passing a stopped car, slow down. Prepare to stop. It's one <u>good</u> way to avoid accidents and you make it work.
6. D.O.T. LOGO.	

PEDESTRIAN SAFETY RADIO SPOT
TURN/MERGE :60

SOUND: CAR ENGINE RUNNING, APPROPRIATE STREET NOISES, ESTABLISH AND UNDER.

PARKER: (STREAM OF CONSCIOUSNESS) Gotta turn left at the next corner ... two way traffic ... no light ... no stop sign ... gotta find a way to get through ... nobody crossing ...

AXR: (OVER PARKER'S SPEECH WHICH CONTINUES UNDER) With all the things a driver has to look out for ... when does he look out for pedestrians?

PARKER: (UP FULL) ... let him pass ... car coming from the right ... let him go ... no cars on the left ... there's my chance, let's do it ... (PANIC) Wait!!

SOUND: SCREECH OF BRAKES. ANGRY HORN.

PARKER: He stepped right in front of me. I almost hit him.

AXR: The driver was lucky. That time.

SOUND EFFECTS

PARKER: (STREAM OF CONSCIOUSNESS) Right at the next corner. No stop sign ... traffic light green ... nobody crossing ... nothing coming from the left ... or right ... all clear ... take one last look for pedestrians. (Suddenly alert) Hold it!!

SOUND: CAR COMES TO A SHORT BUT CONTROLLED STOP.

PARKER: Woman crossing ...

PARKER: (TO HIMSELF. WITH EMPHASIS) If I hadn't taken that one last look, I might have hit her.

AXR: (WITH ENTHUSIASM) That's it ... When you turn at an intersection, check the traffic in all directions, and then ... before going ahead ... take one last look for pedestrians.

<u>SOUND: CAR MAKING A SHORT BUT SLOW STOP</u>

AXR: It's one <u>good</u> way to avoid accidents and you make it work.

AXR: Brought to you as a public service by this station and the National Highway Traffic Safety Administration.

PEDESTRIAN SAFETY RADIO SPOT
Turn/Merge :30

(SOUND: CAR ENGINE AND STREET NOISES IN AND UNDER)

PARKER: (STREAM OF CONSCIOUSNESS) Gotta turn left at the next corner ... no stop sign ... light's green ... nobody crossing ... nothing coming from the left ... or right ... there's my opening ... take one last look for pedestrians. (SUDDENLY ALERT) Hold it ...

SOUND: CAR COMING TO A SHORT BUT SLOW STOP)

PARKER: Woman crossing. (WITH ADDED EMPHASIS) If I hadn't taken that last look, I might have hit her.

AXR: (DECISIVELY) That's the message: Before turning at an intersection, check the traffic in all directions and then ... take one last look for pedestrians.

AXR: It's one good way to avoid accidents and you make it work.

(SOUND: OUT)

AXR: Brought to you as a public service by this station and the National Highway Traffic Safety Administration.

Multiple Threat Radio Spot :60
(SOUND: GENERAL TRAFFIC SOUNDS)

MAN: Well, time for your last driving lesson.

WOMAN: O.K.

MAN: Today you'll learn things even some of the best drivers don't know. (ROAD SOUNDS)

WOMAN: Well, let's go.

MAN: That car stopped between us and the curb; why is it stopped?

WOMAN: Does it matter--we're not in <u>that</u> lane?

MAN: Slow down anyway; that car's stopped at a crosswalk. (SCREECH OF BRAKES--NOT TOO LOUD)

WOMAN: (SHAKEN) There was a pedestrian crossing in front of that stopped car. If I hadn't slowed down, I would've hit him when he stepped out.

MAN: That's right! It's a very common type of accident.

WOMAN: "Oh."

MAN: Anytime you see a car stopped in a traffic lane, ask yourself, "Why is he stopped?" and slow down.

WOMAN: So I can stop if a pedestrian steps out from in front of the stopped car. Right?

MAN: That's the idea. (BACK TO LESSON) Please stay in this lane. (MORE STREET NOISES)

WOMAN: There's a car at the intersection. Why is he stopped?

MAN: That's what you want to know.

WOMAN: So ... I slow down and I'll be able to stop (REACTION--LIGHT SCREECH OF BRAKES) for that pedestrian crossing in front of it.

MAN: It's one <u>good</u> way to avoid accidents, and you make it work. Brought to you as a public service by this station and the National Highway Traffic Safety Administration.

Multiple Threat Radio Spot :30
(SOUND: GENERAL TRAFFIC SOUNDS)

MAN: Your driving lessons are going very well, but even the best drivers can still learn a few things.

WOMAN: O.K.

MAN: Why is that car stopped between us and the curb?

WOMAN: Does it matter--we're not in that lane!

MAN: Slow down anyway; he's stopped at a crosswalk.

(SCREECH OF BRAKES--NOT TOO LOUD)

WOMAN: (SHAKEN) There was a pedestrian crossing in front of that stopped car. If I hadn't slowed down, I would've hit him when he stepped out.

MAN: Right! It's one good way to avoid accidents, and you make it work. Brought to you as a public service by this station and the National Highway Traffic Safety Administration.

APPENDIX B.

VTM Driver Behavior Analysis

A. Introduction

Pedestrian safety message effectiveness is typically evaluated by measuring:

Message Exposure -	was the target audience exposed to the material
Knowledge Gain -	did the target audience learn and understand the recommended safe behavior
Behavioral Change -	did the target audience exhibit the safe behavior appropriately within the naturally occurring roadway situation
Accident Reduction-	was there a reduction in the occurrence of those accident types addressed by the message

Techniques for measuring message exposure and knowledge gain are generally available and generally well understood. Accident reduction is also measureable, but it normally requires an extensive data base and/or an inordinate amount of time to generate the required sample sizes. Even the most common pedestrian accidents are rare events. Thus, given the inherent problems with accident data, it is often critically important to have a valid and reliable measure of behavioral change.

For the most part, the present study had behavioral measures which were sufficiently reliable to support the kinds of analyses required. Unfortunately, this was apparently not the case with respect to the driver behavioral measure for the Vehicle Turn/Merge message. The message advised the driver to take a last look for pedestrians before turning. As discussed in the main body of this report, this behavior was measured by stationing observers at intersections and having them observe head and eye movements of turning drivers. Observers were asked to judge whether or not turning drivers made "eye contact" with them as they stood on the corner, "possible eye contact", "look in their general direction" or whether the driver did not look before turning. It became quite apparent, very early, that the judgment of eye contact could not be made reliably. Drivers wearing sunglasses were impossible to judge and regular glasses, glare or other interference made the task very difficult. Thus, the measure quickly gravitated to simply "look" versus "no look." Even here, however, the data suggested that the reliability among observers was low.

This Appendix describes additional efforts undertaken in an attempt to derive a valid and reliable measure of driver search behavior in turning situations. The measure had to deal with naturally occurring driver turn manuevers. Further, it had to be totally unobtrusive. Thus, approaches such as cameras were out of the question.

The analytic approach taken was to develop a very detailed description of a turning event and attempt to identify measureable aspects of this event which could reasonably be expected to change if more drivers were to adopt the behavior advocated in the Vehicle Turn/Merge safety message. Specifically, detailed analysis of the turn/merge operation was conducted to identify the variables, conditions, decisions and processes that take place when a driver negociates a turn at an intersection. Based on the type and quantity of recorded pedestrian accidents, the left turn from a changing traffic signal was chosen as the sample condition to be examined. The technique used employed an Operational Sequence Diagram (OSD) to study the turning event in a task analytic fashion.

B. Methodology

The Operational Sequence Diagram is a technique used to identify and describe the interrelationships among hardware, software and operators. The OSD accomplishes this description by pictorially displaying information—decision—action sequences of the system during operation. The basic components of the OSD are geometric figures representing various elements of the operational sequence. The symbols and coding most commonly used are as follows:

	=	Receive	S	=	Speech, Sound
	=	Decide	V	=	Visual
	=	Act, Operate	T	=	Touch, Tactual
	=	Inspect, Observe, Check	H	=	Hand, Carry
	=	Store, Hold, File	E	=	Electrical, Electronic
	=	Transmit, Send	M	=	Mechanical, Hydraulic

The system to be described is represented by columns of the OSD form on which the above symbology is applied and interconnected by flow lines. Each column represents a subsystem or component of the overall system and may be hardware, software, or human.

A major advantage of the OSD is that it can be applied at any level of detail depending on the objectives of the analysis. In the present case, the objective was to determine the feasibility of measuring driver behavior, or reliable indicators thereof, with respect to his/her observance of pedestrians during turn/merge driving operations. The system, therefore, is the driver/vehicle combination being acted upon by the external environment which includes traffic signalization, other vehicles, pedestrians, weather, etc. Analysis of this system and its environment resulted in identification of the following variables to be considered for the OSD:

Driver

- Decisions
- Senses (Eyes, Ears, Nose)
- Left Hand
- Right Hand
- Left Foot
- Right Foot

Vehicle

- Steering Wheel Turning
- Pedal Movement—Brake, Clutch, Accelerator
- Lever Movement—Gear, Direction Signal

- Body—Accelerating, Decelerating, Turning
- Wheels—Rolling, Turning (Front), Skidding
- Lights—Directional, Brake
- Engine—RPM Increasing/Decreasing

External

- Signalization—Traffic, Crosswalk (Color Changes, On/Off, Flashing, Arrow, Words)
- Vehicular Traffic—Type (Trucks, Cars, Buses, Motorcycles, Trailers)
  —Direction/Location: Cross, Oncoming, Following, Leading
- Pedestrians—Number, Location, Direction of Movement, Bikes, Mopeds
- Roads—Number of Lanes, Width of Lanes, Surface Type, Lane Markings, Obstructions, Condition (Wet, Ice, Snow, Sandy, Potholes), Protected/Non-Protected
- Visibility—Day/Night, Rain, Snow, Fog, Sun Glare, Street Lights

The driver and vehicle variables represent those with potential for measurement based primarily on detection of movement or change in visual appearance. Decisions cannot be sensed or measured directly but are an integral part of the driving task sequence. The senses have been combined, but only vision appears to present any usefulness to task performance or potential for measurement. Engine RPM was included since it is possible to measure changes in acceleration/deceleration or associated noise level and it might be possible to monitor exhaust gas changes (temperature/pressure).

C. Analysis Discussion

Based on an analysis of pedestrian accidents, the specific turn/merge task chosen was the left turn on a green traffic signal. This vehicle manuever was further developed for analysis by specifying the following initial conditions and assumptions:

Vehicle	Automobile, automatic transmission (in drive), stopped with foot brake on
Driver	Alone in vehicle; uses right foot on accelerator and brake pedal, two hands on steering wheel
Roads	Stopped in left lane of four-lane, two-way road; non-protected turn lane. Turning into four-lane road with cross-walks marked; no obstructions. Surface is asphalt, dry and in good condition
Signalization	Red-Green-Yellow traffic light (no arrow), "WALK/DON'T WALK" pedestrian signal; walk with traffic
Visibility	Daylight, bright sun
Vehicular Traffic	Vehicle is first in line of left lane at traffic light, truck following. On-coming traffic is six vehicles (mixed type) in each lane; first two in left lane making left turn; third and fifth in right lane making right

turn. Spacing to seventh vehicle in right lane is sufficient to make turn. Cross traffic is medium and steady

Pedestrians Several on each corner, moving with pedestrian signals

These initial conditions are reflected on Page 1 of the attached OSD. This page shows the conditions of the driver and vehicle stopped at the traffic light along with all of the external visual factors acting on the driver. Time zero is estabished at the first positive change in external input to the driver. This occurs when the cross traffic light turns yellow, which begins to affect the vehicle cross traffic. It was assumed for this analysis that the cross pedestrian traffic signals were not visible to the driver, otherwise they would have been used as time zero. Following the three-second yellow, the thru-traffic light turns green (Page 2) and the driver notes that the cross traffic has cleared the intersection and the on-coming traffic has begun to move. The driver makes the necessary decisions to release the brakes and move into the intersection. He then stops the vehicle in the intersection with clearances sufficient for the safe movement of on-coming and turning vehicles (Page 3).

The foregoing has set the stage for the activities of Page 4 which directly involve pedestrian safety and are the activities of interest for measurement. We have identified at least two basic variations in the activities on this page. The first, shown on the page, has the driver releasing brakes before the on-coming traffic break actually arrives. Thus, he is essentially timing his entry into the traffic break. This behavior would tend to occur where the on-coming traffic is heavy and the break is small. The Page 4 version also represents the pre-message behavior where the pedestrian observation occurs up stream and the concern during the movement is primarily vehicular traffic. Page 4A shows the same version but with expected post-message behavior of taking one last look for pedestrians before the turn actually begins.

The second version assumes that the brakes are not released until the break in traffic actually arrives adjacent to the turning vehicle. This would be expected to occur in lighter traffic conditions and longer traffic breaks. Only the post-message condition of this version is shown on Page 4B. The remainder of activities involved in completing the turn are shown on Pages 5 and 6.

The driver and vehicle variables actually identified in the OSD are listed in Table 1 along with possibilities for their measurement and/or recording by means external to the vehicle.

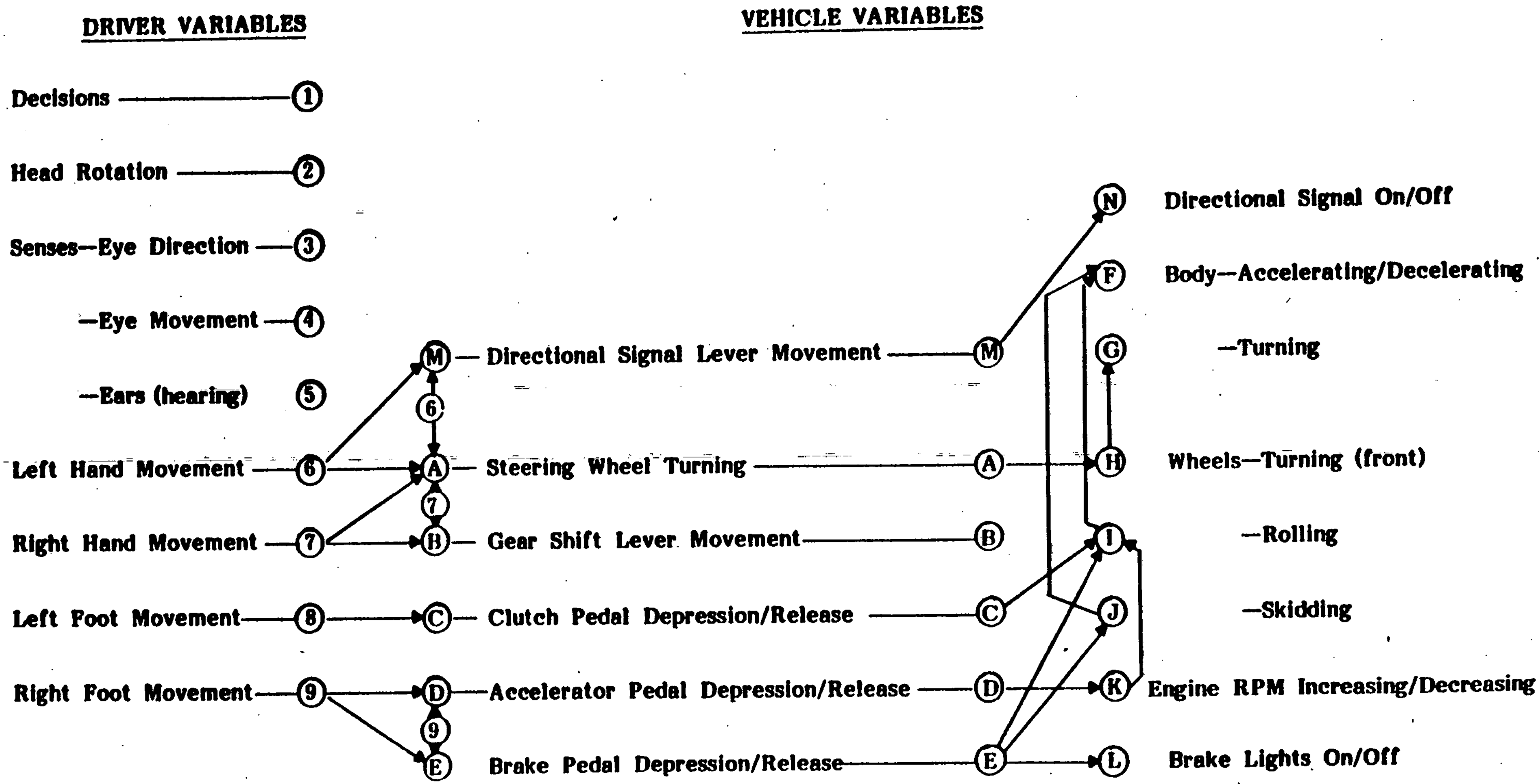
Noting that many of the direct measurement possibilities for the driver variables seem to require highly directional and highly magnified photography or video, Figure 1 was developed to show the interactions among the variables which may permit vehicle measurements that reflect driver behavior. For example, a brake light going off and engine RPM increasing indicates the driver has moved his right foot from the brake pedal to the accelerator pedal. The vehicle measurements may be more easily obtained than attempting to photograph directly the movement of the right foot.

Table 1. Driver and Vehicle Variables

VARIABLE	MEASUREMENT POSSIBILITIES
Driver:	
1. Decisions	
2. Head rotation	Photo/video (telephoto, directional), direct visual observation
3. Eye direction	Eye camera*
4. Eye movement	Eye camera*, Photo/video (telephoto, directional), direct visual observation
5. Ears hearing	
6. Left hand (steering wheel movement)	Photo/video (telephoto, directional), direct visual observation
7. Right hand (steering wheel, gear shift)	Photo/video (telephoto, directional), direct visual observation
8. Left foot (clutch pedal)	Photo/video (telephoto, directional, overhead)
9. Right foot (brake/gas pedal depression) (movement between pedals)	Photo/video (telephoto, directional, overhead)
Vehicle:	
A. Steering wheel turning	Photo/video (telephoto, directional)
B. Lever Movement—Gear shift	Photo/video, direct visual observation
C. Clutch pedal movement	
D. Accelerator pedal movement	
E. Brake pedal movement	
F. Body—Accelerating Decelerating	Photo/video, direct visual observation, electric eye, radar
G. Body turning	Photo/video, direct visual observation
H. Wheels turning	Photo/video, road sensor
I. Wheels rolling	Photo/video, road sensor
J. Wheels skidding	Photo/video, road sensor
K. Engine—Increasing RPM —Decreasing RPM	Sound sensing, exhaust monitoring (pressure/velocity)
L. Brake lights	Photo/video, direct visual observation
M. Lever movement—Directional Signal	Photo/video, direct visual observation
N. Directional signal lights	Photo/video, direct visual observation

*Not external

Figure 1. Driver/Vehicle Variable Interactions



Returning to pages 4, 4A and 4B of the OSD, the basic differences in driver behavior occur in the first few seconds following the break in on-coming traffic. This occurs at approximately 23 seconds in this scenario. Direct measurement of the "last look" might be accomplished by video recording or direct visual observation (aided) of the driver's eye movement. These observations could be made either through the windshield or the driver's side window. There are, however, several technical problems involved in the field collection of this measure. The first problem is window or windshield glare which can be severe under certain circumstances. The major source of glare is the sun. Careful selection of camera angles, location and time of day for measurement, along with the addition of polarized filters can alleviate the problem in some cases. However, a problem still exists in that windshield angles and curvature are variable among different types of vehicles. The second problem is that light within the vehicle is always less than without. This can be alleviated to some extent by using high zoom directly on the driver's face. This solution may require that a second synchronized camera be used to record external reference data.

Some drivers wear sunglasses preventing a view of the eyes completely. In other cases a partial turn into the intersection places the vehicle windshield post directly between the driver's eye and the camera or observer, thus precluding a view of the eyes. This condition is more prevalent when the pedestrian is in the second half crossing.

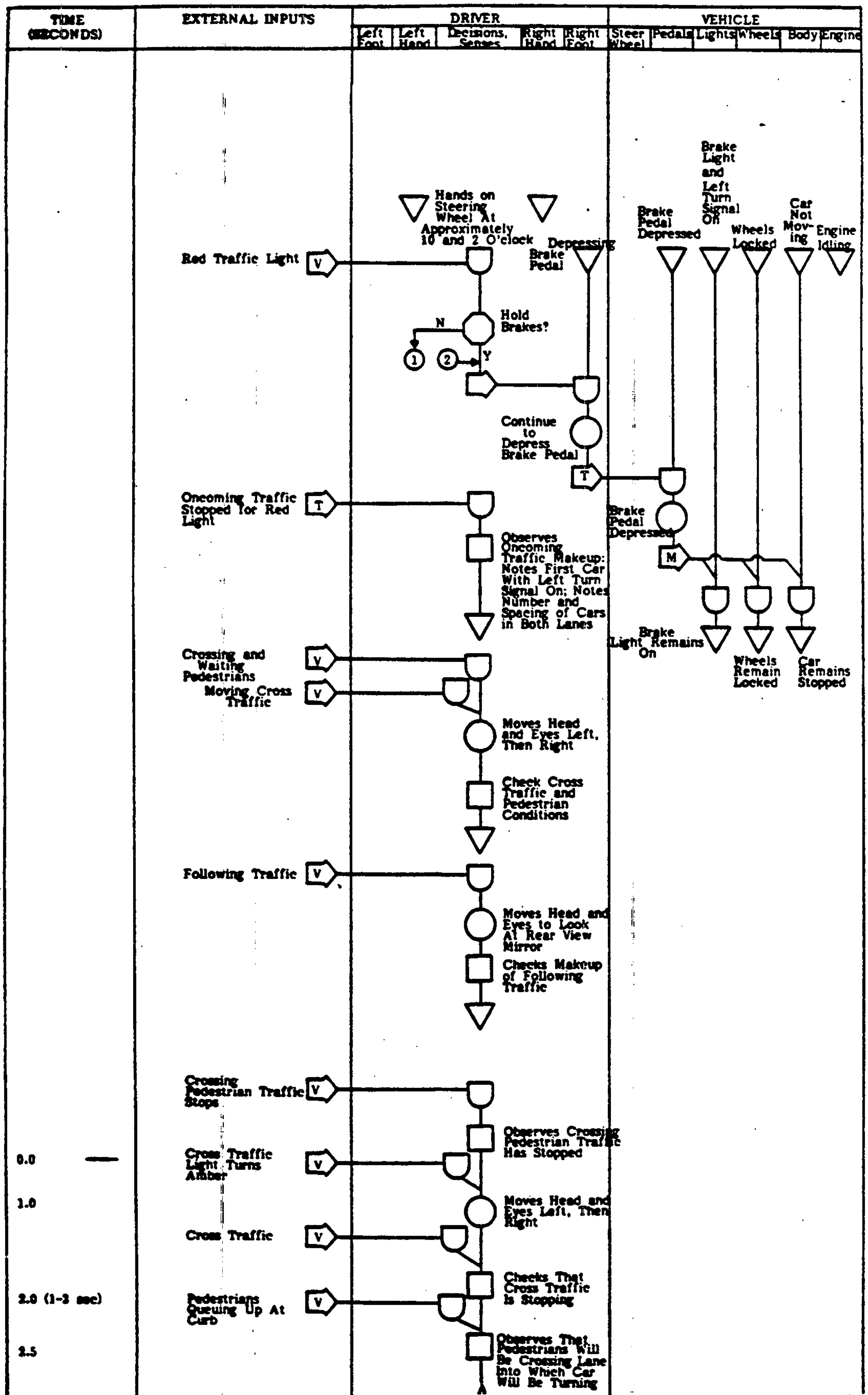
Consideration was given to one indirect measure of the "last look". Assuming that the "last look" requires additional time (possibly in milli-seconds), the turning operation should take longer overall in the post- vs. pre- message condition. Thus, if time were measured from one fixed point to a second point in the turn operation it would be expected that the pre- and post- message samples would show a difference.

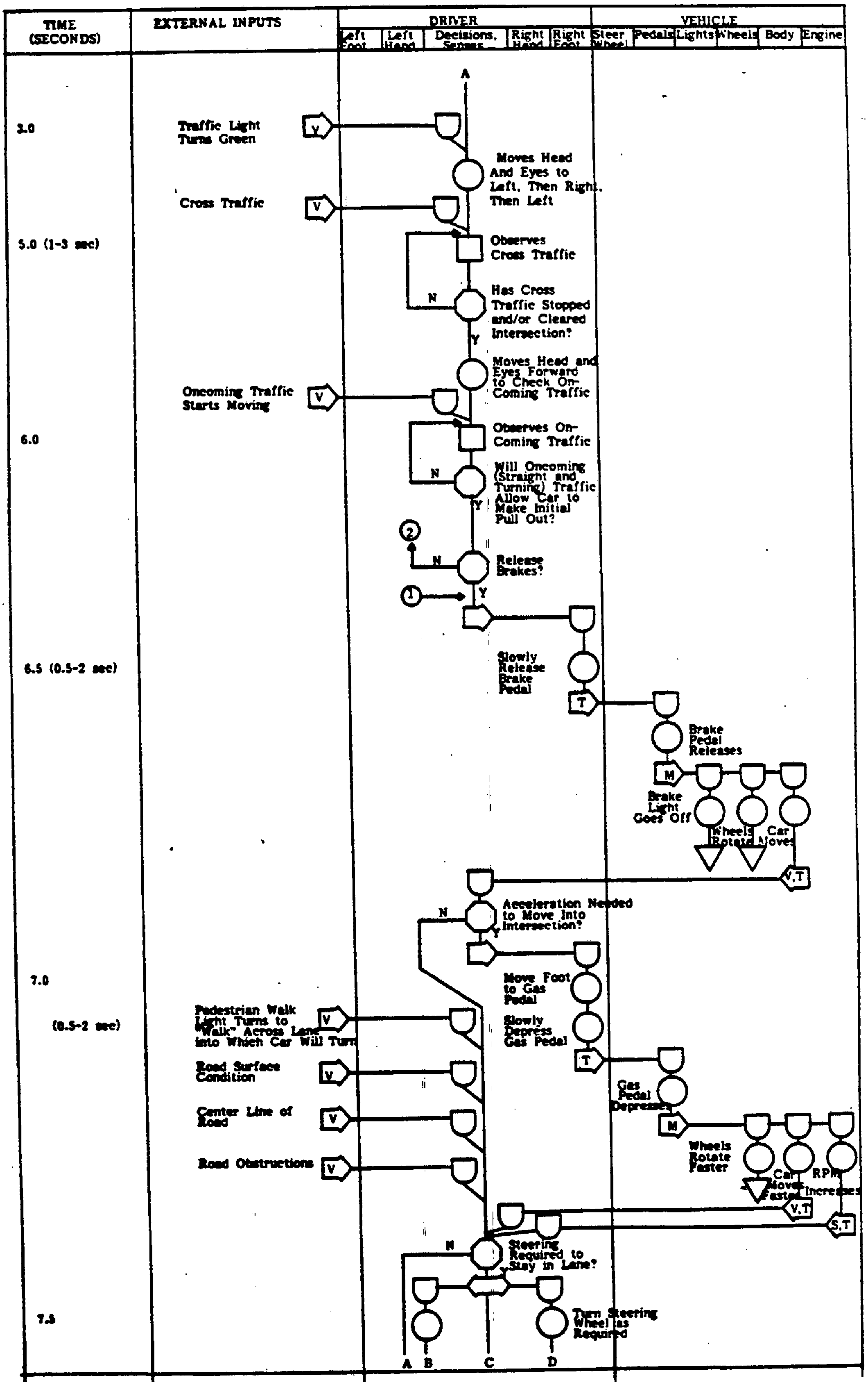
The fixed points might be absolute positions on the roadway or might be relative to the passing of the last oncoming vehicle. Either measure is possible and reasonably practical to obtain. The real problem is in the basic assumption that the "last look" takes additional time. Since the "last look" can be in milli-seconds, it can just as easily be accomplished during the initial part of the turn and therefore not truly affect turn time. In addition, so many uncontrolled variables such as vehicle type, traffic and environmental conditions affect the driver behavior that the measurement validity is immediately suspect.

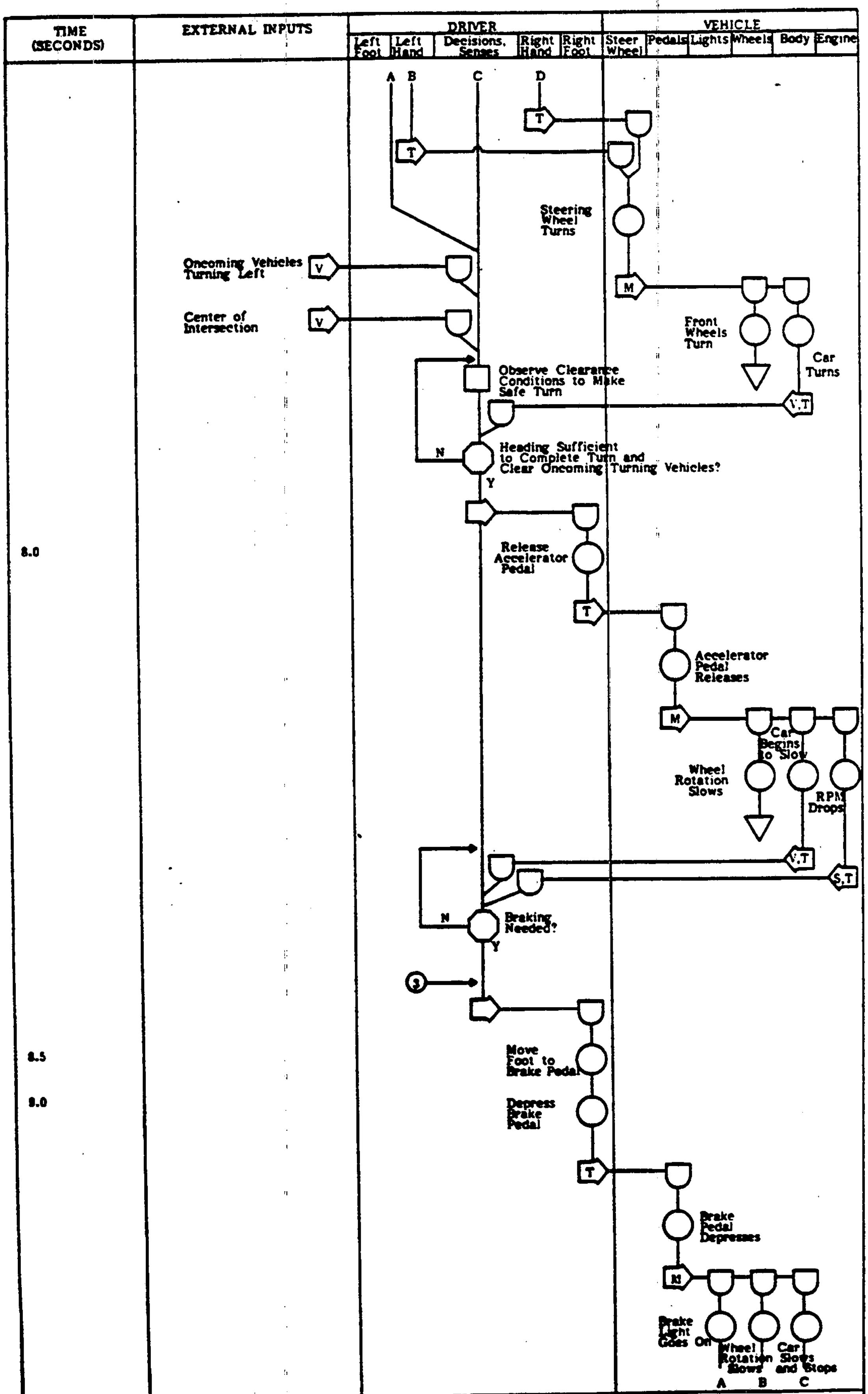
D. Results and Conclusions

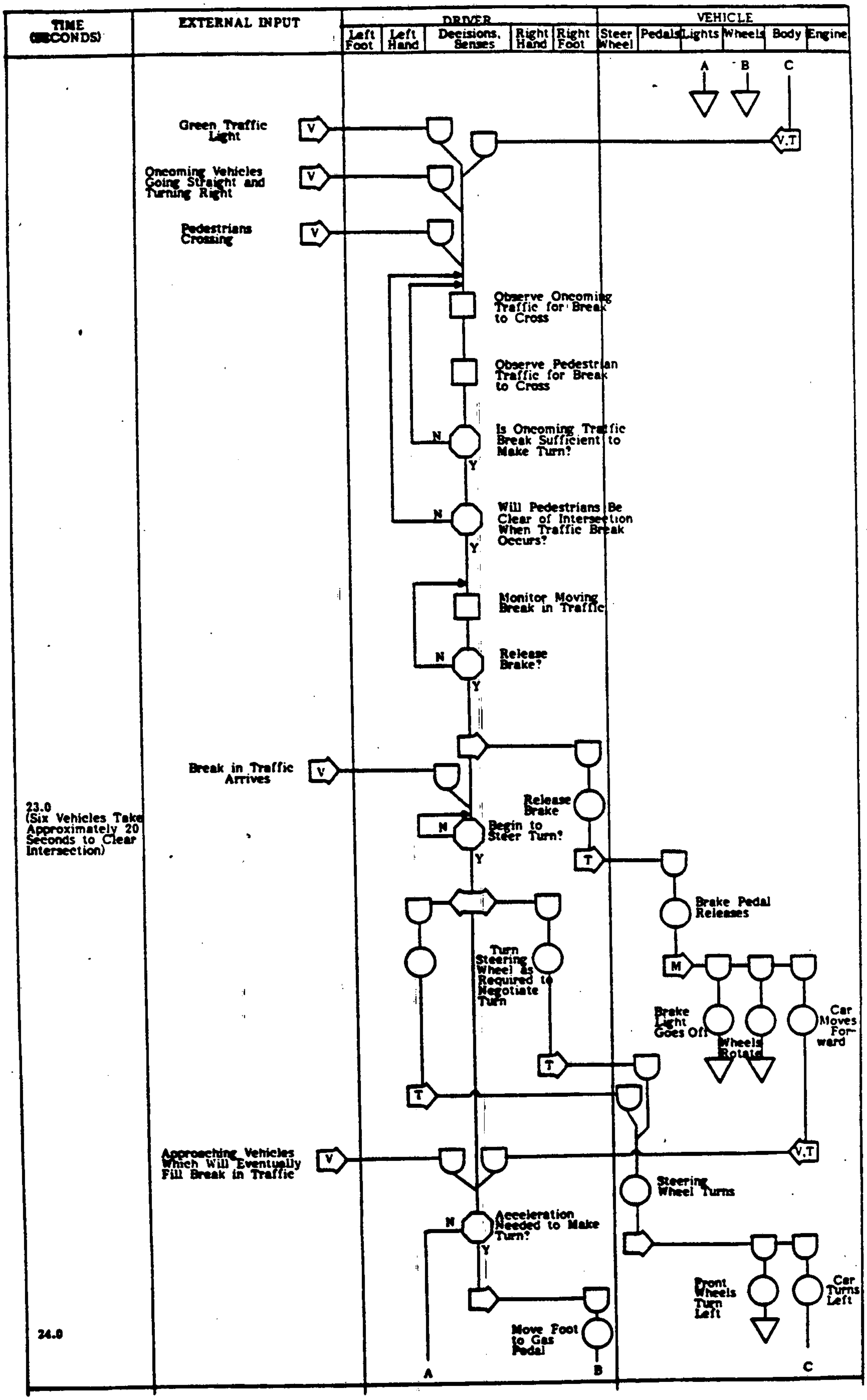
In summary, the foregoing analysis suggested that two potentially measureable behavioral changes might occur should drivers "take a last look for pedestrians". The first, obviously, would be the head and eye movements required to make that last look. The current results, obtained with on-street observers, suggest that direct observation is not feasible. Unfortunately, the problems experienced by the observers appear to be magnified for video, photo or telephoto approaches. In many ways, the human eye is better able to adapt to problems of glare, focus on a moving target, and light/dark ratios from the inside to the outside of the vehicle. At a minimum, any film or video approach would require two cameras synchronized in time. The first would capture the total traffic context and the second would focus telescopically on the driver's head and eyes. However, the expected outcome of such an elaborate equipment-oriented approach appears to be no better than what was achieved by on-street observers and possibly could be significantly worse. For these reasons, no further consideration was given to attempting a measure of head and eye movements for drivers inside of a vehicle during a naturally occurring turning maneuver.

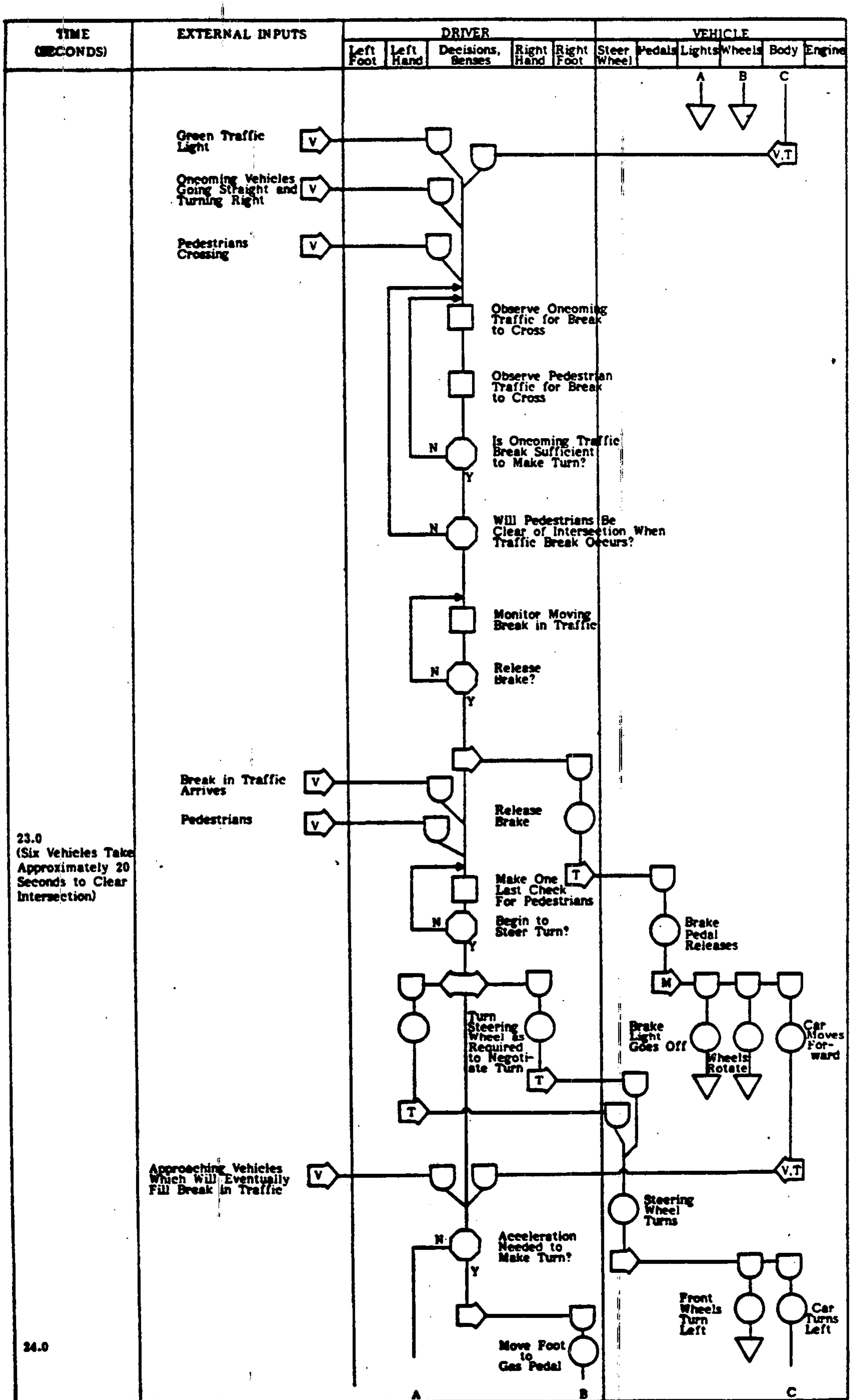
The second potentially measureable change was related to the amount of time the driver required to complete the maneuver. If the driver did take that last look, his or her turning maneuver might take several milliseconds longer. Unfortunately, the last look might occur following brake release in which case the additional time would be very minimal. Further, even if time were added, it appears that its effect would be largely submerged by all the other factors affecting the turn such as vehicle type and condition, driving style and, most importantly, all other traffic. Thus, the present analysis does not suggest a viable driver measure taken from some place outside the vehicle.


TIME (SECONDS)
EXTERNAL INPUTS
DRIVER
Left Foot
Left Hand
Decisions, Senses
Right Hand
Right Foot
VEHICLE
Steer Wheel
Pedals
Lights
Wheels
Body
Engine
Hands on Steering Wheel At Approximately 10 and 2 O'clock
Depressing Brake Pedal
Brake Pedal Depressed
Brake Light and Left Turn Signal On
Wheels Locked
Car Not Moving
Engine Idling
Red Traffic Light
V
Hold Brakes?
N
Y
1
2
Continue to Depress Brake Pedal
T
Oncoming Traffic Stopped for Red Light
Brake Pedal Depressed
M
Observes Oncoming Traffic Makeup: Notes First Car With Left Turn Signal On; Notes Number and Spacing of Cars in Both Lanes
Brake Light Remains On
Wheels Remain Locked
Car Remains Stopped
Crossing and Waiting Pedestrians
Moving Cross Traffic
Moves Head and Eyes Left, Then Right
Check Cross Traffic and Pedestrian Conditions
Following Traffic
Moves Head and Eyes to Look At Rear View Mirror
Checks Makeup of Following Traffic
Crossing Pedestrian Traffic Stops
Observes Crossing Pedestrian Traffic Has Stopped
0.0
Cross Traffic Light Turns Amber
1.0
Moves Head and Eyes Left, Then Right
Cross Traffic
Checks That Cross Traffic Is Stopping
2.0 (1-3 sec)
Pedestrians Queuing Up At Curb
2.5
Observes That Pedestrians Will Be Crossing Lane Into Which Car Will Be Turning
A

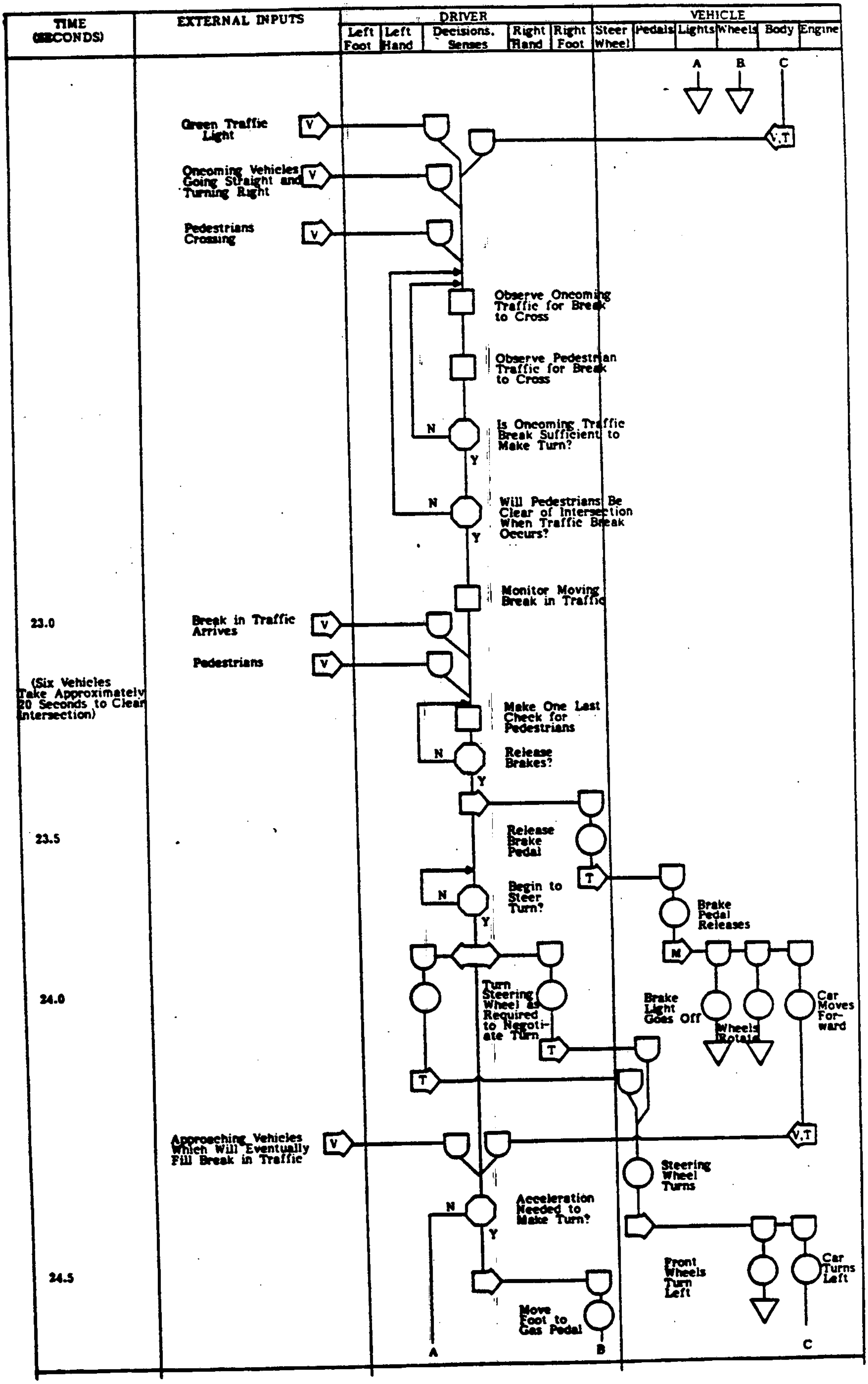

TIME (SECONDS)
EXTERNAL INPUTS
DRIVER
Left Foot
Left Hand
Decisions, Senses
Right Hand
Right Foot
VEHICLE
Steer Wheel
Pedals
Lights
Wheels
Body
Engine
A
Traffic Light Turns Green
V
Moves Head And Eyes to Left, Then Right, Then Left
Cross Traffic
V
5.0 (1-3 sec)
Observes Cross Traffic
N
Has Cross Traffic Stopped and/or Cleared Intersection?
Y
Moves Head and Eyes Forward to Check On-Coming Traffic
Oncoming Traffic Starts Moving
V
6.0
Observes On-Coming Traffic
N
Will Oncoming (Straight and Turning) Traffic Allow Car to Make Initial Pull Out?
Y
2
N
Release Brakes?
1
Y
6.5 (0.5-2 sec)
Slowly Release Brake Pedal
T
Brake Pedal Releases
M
Brake Light Goes Off
Wheels Rotate
Car Moves
V,T
Acceleration Needed to Move Into Intersection?
N
Y
7.0
Move Foot to Gas Pedal
(0.5-2 sec)
Pedestrian Walk Light Turns to "Walk" Across Lane into Which Car Will Turn
V
Slowly Depress Gas Pedal
T
Road Surface Condition
V
Gas Pedal Depresses
Center Line of Road
V
M
Road Obstructions
V
Wheels Rotate Faster
Car Moves Faster
RPM Increases
V,T
S,T
N
Steering Required to Stay in Lane?
Turn Steering Wheel as Required
A
B
C
D

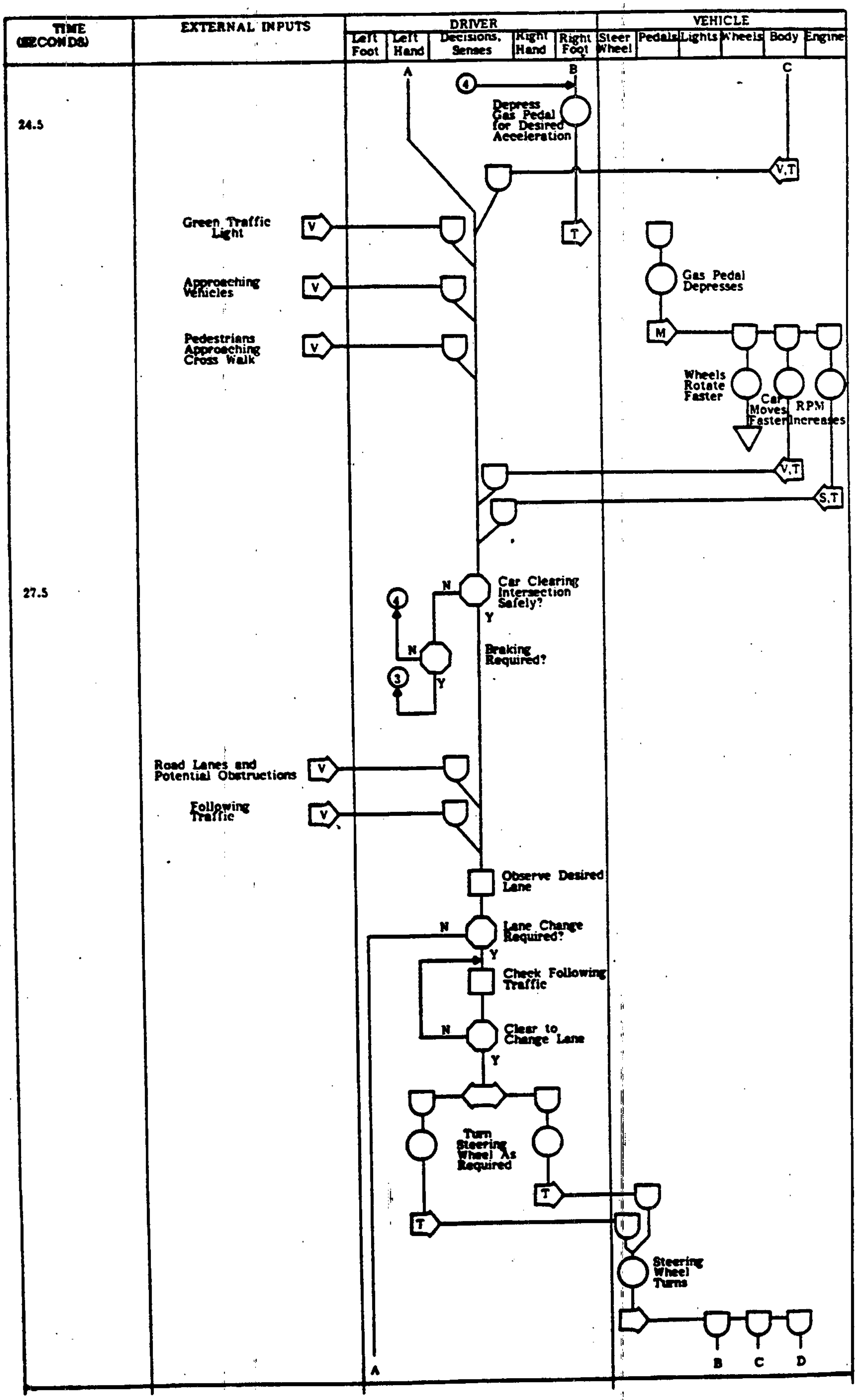

TIME (SECONDS)
EXTERNAL INPUTS
DRIVER
Left Foot
Left Hand
Decisions, Senses
Right Hand
Right Foot
VEHICLE
Steer Wheel
Pedals
Lights
Wheels
Body
Engine
A
B
C
D
T
T
Steering Wheel Turns
Oncoming Vehicles Turning Left
V
Center of Intersection
V
M
Front Wheels Turn
Car Turns
Observe Clearance Conditions to Make Safe Turn
V,T
N
Heading Sufficient to Complete Turn and Clear Oncoming Turning Vehicles?
Y
8.0
Release Accelerator Pedal
T
Accelerator Pedal Releases
M
Car Begins to Slow
Wheel Rotation Slows
RPM Drops
V,T
S,T
N
Braking Needed?
Y
3
8.5
Move Foot to Brake Pedal
9.0
Depress Brake Pedal
T
Brake Pedal Depresses
M
Brake Light Goes On
Wheel Rotation Slows
Car Slows and Stops
A
B
C


TIME (SECONDS)
EXTERNAL INPUT
DRIVER
Left Foot
Left Hand
Decisions, Senses
Right Hand
Right Foot
VEHICLE
Steer Wheel
Pedals
Lights
Wheels
Body
Engine
A
B
C
Green Traffic Light
V
V.T
Oncoming Vehicles Going Straight and Turning Right
Pedestrians Crossing
Observe Oncoming Traffic for Break to Cross
Observe Pedestrian Traffic for Break to Cross
Is Oncoming Traffic Break Sufficient to Make Turn?
N
Y
Will Pedestrians Be Clear of Intersection When Traffic Break Occurs?
Monitor Moving Break in Traffic
Release Brake?
Break in Traffic Arrives
Release Brake
23.0 (Six Vehicles Take Approximately 20 Seconds to Clear Intersection)
Begin to Steer Turn?
T
Brake Pedal Releases
Turn Steering Wheel as Required to Negotiate Turn
M
Brake Light Goes Off
Wheels Rotate
Car Moves Forward
Approaching Vehicles Which Will Eventually Fill Break in Traffic
Steering Wheel Turns
Acceleration Needed to Make Turn?
Front Wheels Turn Left
Car Turns Left
Move Foot to Gas Pedal
24.0

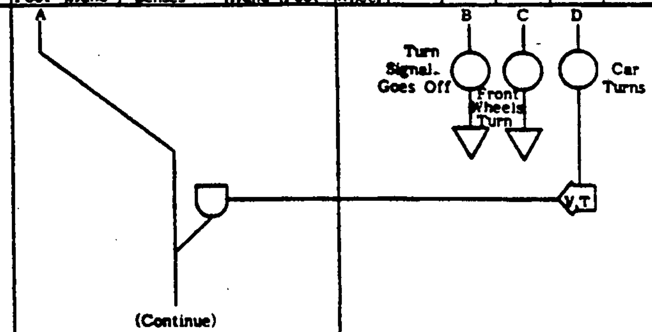


TIME (SECONDS)
EXTERNAL INPUTS
DRIVER
Left Foot
Left Hand
Decisions, Senses
Right Hand
Right Foot
VEHICLE
Steer Wheel
Pedals
Lights
Wheels
Body
Engine
A
B
C
Green Traffic Light
V
V.T
Oncoming Vehicles Going Straight and Turning Right
Pedestrians Crossing
Observe Oncoming Traffic for Break to Cross
Observe Pedestrian Traffic for Break to Cross
N
Is Oncoming Traffic Break Sufficient to Make Turn?
Y
Will Pedestrians Be Clear of Intersection When Traffic Break Occurs?
Monitor Moving Break in Traffic
Release Brake?
Break in Traffic Arrives
Pedestrians
Release Brake
23.0 (Six Vehicles Take Approximately 20 Seconds to Clear Intersection)
Make One Last Check For Pedestrians
T
Begin to Steer Turn?
Brake Pedal Releases
M
Turn Steering Wheel as Required to Negotiate Turn
Brake Light Goes Off
Wheels Rotate
Car Moves Forward
Approaching Vehicles Which Will Eventually Fill Break in Traffic
Steering Wheel Turns
Acceleration Needed to Make Turn?
Front Wheels Turn Left
Car Turns Left
24.0
Move Foot to Gas Pedal


TIME (SECONDS)
EXTERNAL INPUTS
DRIVER
Left Foot
Left Hand
Decisions, Senses
Right Hand
Right Foot
VEHICLE
Steer Wheel
Pedals
Lights
Wheels
Body
Engine
A
B
C
Green Traffic Light
V
V,T
Oncoming Vehicles Going Straight and Turning Right
Pedestrians Crossing
Observe Oncoming Traffic for Break to Cross
Observe Pedestrian Traffic for Break to Cross
N
Is Oncoming Traffic Break Sufficient to Make Turn?
Y
Will Pedestrians Be Clear of Intersection When Traffic Break Occurs?
Monitor Moving Break in Traffic
23.0
Break in Traffic Arrives
Pedestrians
(Six Vehicles Take Approximately 20 Seconds to Clear Intersection)
Make One Last Check for Pedestrians
Release Brakes?
23.5
Release Brake Pedal
T
Begin to Steer Turn?
Brake Pedal Releases
M
24.0
Turn Steering Wheel as Required to Negotiate Turn
Brake Light Goes Off
Wheels Rotate
Car Moves Forward
Approaching Vehicles When Will Eventually Fill Break in Traffic
Steering Wheel Turns
Acceleration Needed to Make Turn?
24.5
Front Wheels Turn Left
Car Turns Left
Move Foot to Gas Pedal


TIME (SECONDS)
EXTERNAL INPUTS
DRIVER
Left Foot
Left Hand
Decisions, Senses
Right Hand
Right Foot
VEHICLE
Steer Wheel
Pedals
Lights
Wheels
Body
Engine
24.5
27.5
Depress Gas Pedal for Desired Acceleration
Green Traffic Light
Approaching Vehicles
Pedestrians Approaching Cross Walk
Gas Pedal Depresses
Wheels Rotate Faster
Car Moves Faster
RPM Increases
Car Clearing Intersection Safely?
Braking Required?
Road Lanes and Potential Obstructions
Following Traffic
Observe Desired Lane
Lane Change Required?
Check Following Traffic
Clear to Change Lane
Turn Steering Wheel As Required
Steering Wheel Turns

TIME (SECONDS)	EXTERNAL INPUTS	DRIVER					VEHICLE					
		Left Foot	Left Hand	Decisions, Senses	Right Hand	Right Foot	Steer Wheel	Pedals	Lights	Wheels	Body	Engine



APPENDIX C.

Accident Series Analysis

Summarized in this Appendix are the monthly accident series relevant to the effectiveness of the Multiple Threat and VTM safety program test described in the body of this report. Each series is presented in full and brief summaries of two types of analyses are also given.

Analysis of variance. Each accident series forms a rectangular year by month matrix. This was analyzed by a standard two-way anova procedure. Because the data were collected according to a time sequence, it is unlikely that all the assumptions of data independence which anova requires are met. However, the main effect and interaction terms of the anova are useful descriptors of the data and provide guidelines for the interpretation of subsequent analyses. Specifically:

- The year x month interaction mean square is a rough estimate of the residual squared standard error in a good-fitting time series model because the interaction term is an estimate of the variability in the monthly accident data after the year and month main effects are subtracted.

- The month main effect F-ratio and its attendant significance level provide a measure of the strength of the seasonal cycles in the data--the tendency for accident rates to be consistently high or low during particular months or seasons of the year. A large month effect here means that an adequate time series model is likely to have to make major seasonal adjustments.

- The year main effect F-ratio and significance level are preliminary estimates of whether the intervention has had an effect on accident rates. Although this test is general and not precisely aligned with the presence or absence of the intervention, a high F-ratio points to significant variation which may be correlated with the introduction of the intervention. Conversely, an F-ratio near or below 1.0 is an indication that it is highly unlikely that the intervention has had any impact.

Both main effect interpretations suffer when the meaningful intervention on-off periods do not precisely align with year boundaries.

Box-Jenkins time series analysis. Several kinds of model were fit to each accident time series. The adequacy of a time series model to fit its data is measured by two primary statistics: The residual standard error, a measure of the differences between the actual data and the data points predicted by the model; and the degree to which those differences, or residuals, have no time-dependent patterns. The residual standard error is shown as SE residual in the time series table. The time-independence of the residuals is labeled "Q" in the table; it is essentially a χ^2 measure of the first 25 or so lag correlations of the residual series. To evaluate the Q statistics, their degrees of freedom are shown along with the probability that the lag correlations could form a residual series without systematic time-dependent fluctuations.

In general, for better time series models, SE residual values should be low and Q values should be equal to or less than their degrees of freedom.

For each series, five types of "models" are summarized. The first two are simply initial descriptions of the accident data to aid the development of precise models. The remaining series are fitted to the data and provide specific information toward evaluating MT and VTM programs.

- None--i.e., the original data series.

- $(1-B^{12})$--i.e., the series formed by annual differencing--subtracting from each datum for the same month in the preceding year (if known). The series is 12 data shorter than the original series.

- Baseline--a model fit to the accident data from all months prior to the safety program introduction is independent of the influence of the safety program. The forecast of accident data through the program period, when compared with the actual data, provides a direct estimate of how and how much accident occurrence rates changed (compared to the best predictions from known, i.e., baseline, data) during the program period. To the extent that large drops were seen in the program period for darts and dashes to children in the program area and to the extent that there were no drops in comparison accident series (same location but different population of same population in other locations), program effectiveness could be inferred.

- All accidents--similar to the baseline model, except fit to all the known accident data (baseline and program). To the extent that this model was similar to the preceding model, no program-period change was present. If the models had to be quite different, or if all the accident data could not fit well in a model, then there is evidence that the accident rates changed significantly during the program period. Because only accident data were involved in these models, however, inferences about program effectiveness were indirect.

- Intervention model--based on all accident data and a second, parallel, time series representing the presence or absence of the safety program. To the extent that an intervention model could be developed which fit the accident data well, and if that model included statistically significant transfer parameters from the safety program intervention series, direct evidence of program impact was present.

For each data series, several forms of time series models were investigated to find the ones which best described the accident data. Those "best fit" models--their forms and parameter values-- are shown below the summary tables. The goodness-of-fit statistics are given in the time series analysis table.

San Diego, VTM and Turning Vehicle Accidents

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avg.
1973	9	6	7	4	2	9	4	4	2	5	5	4	5.083
1974	7	5	4	6	4	6	4	3	5	8	11	14	6.417
1975	7	4	3	6	2	3	6	1	7	7	7	9	5.167
1976	6	9	9	4	6	4	8	1	3	2	4	10	5.500
1977	7	9	8	6	6	9	6	3	5	6	9	12	7.167
1978	20	10	8	6	7	10	11	9	8	12	10	7	9.833
Avg.	9.33	7.17	6.50	5.33	4.50	6.83	6.50	3.50	5.00	6.67	7.67	9.33	6.528

Analysis of Variance

Source	Mean Square	d.f.	F	p
Year	39.222	5	6.340	.000
Month	18.874	11	3.051	.003
Yr x Mon	6.186	55		

Time Series Analysis

Model	S.E. residual	Q	d.f.	p
Orig	3.237	40.31	25	.03
$(1-B^{12})$	3.520	30.31	25	.22
Base	2.567	23.09	21	.35
Int	2.864	15.84	22	n.s.

Deviations from column means	Baseline (1-37)	Messages (38-60)	Post-Msg. (61-72)
Mean	-1.036	-.058	3.306
P.M. Corr.	.050	.193	- .396

Models

Baseline: (37 months) $Y_t - 5.60 = (1 + .38B)(1 + .28^*B^2)a_t$

Intervention: $Y_t - 6.75 = -.70^*X_t + (1 + .50B)(1 + .37B^2)a_t$

*parameter not significant

San Diego, Percent (VTM and Turning Vehicle Accidents) of All Pedestrian Accidents

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avg.
1973	23	13	13	7	4	22	10	10	5	10	15	9	11.75
1974	22	12	10	15	10	14	11	8	14	15	17	29	14.75
1975	17	11	8	13	5	9	13	2	13	17	15	20	11.92
1976	20	18	19	8	13	10	16	2	7	4	11	18	12.17
1977	19	18	26	18	13	22	15	8	11	10	15	23	16.50
1978	33	16	15	15	13	21	25	17	15	24	16	17	18.92
Avg.	22.3	14.7	15.2	12.7	9.7	16.3	15.0	7.8	10.8	13.3	14.8	19.3	14.33

Analysis of Variance

Source	Mean Square	d.f.	F	p
Year	103.40	5	5.008	.001
Month	95.21	11	4.611	.000
Yr x Mon	20.65	55		

Time Series Analysis

Model	S.E. residual	Q	d.f.	p
Orig.	6.167	47.10	25	.006
$(1-B^{12})$	6.469	44.73	25	.011
Base	4.780	18.87	22	n.s.
Int	5.397	19.56	22	n.s.

Deviations from column means	Baseline (1-37)	Messages (38-60)	Post-Msg. (61-72)
Mean	-1.550	.1014	4.583
P.M. Corr.	.097	.2239	- .102

Models

Baseline: (37 months) $(1 - .74B^{12}) (Y_t - 12.74) = a_t$

Intervention: $(1 - .24B) (1 - .57B12) (Y_t - 15.42) = -1.35^* X_t + a_t$

*parameter not significant

Los Angeles, All Pedestrians 10-99 Accidents

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avg.
1973	197	182	180	173	160	148	163	160	180	197	224	186	179.167
1974	247	178	177	165	148	184	152	178	141	180	217	224	182.583
1975	177	173	180	162	178	174	195	163	188	200	216	251	188.083
1976	221	203	206	191	163	186	182	200	199	241	215	244	204.250
1977	232	189	196	175	185	185	191	170	199	205	238	257	201.833
1978	282	253	239	200	205	188	186	203	218	227	256	246	225.250
Avg.	226.00	196.33	196.33	177.67	173.17	177.50	178.17	179.00	187.50	208.33	227.67	234.67	196.861

Analysis of Variance

Source	Mean Square	d.f.	F	p
Year	3550.18	5	13.467	.000
Month	2956.54	11	11.215	.000
Yr x Mon	263.63	55		

Time Series Analysis

Model	S.E. residual	Q	d.f.	p
Orig	30.204	171.77	25	.000
$(1-B^{12})$	25.433	50.51	25	.003
Base	21.475	18.23	21	n.s.
Int	17.387	21.28	23	n.s.

Deviations from column means	Baseline (1-37)	Messages (38-60)	Post-Msg. (61-72)
Mean	-13.351	6.667	28.389
P.M. Corr.	.257	- .018	- .691

Models

Baseline: (37 months) $(1 + .56B^8)(1 - .71B^{12})(Y_t - 184.75) = a_t$

Intervention: $(1-B^{12})Y_t = 13.00X_t + (1 + .30B^{28})(1 - .91B^{12})a_t$

Los Angeles, Percent (10-99 MT)
to All (10-99 Pedestrians Accidents)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avg.
1973	8	4	11	8	11	10	6	8	7	7	7	6	7.75
1974	9	9	6	11	7	8	11	8	3	6	6	8	7.67
1975	8	9	6	8	8	7	9	6	9	9	7	10	8.0
1976	8	7	8	8	9	8	11	10	7	6	14	6	8.5
1977	8	7	9	7	8	7	7	4	8	8	11	7	7.58
1978	9	11	7	10	5	6	10	5	6	10	11	10	8.33
Avg.	8.33	7.83	7.83	8.67	8.0	7.67	9.0	6.83	6.67	7.67	9.33	7.83	7.97

Analysis of Variance

Source	Mean Square	d.f.	F	p
Year	1.689	5	.406	.844
Month	3.692	11	.887	.558
Yr x Mon	4.162	55		

Time Series Analysis

Model	S.E. residual	Q	d.f.	p
Orig.	1.979	16.15	25	n.s.
$(1-B^{12})$	2.738	38.79	25	.05
Int	1.992	16.39	24	n.s.

Deviations from column means	Baseline (1-37)	Messages (38-60)	Post-Msg. (61-72)
Mean	-.171	.087	.361
P.M. Corr.	-.0034	-.1767	.1395

Model

Intervention: $Y_t - 7.94 = .105^* X_t + a_t$

*parameter not significant

Los Angeles, VTM and Turning Vehicle, Pedestrians 10-99 Years

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avg.
1973	60	36	40	34	17	16	24	20	25	40	42	37	32.75
1974	49	33	30	23	21	32	22	26	22	28	40	43	30.75
1975	39	31	31	20	25	19	30	30	26	32	46	53	31.83
1976	65	40	30	26	26	22	22	28	26	38	35	58	34.67
1977	56	37	37	26	24	22	22	27	25	35	40	49	33.33
1978	63	47	50	28	40	31	38	26	37	39	52	55	42.17
Avg.	55.33	37.33	36.33	26.17	25.50	24.00	26.33	26.17	26.83	35.33	42.50	49.17	34.25

Analysis of Variance

Source	Mean Square	d.f.	F	p
Year	201.667	5	7.209	.000
Month	643.680	11	23.008	.000
Yr x Mon	27.976	55		

Time Series Analysis

Model	S.E. residual	Q	d.f.	p
Orig	11.564	276.11	25	.000
$(1-B^{12})$	7.919	39.45	25	.04
Base	7.031	22.14	22	.46
Int_1	6.505	33.03	22	.07
Int_2	5.370	30.07	22	.12

Deviations from column means	Baseline (1-37)	Messages (38-60)	Post-Msg. (61-72)
Mean	-2.144	-.661	7.917
P.M. Corr.	.078	-.033	- .248

Models

Baseline: (37 months) $(1-B^{12})Y_t = (1 + .34^*B)(1 - .86B^{12})a_t$

Intervention$_1$: $(1 - .20B^2)(1 - .83B^{12})(Y_t - .51^*) = -4.48X_t + a_t$

Intervention$_2$: $(1-B^{12})Y_t = 2.12X_t + (1 + .34B^2)(1 + .26B^4)(1 - .93B^{12})a_t$

*parameter not significant

Los Angeles, Percent (10-99 VTM and Turning Vehicle Accidents) of All 10-99 Pedestrians Accidents

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avg.
1973	30	20	22	20	11	12	15	12	14	20	19	20	17.92
1974	20	19	17	14	14	17	14	15	16	16	18	19	16.58
1975	22	18	17	12	14	11	15	18	14	16	21	21	16.58
1976	29	20	15	14	16	12	12	14	13	16	16	24	16.75
1977	24	20	19	15	13	12	12	16	13	17	17	19	16.42
1978	22	19	21	14	20	16	20	13	17	17	20	22	18.42
Avg.	24.50	19.33	18.50	14.83	14.67	13.33	14.67	14.67	14.50	17.00	18.50	20.83	17.11

Analysis of Variance

Source	Mean Square	d.f.	F	p
Year	8.456	5	1.435	.226
Month	66.252	11	11.245	.000
Yr x Mon	5.892	55		

Time Series Analysis

Model	S.E. residual	Q	d.f.	p
Orig	3.927	220.40	25	.000
$(1-B^{12})$	3.418	28.70	25	.28
Int	3.298	27.77	25	.33

Deviations from column means	Baseline (1-37)	Messages (38-60)	Post-Msg. (61-72)
Mean	.041	-.746	1.306
P.M. Corr.	-.097	-.004	.189

Model

Intervention: $Y_t = -1.42^{*}X_t + \dfrac{a_t}{(1 - B^{12})}$

*parameter not significant

Los Angeles, Spanish-Surname Pedestrians or Drivers,
Percent (10-99 VTM and Turning Vehicle Accidents) of All 10-99 Accidents

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avg.
1973	28	20	29	16	6	14	18	14	11	21	16	23	18.00
1974	24	24	17	17	16	20	25	18	17	18	21	14	19.25
1975	23	17	22	11	14	7	16	15	12	19	14	27	16.42
1976	28	24	18	14	20	12	4	11	10	14	11	16	15.17
1977	22	17	17	17	12	16	9	9	10	13	16	13	14.25
1978	21	24	19	12	12	15	19	9	16	12	21	19	16.58
Avg.	24.33	21.00	20.33	14.50	13.33	14.00	15.17	12.67	12.67	16.17	16.50	18.67	16.61

Analysis of Variance

Source	Mean Square	d.f.	F	p
Year	39.822	5	2.331	.054
Month	83.131	11	4.866	.000
Yr x Mon	17.082	55		

Time Series Analysis

Model	S.E. residual	Q	d.f.	p
Orig	5.378	75.50	25	.000
$(1-B^{12})$	6.020	43.89	25	.013
Base	3.863	17.64	22	n.s.
Intervention	4.321	35.60	24	.07

Deviations from column means	Baseline (1-37)	Messages (38-60)	Post-Msg. (61-72)
Mean	1.342	-2.145	-.003
P.M. Corr.	- .062	- .219	.236

Models

Baseline: (37 months) $Y_t - 16.64 = (1 + .93B^{12})a_t$

Intervention: $Y_t = 3.13X_t = \frac{(1-.92B^{12})}{(1-B^{12})} a_t$

Los Angeles, Spanish-Surname Drivers, Percent (10-99 VTM and Turning Vehicle Accidents) of All 10-99 Accidents

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avg.
1973	29	16	17	7	3	17	21	14	12	20	12	30	16.50
1974	16	13	13	20	14	15	29	20	23	20	13	18	17.83
1975	23	13	24	12	21	9	26	14	15	19	20	22	18.17
1976	25	20	20	3	12	15	3	15	14	10	6	15	13.17
1977	21	14	7	14	10	15	13	8	12	9	14	12	12.42
1978	18	27	23	17	14	21	16	2	21	8	19	22	17.33
Avg.	22.00	17.17	17.33	12.17	12.33	15.33	18.00	12.17	16.17	14.33	14.00	19.83	15.90

Analysis of Variance

Source	Mean Square	d.f.	F	p
Year	74.147	5	2.255	.061
Month	58.202	11	1.788	.078
Yr x Mon	32.886	55		

Time Series Analysis

Model	S.E. residual	Q	d.f.	p
Orig	6.309	22.76	25	n.s.
$(1-B^{12})$	8.015	42.66	25	.02
Int	5.829	20.03	24	n.s.

Deviations from column means	Baseline (1-37)	Messages (38-60)	Post-Msg. (61-72)
Mean	1.635	-3.377	1.431
P.M. Corr.	.221	- .159	- .221

Model

Intervention: $Y_t - 17.61 = -5.35X_t + a_t$