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November 1983
Final Report

DOT HS-806-521

EXPERIMENTAL FIELD TEST OF PROPOSED PEDESTRIAN SAFETY MESSAGES

VOLUME I
METHODS AND MATERIALS DEVELOPMENT

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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 this Volume. 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 Volume III. 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

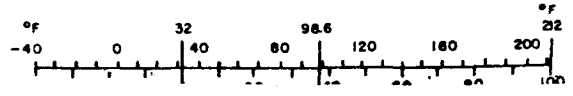
Approximate Conversions to Metric Measures

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."

- 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.

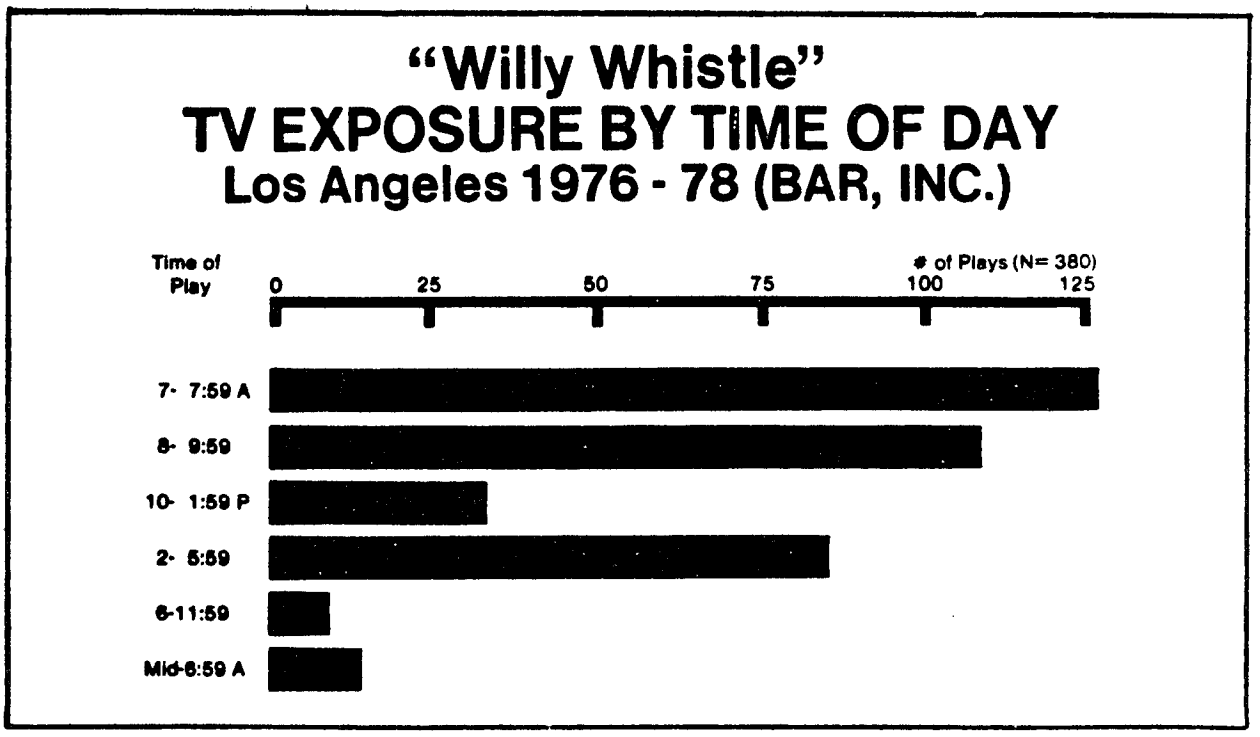
The three 30 second spots were essentially abbreviated versions of the 60 second materials and were titled:

- o "Search"
- o "Curbs"
- o "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

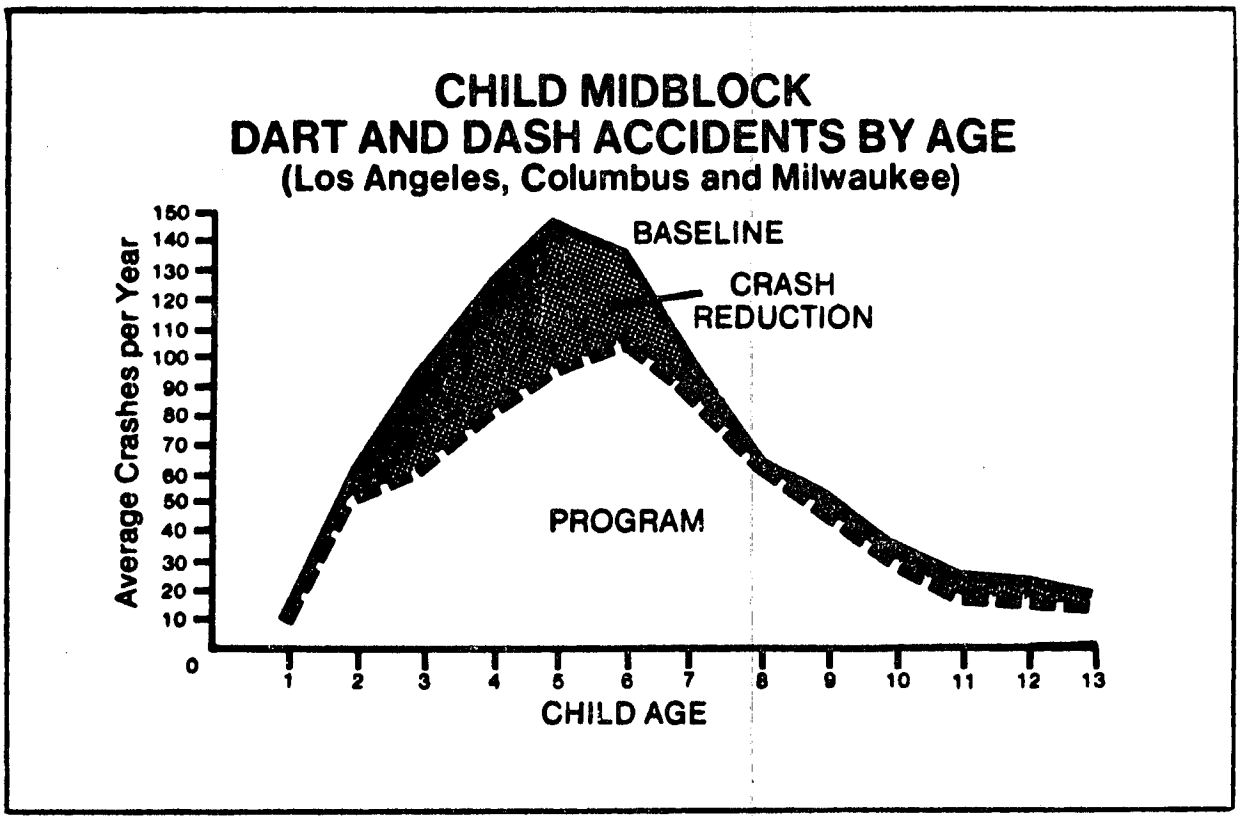
	Los Angeles		Columbus		Milwaukee	
	Pre	Post	Pre	Post	Pre	Post
N=	4096	5692	1148	1126	3502	2261
Search (L-R-L)	5%	11%	5%	7%	3%	9%
Course (Full Stop)	20	16	15	12	12	17

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 all pedestrian crashes involving this age group. There was a statistically significant drop in child Dart-Out accidents in each of the three cities when measured using time series techniques. The crash reduction results were not, however, uniformly distributed by age.

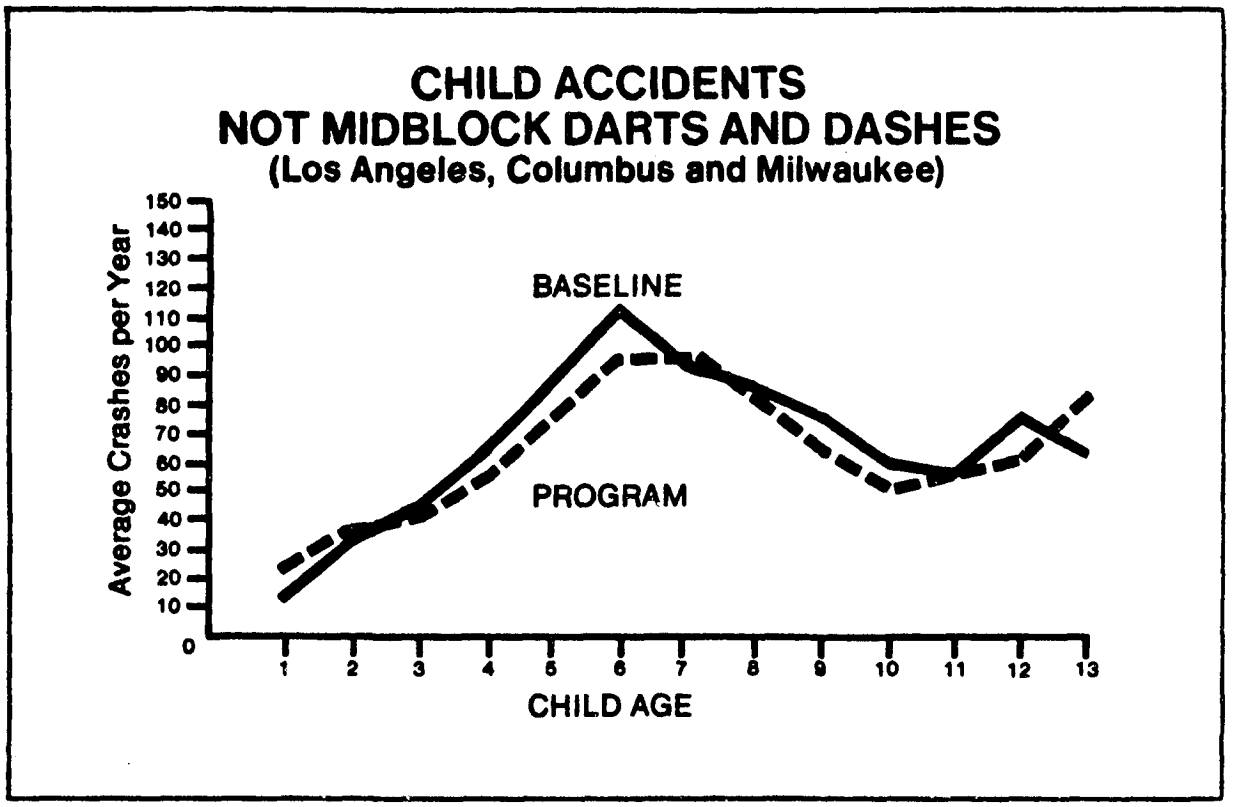
The Figure below shows the distribution of the average annual number of Dart-Out accidents by age for the three test cities combined, separated into the baseline and program periods. From this Figure, one can clearly observe that the great majority of the crash reduction took place among four to six 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 not 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 not 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:

- o 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.

- o 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		San Diego	
		PRE	POST	PRE	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

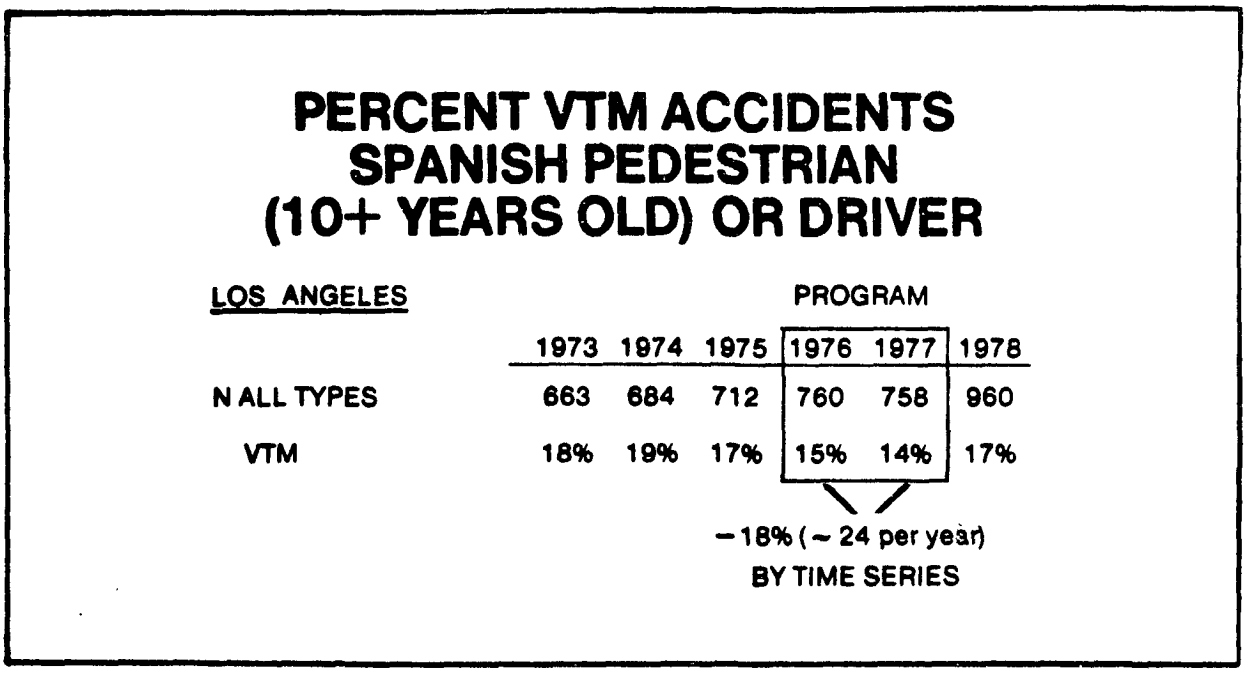
	1973	1974	1975	PROGRAM 1976	1977	1978
N ALL ACC. TYPES	3062	3082	3141	3310	3239	3549
VTM	14.0%	13.0%	13.4%	13.7%	13.2%	15.2%
MT	6.6	6.8	7.0	7.4	6.9	7.7

No change by Time Series

SAN DIEGO

	1973	1974	1975	PROGRAM 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.



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 first 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 describes the theory behind the development of the messages and details the development process. Volume II is devoted to a description of the field test of the messages directed to child audiences. Volume III presents the methods and results of the field test of the messages directed to adults.

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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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I. INTRODUCTION

This volume details the media development methods and procedures of Contract No. DOT-HS-4-00952 between the U.S. Department of Transportation, National Highway Traffic Safety Administration (NHTSA) and Dunlap and Associates East, Inc. (formerly Dunlap and Associates, Inc.). Its primary purpose is to describe the background of the study and the rationale for the media approaches undertaken. Study results are presented in two additional volumes of this final report.

A. Background

Before proceeding with the details of the study, it is important to understand its context within NHTSA's overall pedestrian safety research program. The first step in NHTSA's program was to conduct research into the characteristics of the urban pedestrian-vehicle crash. That study, concluded by Snyder and Knoblauch in 1971, identified "unique" accident types or accident groupings, described the characteristics and behavioral errors involved in each type and suggested possible countermeasures. Since many of the accident types and related behavioral errors identified by Snyder and Knoblauch were not widely known among members of the general public, public education was suggested as a promising countermeasure approach. However, it remained to be shown whether people exposed to the new information or behavioral remedies derived from it would change their behavior.

In 1973, NHTSA awarded a contract to Dunlap and Associates, Inc., to develop and pre-test public education messages derived from the findings of Snyder and Knoblauch. This study further analyzed the raw data collected by Snyder and Knoblauch and developed 14 message contents or sets of behavioral advice to combat the major identified behavioral errors in nine of the identified accident types. Seven of these 14 messages were pre-tested by preparing them in a form suitable for transmission over various media, insuring exposure of a selected group of pedestrians and drivers from the total target audience and covertly measuring behavioral responses in the traffic environment. For example, a message instructing people not to cross in front of a transit bus was played continuously over loudspeakers on the bus. This insured that all riders heard the message. Their street crossing behavior at selected stops along the bus route was then observed.

The results of this study (Blomberg and Preusser, 1975) indicated that an immediate behavioral change could be obtained from a single presentation of a message if exposure of the target audience was insured and the message was understood by the audience. However, neither transmission nor reception and comprehension can be guaranteed with mass media public information and education (PI&E). In particular, achieving exposure of a significant proportion of the target audience for each message without paying for media time or space, i.e., through public service channels, is a difficult undertaking. It, therefore, became the task of the current effort to assess the effectiveness of mass media PI&E materials based on the previously developed message contents.

Initial effort on the present study involved the selection of the message contents for field testing from among the 14 message contents developed under the earlier contract. While this was primarily a NHTSA decision, input information and suggestions were generated from further analyses of the Snyder and Knoblauch (1971) and Blomberg and Preusser (1975) data. In addition, the literature review compiled by Blomberg and Preusser (1975) was re-examined for specific guidance in message selection and for information to aid or constrain the creative development process.

Upon selection of seven message contents by NHTSA relating to three classes of accidents identified by Snyder and Knoblauch (1971), creative development began. The entire creative process was guided by several basic principles. First, every attempt was made to be faithful to the available accident (Snyder and Knoblauch, 1971) and pre-test behavioral data (Blomberg and Preusser, 1975) in preparing the messages. This included matching the characteristics (age, sex, etc.) of actors cast in the films and environmental variables (type of street, neighborhood, etc.) with the known accident picture as described in the available accident data base.

Second, it was decided to focus the messages solely at a behavioral level. That is, people were to be shown what to do with their eyes, feet, etc., and why it was to their advantage to follow the advice, i.e., the accident circumstances. No attempt would be made to "sell safety" or convey a general desire to "be safe" without providing specific and simple behavioral remedies for the audience to follow. This apparently novel approach was made possible by the extent and depth of the available data. Moreover, it paralleled the philosophy of the pre-test work (Blomberg and Preusser, 1975) which indicated that a positive behavioral response was obtainable using this approach.

Finally, it was recognized at the outset that public service media time, particularly on television, the primary medium for messages of this type, is difficult to obtain. There is fierce competition for time for public service announcements (PSA's), with local, state and national groups all seeking to air their message or appeal. Thus, it was decided that the materials for this project had to be of uniformly high quality. Moreover, they had to be compelling enough as "entertainment" or "public interest" features to insure their choice over competitive materials.

The actual development of the messages was only one of three major parts of the study. After development, they had to be disseminated according to a rigorous experimental design which permitted the accumulation of the data needed to answer the research questions posed above. An evaluation system had to be devised which was capable of gathering the needed data and analyzing it to test the critical hypotheses. The details of these experimental designs and measurement systems varied depending on the accident type and target audience being addressed. These details, as well as the results of the evaluation, will be fully described in Volumes II and III of this report which cover, respectively, the messages directed at children and those focused at adults. The remainder of this volume will address the specific objectives of the project, some of the theoretical support for the message development process and the content of each of the messages tested.

B. Study Objectives

The ultimate objective of the study was to field test a set of selected pedestrian safety public education messages to determine if they were effective in reducing the occurrence of accident situations or types which tend to recur. The content of the messages was specific behavioral advice developed previously by Blomberg and Preusser (1975). Subsumed in this overall objective were several sub-objectives. These included:

- The creative development and production of the previously pre-tested messages into mass media form so that transmission in public service time could be maximized.

- Selection of a set of test cities for the program which were typical of the entire United States and provided an uncontaminated and viable setting for the research.

- Development and/or adaptation of a pedestrian accident data collection plan in each of the test cities which was statistically sound and allowed each accident to be classified according to the typology developed by Snyder and Knoblauch (1971) and utilized in previous Dunlap efforts (e.g., Blomberg and Preusser, 1975) to define the target problems which spawned the message concepts.

- Assessment of the effectiveness of the messages through behavioral observations and survey data so that the utility of the messages could be enhanced in later applications and a complete view of the message process could be obtained.

- The development of an evaluation plan including data sources and analyses which provided for a rigorous test of each of the five messages and permitted the interpretation of the data to provide unambiguous answers to the questions:

  - What was the exposure of the messages in each city/media market?

  - What were the effects of exposure on the knowledge and behavior of the target population(s) for each message during the study period?

  - Did individual messages gain effectiveness when disseminated in combination as a "campaign"?

  - What is the best form for each message in wide-scale implementation, i.e., how might any deficiencies inherent in the message or fostered by the experimental conditions be countered?

  - Could accident reduction be attributed to each message?

- The distribution of the messages through public service (without cost for time or space) channels so that total exposure of the target population to the messages was maximized.

- Obtaining cooperation from the many public and private agencies who had to provide data, media support and permission for the tests.

The work effort began in July of 1974 and continued through November 1983.

II. MODEL OF PUBLIC EDUCATION AS A SAFETY COUNTERMEASURE

Development of effective public education materials should begin from a conceptual base which describes the process by which communications can ultimately lead to accident reduction. Such a base should describe each step in this process and fully depict each potential "loss" or critical point at which the efficiency or effectiveness of the communication in achieving its design goal could be jeopardized. The paragraphs that follow describe the conceptual base or "model" that was utilized in this study. This model consists of seven sequential steps or processes and six potential losses between steps. These are shown in Figure 1 where the steps are indicated by Roman numerals and the losses are indicated by subscripted "L's."

A. The Steps

1. Knowledge of Accident Causation

The first step in the model involves knowledge of the particular hazards and behaviors leading to accident occurrence. This knowledge, derived from epidemiological studies, must include information about causative factors in three areas:

- Behavioral errors--incorrect or "unsafe" behaviors which tend to precipitate accidents because of their relatively high risk.
- Environmental factors--elements in the environment which predispose an accident to occur, i.e., increase the probability that a behavioral error will be made and, hence, that an accident will occur.
- Situational factors--the demographics and socio-economics of the accident victims as well as any temporal characteristics which distinguish the accidents as a group and/or major subgroups within the total problem.

In general, causative information of the type just described will define specific accident types and associated target populations for use in defining countermeasure objectives. In the present study, the pedestrian accident research work of Snyder and Knoblauch (1971) was utilized as the major source of input information.

2. Message/Instructional Content

The results of the first step provide a basic knowledge of the hazards to be counteracted. This information must be transformed into specific message/instructional contents in the second step. A content usually consists of causal insights and specific behavioral advice designed to counter the identified unsafe actions associated with accident occurrence. In addition, the informational content may contain usage instructions (when, where, how) for the correct behaviors and guidance in threat assessment and recognition.

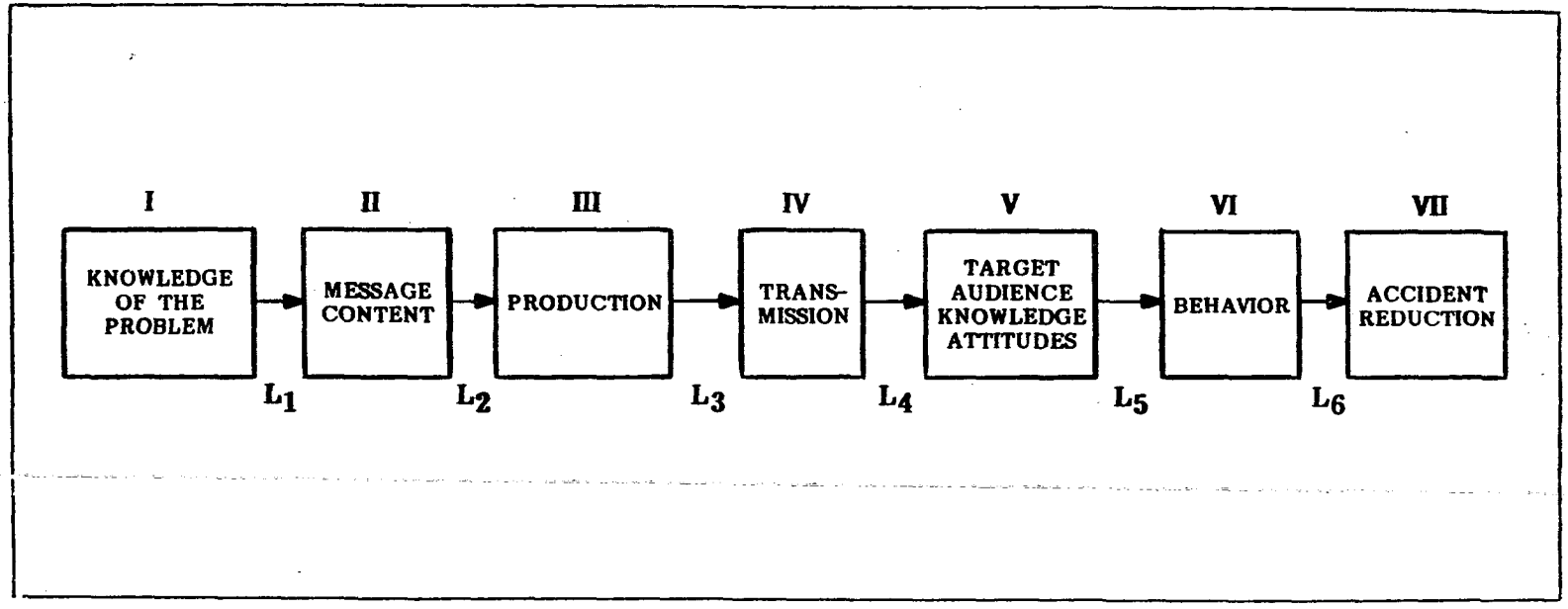

Figure 1. A Model of Public Information Development and Implementation

Ideally, the content of a message should specify its target audience, tell that audience what dangers it faces (where the age of the audience permits conceptualization) and specifically, in behavioral terms, how to avoid the dangers.

3. Production

The third step involves producing the message content in appropriate media form(s). This step begins with media selection. Each different media type has its own special parameters in terms of the audience it can reach, when they are reached and the kinds of messages that can be carried. Radio offers a point of behavior opportunity e.g., for a motorist message, but it lacks the ability to visually demonstrate a safe behavior and therefore is not generally effective in reaching young children. Printed media (excluding posters) offer an opportunity to fully explain a message content, but can be difficult to distribute, require reading skill and generally lack the impact of television. Television, itself, while referred to as the great "influencer" in our society, is not without its drawbacks. First, it is very expensive. Second, most applications of television rely on the 60 second or 30 second spot announcement. These announcements are delivered in such a short amount of time that messages must be distilled to very concise, very simple pieces of information. As a result, details, nuances of interpretation and other related accident generating factors often have to be omitted. If the 30 or 60 second spot announcements are to be delivered in public service times, i.e., donated by the stations, the messages must be capable of achieving their objective with limited or no control over the amount or timing of exposure. Thus, media selection and integration is extremely important. It depends on the message itself, message complexity, target audience characteristics, the desired timing of message delivery and the degree of support that can be provided to message distribution.

The production effort itself should faithfully transmit ideal message content while:

- Securing and holding the interest of the target audience.
- Being acceptable and attractive to media distribution channels.
- Maintaining message clarity and completeness.

4. Transmission

Once the message content is produced in a finished media form, it is necessary to accomplish transmission to the desired target audience. For maximum impact, it is essential to obtain transmission to those people whose behavior is to be changed with sufficient impact to insure that they will grasp the message. This generally means securing repeated exposures of the audience to the messages. For the purposes of evaluation, it may also be necessary to accomplish transmission on a schedule which is consistent with the timing of measurements of program effectiveness.

5. Target Audience Knowledge/Attitudes

If the messages are well conceived and well produced and if transmission is achieved, a change in knowledge level and/or attitudes among members of the target audience can be expected. This change may come in two different forms:

- Recall of the specific message, the vehicle in which it was contained, or associated program symbols.
- Improved knowledge of the correct safety behavior and when and how to employ it.

From a safety standpoint, the second type of knowledge gain is most important because it indicates that more people know the "safe" way to behave. Recall of the source of any knowledge change is important, however, for evaluative purposes. It helps insure that measured changes are the result of the test program rather than peripheral forces.

6. Behavior

The basic model assumes that accident reduction will be achieved by eliminating unsafe behaviors and substituting correct behaviors. The specification of the unsafe behaviors comes from a detailed study of accident causation. Remedial behaviors must be defined based on an analysis of the identified unsafe behaviors and the postulation of replacements which would improve safety. Therefore, a critical step in the model is the alteration of target audience behaviors. These behaviors may be universal, i.e., applied often in frequently occurring situations or specialized, i.e., utilized only infrequently in a well-defined set of circumstances. Behaviors may be simple or complex. They may also be a substitute for incorrect behaviors or an addition to a person's repertoire. The critical element is that a person in the population at risk reduces his or her probability of an accident through the alteration of behavior.

7. Accident Avoidance by Type

As conceptualized in this model, a safety message should be targeted at one or more specific types or clusters of accidents identified in step one. If someone in the target audience receives the message, understands it and alters his or her behavior at the appropriate time, accident avoidance will be achieved. Alternatively or additionally, audience members may be sensitized by the message. This sensitization can lead to a greater depth of thinking concerning specific behaviors and when to apply them to achieve the greatest safety benefit. As a result, each individual may avoid hazardous situations and/or work out their own behavioral remedies.

B. The Losses

The seven step model just presented is made considerably more complex by the presence of at least six major losses or filters which can reduce the effectiveness of an information countermeasure. These major losses can take place as the process proceeds from step-to-step. If they sum to 100 percent, the countermeasure will have no effect. When they are minimized, the

countermeasure will be maximally effective. It is important to consider these potential losses for at least two reasons. First, their measurement is an important goal of a message countermeasure evaluation effort. Even though the different losses cannot usually be measured with equal precision, their examination can provide invaluable insights into the reasons for the success or failure of a message program. The detailed field test results presented in Volumes II and III of this report were based on data collection structured to obtain information on the losses inherent in the model.

Even if it is not possible to quantify the entire model, it is important to be sensitive to the potential losses in it when preparing safety messages. Simply, they may be considered as a list of potential pitfalls which often can be avoided or minimized if taken into consideration early enough in the design process.

1. Content and Targeting of Message

Knowledge of causation from step one is utilized to create instructional content in step two. Several losses are possible at this stage. First, the basic epidemiological data may be incorrect or incomplete. Even if accurate, they may be misinterpreted when developing educational materials.

Assuming accurate input data and correct analysis, losses are still possible. Most public information and education media have a limited capacity. Simply, not all aspects of a problem can be covered in the available space or time. Therefore, some generalization is usually necessary when developing and targeting the program. This may reduce its coverage if some aspects of the problem are omitted and/or some members of the target audience do not believe the message is directed to them. This loss may be minimal if the program has enough space/time to be comprehensive and/or if the accidents to be reduced are relatively homogeneous. When a program is comprehensive, more information can be presented to provide complete coverage. If the problem is homogeneous, generalization excludes fewer people or situations.

2. Clarity in Materials Production

Once a content is developed, it must be produced in a form which will permit its dissemination to the target audience. At this stage, many constraints can limit the extent to which the finished product is faithful to its design goals. Time, money and the problems of depicting or describing abstract concepts can severely limit what is presented or how it is conveyed. Thus, the end product may not be optimal in terms of appeal, comprehensiveness or faithfulness to the underlying data.

3. Distribution/Exposure

The best program is of little value if it does not reach its intended audience. Before the produced materials have a chance to transmit content to audience members, the members must be exposed to them. This exposure is accomplished through distribution of the materials in specially designed programs or through the mass media. Regardless of the strategy or medium chosen, it is always possible that members of the target audience will not be exposed. Simply, they may not be at the right place at the right time. Losses from distribution are particularly large when the program must depend on public service (donated) space or time from newspaper or broadcast media.

4. Reception

Even those people who are exposed to the message may not "receive" the intended message. Perhaps they did not listen or if they listened they did not really hear what was presented. Alternatively, they may have misinterpreted the information and actually received a different message from the one intended. Finally, even if the message is received, it may not be remembered at the times and places when it is needed to accomplish accident reduction.

5. Putting Knowledge to Work

A basic assumption of the entire model is that knowledge change alone will not yield an accident reduction. The materials must be sufficiently motivating so as to insure that the desired behavioral change will result from the new knowledge and attitudes. Thus, losses are possible as audience members translate words and thoughts into actions in a safety environment. Timing is essential, and, without it, effectiveness may be diminished. Most accidents do not result from situations which are encountered continuously. Therefore, the target audience must choose the right time to exhibit the behavior, the behavior must be correct for the situation and it must be done consistently. Accidents are statistically rare events. Most dangerous situations do not result in an accident. Therefore, it is essential that the new countermeasure behavior is practiced regularly so that it will be reliably implemented when the hazardous situation is correctly perceived.

6. Appropriateness

After the sixth step in the model some proportion of the target audience will routinely be exhibiting the desired behaviors. Nevertheless, there is the possibility that although the behavior is instilled in the individual, this behavior and associated advice are not entirely effective in obtaining the ultimate safety benefits. While it is not likely that the learned behavior will have unintended consequences, it nonetheless must be considered as a possible loss. Common losses of this type occur when one poor behavior is modified by replacement with a second equally poor behavior. Alternatively, a positive behavior is instilled only in those individuals who are not likely to become accident involved. Thus, losses are still possible at this point and ultimate impact, i.e., accident reduction, must be measured in addition to measurement of behavior.

C. Discussion

This model obviously assumes a directionality and a sequential nature to the process of achieving behavioral change with educational materials. Exposure is intended to improve knowledge (and perhaps attitudes or beliefs) which in turn influences behavior etc., which means that the flow of the model is uni-directional. Most media development efforts in the health and safety area rely on this knowledge-to-behavior sequence with or without mediating concepts such as beliefs and attitudes. Researchers deviating from this model argue that attitudes, in particular, are shaped by behavior thus violating the uni-directional concept. Clearly, if an "attitude" is defined as a predisposition to act or believe in a certain manner then a successfully performed action or

behavior can easily have the effect of reinforcing the related attitude. Further, an unsuccessful behavior can have the opposite effect on a related attitude and probably even foster new or different attitudes. For example, a pedestrian who correctly follows the advice in a message and has it result in a near-miss accident, might be inclined to alter his or her attitude to reject the new behavior as being safe. One way of looking at this is to say that behavior itself is a greater contributor to the knowledge base and thus, in fact, the model cannot be uni-directional. Unfortunately, in practice, most public education efforts enter this sequence from the exposure--transmission--knowledge side and thus reverse directionality (i.e., behavioral experience reshaping attitudes) is often only of academic concern. The potential existence of reverse directionality would be an important evaluation consideration should any of the messages prepared in accordance with this model eventually be included in training programs or other situations allowing the direct monitoring of learning and/or "doing" activities.

It should also be pointed out that health and safety related public education in general has not always been effective. In fact, the general impression that one gets from the currently available literature is negative. However, one recently completed evaluation of public education for the U.S. Consumer Product Safety Commission (Preusser and Blomberg, 1979) and the results of the present study show positive results at each measured step of this public education model.

An examination of this model and previous message efforts leads to the belief that many previous campaigns have failed because too little attention was given to campaign objectives and the general notion of what can and cannot be accomplished in a 30 second TV spot or a poster or a pamphlet. On the one hand are commercial advertisers whose primary objective is often no more than to move consumers from one brand to another brand of essentially the same product. The behavior they wish to modify is incredibly simple and can be implemented by the consumer at incredibly low "cost." Coke and Pepsi, for instance, are similar products, available at similar prices and are found in the same aisle of the supermarket. All the consumer is asked to do is reach to the right for Coke instead of to the left for Pepsi or vice versa. There is overwhelming evidence that brand choice among similar products can be influenced by good 30 second TV spots effectively transmitted through paid air time. Further, the desired behavioral change can be accomplished very quickly and on a trial basis with immediate feedback. The consumer who tries Coke and does not like it as well as Pepsi will switch back and suffer no significant consequences.

At the other end of the scale are public education efforts which attempt to change basic lifestyles. Drinking and driving, for instance, has been particularly resistant to public education efforts. Here, the consumer or target audience member is being asked to change transportation habits and/or drinking habits both of which tend to be behaviors which are imbedded and developed over five, ten or twenty years, and it is unreasonable to expect any 30 second TV spot to produce immediate behavior modification. Similarly, a spot on cigarette smoking is unlikely to produce an immediate change in a heavy smoker or a spot on heroin addiction is unlikely to change the drug taking behavior of an addict. In short, the cost of the change or the magnitude of the change is such that it is unreasonable to ask a 30 second spot, or several spots and a pamphlet, to accomplish such objectives. Success

in lifestyle-type changes has apparently been achieved through public education only in situations where:

- The educational materials truly provide new information. (This may have been the case with the LSD drug campaigns in the 1960's.)
- The educational program takes an extremely long view (anti-smoking campaigns took years to show an effect).
- The campaign is attempting to prevent the audience from starting something bad rather than stopping it once it has been behaviorally established (there is apparently some evidence that the anti-smoking campaigns were particularly effective in preventing non-smokers from starting to smoke).

In the middle, between low cost behavior change such as those often sought by commercial advertisers and lifestyle changes, are a variety of moderate objectives which can likely be achieved consistently with public education if sufficient exposure of the message is obtained. In terms of the current effort, it was suggested and subsequently proved that asking a child pedestrian to stop and look left-right-left is achievable through public education. The behavior sought requires only a few seconds to implement for each street crossing. "Cross at the green" behavior is more difficult since the pedestrian is asked to go to the corner, wait for the light and then cross. This could require one or two minutes of extra time and a possible route change.

Within the context of the present study, the model just presented served two important purposes. First, as discussed above it provided a conceptual basis for designing measurement systems capable of measuring the various losses as a means of assessing the effectiveness of the developed messages. Second, the framework of the model facilitated a critical review of previous message campaigns in an attempt to ascertain the reasons for their success or failure. Most of the literature had already been reviewed in a previous study (Blomberg and Preusser, 1975) which laid the groundwork for the present effort.

The distillation of all of the background materials and the concepts inherent in the model led to the derivation of a set of overriding concepts to guide the actual process of message production. These were:

- The target audience should receive some new piece of safety information (i.e., not just "don't jaywalk," or "be safe").
- Presentation should be straightforward such that it is clear that the message is about pedestrian safety.
- The theme of each message should be homogeneous (i.e., integrated, concise).
- The safety information must be "sold" to the audience such that they understand the concepts and are motivated to perform the recommended behaviors.

- The developed messages should have entertainment value sufficient to:
  - gain and hold attention of the audience
  - maximize air-time in a public service environment
- Showing completed unsafe behavior should be avoided (e.g., child running all the way into the street without stopping and looking).
- Showing completed safe or correct behaviors is necessary. The audience cannot be trusted to work out the correct solutions on their own.
- Media selection and presentation strategy should be such as to insure reaching the widest possible audience. Since the messages will likely be designed to work with a minimum number of repeat exposures, achieving multiple exposures to the same individual is not as critical as obtaining at least a single exposure to as many members of the target audience as possible.
- Casting and the selection of shooting locations should be as faithful as possible to the modal accident situation being addressed. This should aid the target audience in identifying with the message.
- The target audience must clearly and quickly understand that the spot is directed to them. There simply is no time for subtlety in most 30 or 60 second spots which are attempting to alter safety-related behaviors.

These precepts were closely followed in the present study and, it is believed, contributed greatly to the success of the developed materials. Specific data relating to the measurement of that success are reported in Volumes II (child messages) and III (adult messages) of this report. The remainder of this volume covers a description of the derivation of each of the messages which were produced and tested as part of this study.

III. THE MESSAGES, THEIR MEDIA AND DISTRIBUTION

This section will address the messages which were tested and the media forms in which they were executed. Initial attention will be focused on the accident types from Snyder and Knoblauch (1971) which the messages addressed. The specific behaviors to be engendered for each accident type (based on the message contents developed by Blomberg and Preusser, 1975) and the relevant accident characteristics are then presented. This is followed by a description of the media packages actually developed. Finally, the selection of test cities and the distribution of the developed materials among them is discussed.

A. Accident Types/Message Contents

NHTSA chose three accident type groupings identified by Snyder and Knoblauch (1971) for testing under this study. These were:

- Darts and Dashes by Children
- Vehicle Turn/Merge with Attention Conflict (VTM)
- Multiple Threat (MT)

Each will be described below together with their related messages contents as originally proposed by Blomberg and Preusser (1975).

1. Darts and Dashes

a. The Accident Types

The dart and dash category encompasses four separate accident types characterized by similar pedestrian behavioral errors. It is primarily a pedestrian problem because the pedestrian's actions (generally appearing suddenly from the side of the road) do not give the driver sufficient time to react. In total, darts and dashes by all age groups represented 45.4% of the Snyder and Knoblauch (1971) cases. The four specific types, including description and incidence, as per Snyder and Knoblauch (1971) are:

- Dart-Out First Half (24.1% of all cases)

  A pedestrian, not in an intersection crosswalk, appears suddenly from the roadside. His quick appearance and short-time exposure to the driver are the critical factors. The pedestrian may often be running, and parked cars often obstruct vision, but neither need be present if the basic condition of sudden appearance to the driver's view is met.

  The prime example of the dart-out is a school-age child running out from between parked cars on his own block, in a residental area in the center city in the afternoon after school. He heads straight across the relatively narrow street, looking only where he is going and is

struck less than half-way across. The driver, traveling at a normal rate of speed, did not have enough time to stop after detecting the child. Other variations, such as a crash involving an elderly pedestrian, may occur, but the above example was a recurring pattern.

- Dart-Out Second Half (9.0% of all cases)

  This is the same as the dart-out described for the first half above, except that the pedestrian covers half of a normal crossing before being struck. The distinction is made because of the possible differences in the opportunities or problems relative to driver detection and recognition of danger if the roadway is clear. (This accident type was coded even if the pedestrian crosses a medium-size median strip of a boulevard.)

- Pedestrian Strikes Vehicle (4.0% of all cases)

  This classification covers crashes not covered by other clear types (e.g., dart-out), in which it has been determined that the pedestrian ran or walked into the car.

- Intersection Dash (8.3% of all cases)

  This category covers cases similar to dart-outs with regard to pedestrian exposure to view, but the incident occurs in a marked or unmarked crosswalk at an intersection. Cases are included if the pedestrian is running across the intersection even though his exposure to possible driver view is not extremely short. (His speed will in effect limit his actual exposure to the driver.)

The distribution of these dart-out accidents by pedestrian age clearly indicates that these messages should be directed to child audiences, particularly the 5 - 9 year old age group. Fully, 46-48% of all dart-outs occur in this age group including 51.7% of dart-out first half and 48.5% of dart-out second half. Moreover, assuming "children" to include anyone 15 or younger, 80% of all types of darts and dashes (87.7%, 77.8%, 67.8% and 65.6% of the four types, respectively) are child accidents. Thus, it is clear that any messages directed at these types should be focused at children with a modal age in the 5 to 9 year old range.

b. The Message Content

In addition to defining accident types, Snyder and Knoblauch (1971) also catalogued the major behavioral errors which precipitate each type and any environmental or situational factors which were predisposing to an accident occurrence. As suggested by the accident type descriptions above, darts and dashes are primarily the result of improper course and search behaviors by the pedestrian. Presenting a short time exposure to the driver, i.e., giving him little time to react, was the primary course failure. This may

have resulted from running or choosing a poor path to follow such as in front of parked cars.

Search errors in the darts and dashes can generally be classified as improper, inadequate or distracted search efforts. Basically, the pedestrian looks where he is going and not for oncoming vehicles in either direction.

To counteract these identified errors, particularly for a child audience, a simple behavior sequence was needed. Thus, based on the previous analyses by Blomberg and Preusser (1975), it was decided to demonstrate the following behaviors:

- Stopping at the curb, and looking left-right-left until no cars are coming before crossing.
- Stopping at the curb and then at the outside edge of a parked car and looking left-right-left until no cars are coming before crossing.
- Running along the sidewalk, stopping at the curb or outside edge of a parked car and looking left-right-left until no cars are coming before crossing.
- Interrupted sequence being reinitiated from the beginning (e.g., look left-right, seeing a car, waiting for car to pass, then looking the full left-right-left again until no cars are coming).

The first three items above present a "stop and search" paradigm which it is believed children can easily learn. It does not depend on gap or speed discrimination which have been shown (Salvatore, 1972) to be poor in children in the target age group. Thus, if anything, it is an extremely conservative behavioral sequence to teach because it does not assume any abilities other than normal vision.

The fourth item, termed reinitiation in this study, addresses a problem suggested by Sandels (1970), the Road Research Laboratory (1971) and others and summarized by Blomberg and Preusser (1975, p. 24):

> Children generally follow training sequences by rote without understanding the underlying reasons for their actions. They are, therefore, incapable of acting properly when external stimuli interrupt the learned behavioral sequence. For example, a child who is taught the proper sequence for crossing a street will execute all of the steps if uninterrupted. However, if the sequence is disturbed, e.g., by visual distraction, he is more likely to pick up where he stopped than to re-initiate the sequence.

Although there is no direct epidemiological evidence that failure to reinitiate a correct behavioral sequence is resulting in accidents, there are compelling reasons for attempting to convey this concept to children when teaching them a new sequence to be learned by rote. First, children are

apparently not following any sequence at all at present. Data collected by Blomberg and Preusser (1975) and supported by baseline measures taken for the present study showed that only 1% of 999 children observed in Pittsburgh prior to viewing the pre-test message were exhibiting the correct stop, left-right-left sequence. This increased to 8% of 1,211 children viewed after a single exposure to the message. Thus, if the messages disseminated in this study are successful, more children will be following a rote sequence and will, therefore, be more susceptible to a reinitiation failure.

A second reason to promote reinitiation has already been mentioned. The poor perceptual skills exhibited by children dictate the need for simple behavioral remedies which do not depend upon complex perceptions of judgments. Continuing search activity while stopped until three clear looks are obtained (left-right-left) is perhaps the surest way to guarantee a safe crossing while placing minimum perceptual demands on children.

Finally, the desired behavioral sequence involves fostering a left-right-left search pattern. This permits two looks (the first and last) in the direction of the most immediate threat before crossing a two-way street (the most common settings for darts and dashes). However, Sandels (1970) and others have shown that young children may not know right from left reliably. Although any multiple looks (right-left-right, right-left, etc.) are better than no search at all (the current behavior of most children), it was deemed desirable to attempt to engender the perfectly correct sequence. Thus, it was decided to attempt to teach children the directions left and right in a traffic environment as some part of the final message package.

It should be noted that the proposed behavioral sequence is considered maximal for dart-out first half and dart-out second half, which are primarily midblock events. Analysis of the Snyder and Knoblauch (1971) data indicates that the vast majority of children involved in these accidents are struck midblock. Intersection dash accidents by definition and many pedestrian strikes vehicle crashes are, however, occurring at intersections. For these situations, the advice is considered optimal but not necessarily maximal because it does not specifically address turning vehicle threats. The advice for avoiding turning vehicle accidents is discussed below as part of the vehicle turn/merge accident type. However, the pedestrian behavior in that situation (looking for eye contact with the driver) is too complex conceptually for children, particularly with the universal acceptance of right-turn-on-red (RTOR) which poses unique hazards for the pedestrian at an intersection (see Preusser et.al, 1981). Moreover, the behavioral data collected by Blomberg and Preusser (1975) in Pittsburgh referenced earlier were taken primarily at intersections and showed that only 7% of the children were searching in a safe manner. Thus, it is fair to assume that a stop, left-right-left sequence will lead to a reduction in darts and dashes at intersections, particularly in those cases in which the child is struck by a vehicle proceeding straight ahead across his path.

c. Situational Variables

Data from Snyder and Knoblauch (1971) provided information as to the setting, environmental situation and other factors typically associated with dart and dash crashes. To the extent practical and feasible, the

developed messages were designed to conform to and/or represent these situational environmental constraints:

- Pedestrian Sex--Males are more often involved in these crashes than females (66& vs. 34%).

- Pedestrian Race--The urban, dart and dash accidents typically involve minority children. The overall racial breakdown was 51% black, 41% white (Anglo) and 8% other minority (Mexican-American, Oriental, etc.).

- Neighborhood--The dart and dash accidents typically occur in a single (26%) or multi-unit (35%) urban residential neighborhood. This is especially true for the child dart and dash crashes.

- Crossing Controls--These crashes typically do not occur at a marked crosswalk (73%) and typically there is no traffic light, stop sign, etc. (76%).

- Location--The streets on which these crashes occur are typically 40 feet wide or less (68%) with posted vehicle speed limits of 25 m.p.h. or less (64%). Fully 99% involve posted vehicle speeds of 35 m.p.h. or less.

- Date/Time--These crashes tend to occur more often in the warmer months and during daylight hours. A particularly hazardous period appears to be from 3-6 p.m. (49% of all crashes). Friday is the least likely day of occurrence (6% of all crashes); Wednesday is the most likely (17% of all crashes).

- Driver Characteristics--Generally speaking, the driver is not a distinguishing causative element in these crashes, since once the child darts into the street there is little that the driver can do. Thus, the driver appears in the messages as strictly average and generally inconspicuous. The typical driver involved in these crashes was male (80%), middle aged, had more than ten years of driving experience (50%) and was traveling at or below the posted speed limit (95%).

2. Vehicle Turn/Merge with Attention Conflict

a. The Accident Type

The vehicle turn/merge with attention conflict (VTM) accident type was described by Snyder and Knoblauch (1971) as follows:

> The driver is turning into or merging with traffic; the situation is such that he attends to auto traffic in one direction and hits the pedestrian who is in a different direction from his attention. A critical feature is that the attention conflict is built into the situation. Usually the driver directs his attention

in a given direction to determine an acceptable gap into which he will enter.

As a type, it represented 6.4% of the 2,163 cases studied by Snyder and Knoblauch (1971), making it the most common identified type other than dart-out first and second half and intersection dash. Moreover, unlike the darts and dashes, VTM is characterized by a more even split of pedestrian and driver behavioral errors. Fully 60% of the errors identified by Snyder and Knoblauch (1971) in VTM accidents were committed by drivers. Thus, as suggested by Blomberg and Preusser (1975), separate driver and pedestrian advice is needed to address completely the VTM accident type.

b. The Message Content

The VTM situation is relatively unique in that all parties apparently believe they are behaving in a safe manner. The pedestrian is typically crossing at a corner in a crosswalk (marked or unmarked) and facing a green light or "Walk" signal. The driver is searching for threats but is apparently preoccupied with vehicular traffic and finding a gap in traffic. The typical situation involves a left turning vehicle (68%) and a pedestrian who has just started into the street (75% are struck in the first half of their crossing). It is clear from the data that both parties are basically unaware of the problems facing the other. The pedestrian believes he has the right-of-way by being in a crosswalk and crossing with the light. He does not necessarily appreciate the search overload the driver is experiencing. The driver, on the other hand, is searching. Moreover, he feels the pedestrian can see him and will watch his movements. He does not realize that while he is waiting and searching for a gap in traffic, the pedestrian is assuming that he has yielded to him to permit a safe crossing.

The essence of the behavioral advice conveyed in this situation is best summarized by the original message contents developed by Blomberg and Preusser (1975). These were:

- Pedestrian Message--Drivers turning the corner at intersections have many attention conflicts. They must watch traffic from four directions and pedestrians. Thus, they may be overloaded and fail to see you in time. Furthermore, vehicles can come at you from four directions. Therefore, when crossing at an intersection, look in all directions for turning vehicles and do not cross the path of a turning vehicle until you are sure he will stop or you can make it safely across.

- Driver Message--When turning a corner there are a lot of things you must pay attention to. With all of the possible vehicle-to-vehicle confrontations, you may neglect to search completely for pedestrians. Therefore, when turning a corner, look in all directions for a safe route to follow, then, before turning, look again for pedestrians.

In essence, these message contents were attempting to prompt the driver and pedestrian to establish eye contact, a notion carried over into the final versions of the messages.

More recent research conducted by Preusser et.al (1981) suggests that the universal acceptance of permissive or "western" RTOR may have significantly altered the relative proportion of right- and left-turning vehicles in the VTM type found by Snyder and Knoblauch (1971). The RTOR situation appears to exaggerate the driver's attention conflict because he must find a safe gap in a moving traffic stream. This appears to lead to a search overload and a neglect on the part of the motorist to search back to his or her right for a pedestrian. Although the detailed insights of Preusser et.al (1981) were not available as input to the message development process for the study reported herein, the VTM messages which emerged appear valid, although not totally comprehensive, for the RTOR situation.

c. Situational Variables

Data from Snyder and Knoblauch (1971) provided the following information as to setting, environment, target group characteristics, etc.:

- Pedestrian Age--Only 5% of the accident victims were 15 years old or less. Fully 56% were past the age of 45.
- Pedestrian Sex--The majority (58%) of the victims were female, probably reflecting differential exposure of females at the times and places of VTM crashes.
- Pedestrian Race--The overall racial breakdown for victims of this accident was 76% white, 17% black and 7% other minority.
- Neighborhood--The majority of these accidents (76%) occurred in a "commercial" setting. The downtown business district is probably typical as this would coincide with a female population of shoppers.
- Crossing Controls--Only 9% of these crashes occurred at non-controlled intersections and only 17% occurred where only a stop sign was present. The remainder (79%) occurred in the presence of a traffic light.
- Location--The streets on which these accidents occurred were typically 41 feet wide or more (60%) with posted vehicle speeds of 35 m.p.h. or less (99%).
- Date/Time--These accidents occur throughout the year, during daylight hours (especially noon to dusk) and are most prevalent from Monday to Friday.
- Driver Age--Younger drivers (37% were 25 years old or younger) with five years of driving experience or less (54%) predominated. Thus, while the "average" driver does become involved in this accident type, it is slightly more prevalent among the younger, less experienced individual.

- Driver Sex--Fully 83% of the drivers involved in these accidents were male. While this does not necessarily indicate an over-representation of male driver involvements as compared to all urban drivers, it does indicate that the primary audience for the driver message is male.

3. Multiple Threat

1. The Accident Type

The multiple threat accident type involves an overtaking vehicle striking a pedestrian crossing in front of the vehicle or vehicles being overtaken. It represents 3.2% of all cases studied by Snyder and Knoblauch (1971) and was described by them as follows:

> The pedestrian is struck by car x after other cars blocking the vision of car x stopped in other lanes, going the same direction, and avoided hitting the pedestrian. For example, cars in lanes one and two stop and permit the pedestrian to cross; car x in lane three going in the same direction hits the pedestrian as he steps out in front of the car in lane two. This classification is not used if the striking vehicle is going in the opposite direction from the stopping cars. (In that situation the stopping cars would not block the driver's vision.)

The major causative element in this crash is the screening effect of the car(s) which initially stop for the pedestrian. However, from a behavioral standpoint, both drivers (36% of the time) and pedestrians (64% of the time) can precipitate a multiple threat crash. Thus, as with the VTM accident, both driver and pedestrian messages are desirable for complete coverage. The frequency of multiple threat accidents varies greatly across cities. In western states where drivers generally comply with pedestrian right-of-way laws, multiple threats can represent as much as 10% of a city's pedestrian accidents. In other areas where motorists typically do not stop to yield to pedestrians, multiple threats may be only 1% of total pedestrian accidents.

b. The Message Content

The multiple threat crash covers the complete range of pedestrian ages and can involve both driver and pedestrian culpability. It is similar to the VTM situation in that both the driver and pedestrian in a given crash may believe they are performing safely. The pedestrian usually has the legal right-of-way and is crossing in front of at least one vehicle which has already acknowledged this right. The driver may be obeying the speed limit, and may be attentive to the traffic environment and still fail to detect the crossing pedestrian threat because of the screening effect of the stopped vehicle(s). Thus, an adequate description of the accident's dynamics was an essential ingredient of both the pedestrian and driver messages.

In addition to describing the inherent danger in the multiple threat situation, the pedestrian message provided a simple behavioral remedy analogous to the dart and dash advice for crossing in front of a parked car. The desired behaviors are to stop at the edge of each car that stops for you and look around it for oncoming vehicles. This allows the pedestrian to see threatening vehicles before he enters their lane and also gives drivers a chance to detect pedestrians and take evasive action.

The only significant cue the driver has to signal an impending multiple threat is the presence of a vehicle stopped in a traffic lane (often but not always at a crosswalk or intersection). However, a vehicle may be stopped in the roadway for many reasons, and drivers often overtake such vehicles without encountering a crossing pedestrian. Hence, a potentially productive driver message would describe the situation and counsel a driver to slow down and be prepared to stop whenever overtaking a vehicle stopped in the roadway. By posing the question "ask yourself why is he stopped," the message might also sensitize drivers to the need to be constantly alert when overtaking a stopped vehicle. Finally, the driver message content must convey the notion that multiple threat situations can develop anywhere (intersections, crosswalks, midblock) a driver stops to let a pedestrian cross in front of his car.

c. Situational Variables

The Snyder and Knoblauch (1971) data were analyzed to produce the following situational profile:

- Pedestrian Age--The multiple threat accident involves pedestrians of all ages. Nearly half of the involved pedestrians were 15 years or younger (43%), nearly half were 16-65 (42%) and the remainder (14%) were over 65.

- Pedestrian Sex--Males and females were nearly equally represented in this accident type (48% male; 52% female).

- Pedestrian Race--The multiple threat accident seems to involved white (Anglo) pedestrians more often than members of minority groups. However, all groups are involved. The racial breakdown was: 64% white; 26% black; 11% other minority.

- Neighborhood--The typical setting for this accident is in a "commercial" area (65%). While residential areas were represented (23%), the downtown or other commercial location seems to predominate.

- Crossing Controls--The typical location for this crash is in a marked crosswalk (60%), or other location with pedestrian controls (8%). However, vehicular controls are less likely with only 7% at stop signs and 38% at traffic lights. The crosswalk and the standing vehicle probably provide the pedestrian with an extreme, yet unwarranted, sense of security. The lack of vehicular controls help create the danger since overtaking drivers do not realize that they must also stop.

- Date/Time--This accident occurs throughout the months of the year. It is most often a daylight event, with 65% occurring between noon and 6 p.m. Also, they are more likely on weekdays than on weekends.

- Driver Age--Drivers of all ages were represented among these crashes. The typical driver was 45 years of age and had ten or more years of driving experience.

- Driver Sex--The driver was most often male (74%), but, as with the other accident types, this probably only reflects the fact that males drive more often, especially in urban areas.

B. Developed Media Packages

The previous section discussed the dart and dash, VTM and multiple threat accidents in terms of the characteristics of each accident, the target population and the behaviors which each message attempted to modify. The messages, however, were specified only in content and not in specific media format. This section will discuss the specific media materials developed.

1. Dart and Dash Messages

The dart and dash messages were targeted for school age children, especially those 5-9 years old. Previous research (see, e.g., Sandels, 1970) suggested that children in this age range do not learn by being told what to do, but rather they must, at a minimum, be shown the correct behaviors. Thus, the media package developed for these messages emphasized visual materials. The next question was how best to format these materials such that maximum exposure to the target audience could be achieved. The first conclusion reached was that public service announcements shown close in time to children's television programming would be ideal. The second conclusion was that materials suited for in-school presentation would also be effective. Both of these objectives were achieved by producing one "long" film depicting all of the behaviors of interest and using the footage from this film to produce specific television spot announcements. In addition, a poster was prepared for use in schools. The purpose of the poster was to key recall of the behavioral advice shown in the film and the television spots. The entire set of materials, poster, film, and television spots were coordinated through the use of "Willy Whistle," an original cartoon characterization of a policeman's whistle, to convey the behavioral advice.

The general content of each of the Willy Whistle materials is summarized below:

Willy Whistle (6 minute 22 second motion picture)

- Willy Whistle and three older children are introduced

- Younger children are introduced and asked if they know the right way to cross streets

- Children are taught to always stop at the curb

- Children are taught to look left-right-left

- Children learn left hand versus right hand

- Reinitiation is taught
- The parked car situation is depicted
- All teaching points are reviewed

The Whole Story (60 second TV spot)

- Shows stopping at the curb
- Looking left-right-left
- Parked car situation
- Reinitiation

Search (30 second TV spot)

- Shows stopping at the curb
- Looking left-right-left

Reinitiation (60 second TV spot)

- Shows stopping at the curb and looking left-right-left
- Car appears, and passes by
- Search conducted over again from beginning

Curbs (30 second TV spot)

- Shows stopping at the curb by two different children
- Ends by telling children not to go into the street until they are sure no cars are coming

Curbs and Parked Cars (60 second TV spot)

- Shows stopping at the curb by two children
- Going out to the edge of the parked car
- Looking left-right-left

Parked Cars (30 second TV spot)

- Shows stopping at the curb
- Stopping at the edge of a parked car
- Looking left-right-left

Poster (17½ x 21½ 3 color poster)

- Uses same colors as long film to differentiate left and right
- Shows Willy Whistle
- Willy tells readers to stop at the curb and look left-right-left before crossing

Over the life of the project, three versions of the classroom film and two versions of the six TV spots were prepared. The original versions were set on a long stretch of road in a housing project without any visible intersections. The concept was not necessarily to encourage non-intersection street crossings but, rather, to acknowledge that they were inevitable (as evidenced by the accident data and behavioral observations) and teach children to negotiate them successfully. In fact, the materials never address where to cross, only how to cross.

During the solicitation of test sites, the fact that non-intersection crossings were shown without any acknowledgment that crossing aids such as crosswalks and signals might be preferable caused consternation among local officials. In one city (Los Angeles) it was possible to convince these individuals that the approach was valid and not counterproductive, and they therefore agreed to utilize the film and spots as originally prepared. A second site (Milwaukee) also agreed to use the TV spots as originally shot, but requested a modification to the classroom film to address the issue of intersection versus non-intersection crossings. To meet this request, a 14 second insert was made in the opening scenes. In this additional footage, Willy Whistle tells the audience that traffic lights, crosswalks and policemen or crossing guards can all help someone cross the street safely. However, these aids are not always available when needed and, therefore the film will teach you to cross safely even when there is no help around.

Several cities, including Columbus, Ohio, a city for which extensive pedestrian accident data had already been collected by NHTSA, refused to show the film or use the TV spots as long as non-intersection crossing were depicted. Since it appeared as though this position represented a significant subset of the total market for pedestrian safety messages, NHTSA agreed to create an intersection version of the Willy Whistle materials. In order to utilize essentially the same script and approach but avoid addressing the complexity of turning vehicle threats at intersections, this version was set at a "T" intersection. All of the crossings were shown originating from the top or closed side of the "T" so that turning vehicle threats from behind the pedestrian were eliminated. Other than the setting and minor dialogue changes to accommodate the change, the long film and six TV spots covered exactly the same behaviors as the non-intersection versions.

2. Vehicle Turn/Merge Messages

The vehicle turn/merge messages were directed at both drivers and pedestrians, thus two media packages had to be developed. For both, it was felt that the best format for delivering the behavioral advice was the TV spot announcements. Nearly everyone in the target populations could be expected to watch television, and television provides the opportunity to present visually the full accident situation. Two TV spots were produced depicting the driver

advice. In addition, the driver media package contained two radio spots, since radio is capable of reaching a driver while he is in the car and can therefore provide advice close to the time when it is needed, i.e., at the "point of behavior."

The general content of each of these materials is summarized below:

VTM-Pedestrian (60 second TV spot)

- A previously injured female pedestrian and a previously injured male pedestrian express their frustration concerning the crash in which they were injured. Neither knows how their accident could have been avoided.
- The narrator tells those pedestrians that drivers making turns have many hazards to watch out for.
- The spot closes by telling pedestrians (twice) to "look at the driver, not just the car. The car won't stop unless the driver sees you."

VTM-Pedestrian (30 second TV spot)

- This 30 second spot is an abbreviated version of the 60 second pedestrian spot. It begins by stating and showing the turning vehicle problem and concludes with the VTM behavioral message.

VTM-Driver (60 second TV spot)

- A male pedestrian has been hit.
- Two "traffic engineers" (only their hands are visible) discuss and show on a model, the situation that led to the crash. They state that the driver was distracted and forgot to take a last look for pedestrians before turning.
- The above sequence is repeated, this time with a female pedestrian.
- Correct behaviors are then shown for left and right turns each followed by the "last look for pedestrians" message.

VTM-Driver (30 second TV spot)

- This 30 second spot is an abbreviated version of the 60 second driver spot. It starts by showing that a pedestrian has been hit and the problem was driver distraction. It ends by showing the correct behavior, and advising drivers "to take a last look for pedestrians."

VTM-Driver (60 second radio spot)

- A driver, probably alone in the car, is relating his stream of consciousness as he maneuvers his vehicle in urban traffic. He

is about to turn, checks traffic controls, checks other traffic and almost hits a pedestrian.

- The narrator says that the driver forgot to take a last look for pedestrians.
- At the next corner, he remembers and successfully avoids another near miss.
- The spot ends by reiterating the last look for pedestrians message.

The next section of this report will discuss the selection of the cities in which the effectiveness for all of these materials were tested. This selection led to the VTM messages being placed in two cities (San Diego and Los Angeles) with significant Spanish speaking populations. For this reason, the four TV spots and the two radio spots outlined above were produced in both Spanish and English.

As the study progressed, it became clear that the exposure of the VTM messages was less than desirable because of the fierce competition for public service air time (see Volume III for a more detailed discussion of exposure). Therefore, when NHTSA funded a large pedestrian safety demonstration project in Dade County, FL (Miami area), it was decided to examine alternate means to convey the VTM (and multiple threat) messages. This led to the production and distribution in Dade County of the following VTM materials to carry the same messages as the TV and radio spots:

- Print Ads--Reproducibles of various sizes for use in major newspapers, neighborhood newspapers and magazines.
- A two color bumper sticker.
- A poster.
- A pamphlet suitable for mail distribution as a "statement stuffer" or for placement in "take one" racks.
- A media kit containing the VTM and multiple threat materials and advice for disseminating pedestrian safety materials.

The actual distribution of the ancillary VTM and multiple threat materials was undertaken by the Dade County Project. Likewise, Dade County conducted an in-depth evaluation of all of the pedestrian countermeasures they employed. These included all of the messages developed by the study reported herein. This evaluation following the design of the current study and, in fact, Dunlap and Associates, Inc., provided assistance to the Dade County Project as part of this effort. For details on the performance of the messages in Dade County, the reader is referred to the various reports of the Pedestrian Demonstration Project conducted by the Metropolitan Dade County Department of Traffic and Transportation which may be obtained from NHTSA (c.f., Madeiro, Thompson and Goodman, 1982).

3. Multiple Threat Messages

The multiple threat messages were directed at both drivers and pedestrians as were the VTM messages. Thus, two media packages were again developed, and again the TV spot announcement was chosen as the primary media format. The pedestrian package consisted of one 60 second and one 30 second TV spot. The driver package consisted of one 60 second and one 30 second TV spot which were again augmented with 60 second and 30 second "point of behavior" radio spots.

The general content of each of these materials is summarized below:

Multiple Threat-Pedestrian (60 second TV spot)

- A male pedestrian has been injured by an overtaking vehicle.
- Two "traffic engineers" discuss the crash and show on a model exactly how the crash occurred.
- This sequence is repeated for an injured female pedestrian.
- A male pedestrian then crosses correctly and the crossing is demonstrated on the model by the two "traffic engineers." The message to the pedestrian is to stop and look around the stopped car.
- The sequence is repeated with a female pedestrian.

Multiple Threat-Pedestrian (30 second TV spot)

- This 30 second spot is an abbreviated version of the 60 second pedestrian spot. It shows the injured man, and presents the message using the female pedestrian sequence.

Multiple Threat-Driver (60 second TV spot)

- A distraught female driver has just hit a pedestrian and she doesn't know how the accident could have been avoided.
- A distraught male driver finds himself in the same situation.
- The announcer describes the accident situation and presents the driver message. Namely, "slow down so you can stop if the car is hiding a pedestrian."
- Correct behavior is demonstrated in two different situations.

Multiple Threat-Driver (30 second TV spot)

- This 30 second spot is an abbreviated version of the 60 second driver spot. It presents the basic message and demonstrates the correct behavior in two different situations.

Multiple Threat-Driver (60 second radio spot)

- A woman is having a driving lesson.
- The teacher advises her to slow down because the car ahead in the next lane is stopped at a crosswalk.
- The car ahead was hiding a pedestrian and an accident was avoided.
- The sequence is repeated, but this time the pupil slows down without being told. She has understood the message.

Multiple Threat-Driver (30 second radio spot)

- This 30 second radio spot is an abbreviated version of the 60 second driver spot. It depicts the woman's initial learning of the message.

As with the VTM package, supplementary print materials were prepared for use in the Dade County Project. Print ads, a bumper sticker and a bus card/poster were actually produced and distributed. A pamphlet was designed and executed as a reproducible but budgetary constraints in Dade County precluded printing and distributing it.

C. Selection of Test Cities

1. The Plan

The implementation of a field test of the developed messages necessitated the selection of cities and media markets in which the test would be conducted. Before this selection could be undertaken, a fundamental experimental design decision had to be made. Basically, the developed set of messages could either be grouped as a campaign aimed at all three accident types (child dart-out, VTM and multiple threat) or considered as three separate sets of messages for independent testing.

Previous pedestrian safety public education efforts as summarized by Blomberg and Preusser (1975) indicated a possible synergistic effect of presenting messages in combination. A large bombardment of pedestrian safety information in a given media market may create a general sensitivity to the problem of pedestrian safety which actually augments the specific behavioral advice presented in each message. On the other hand, a campaign in a single media market creates competition among the messages for the limited public service broadcast time available. Thus, while total air time may remain constant or even increase slightly, the exposure of each individual message is likely to decrease.

This concept of a campaign versus individual message or accident type presentation was of interest to this study in deriving strategies for nationwide distribution of the developed messages. Since there was little available information to assist in making a distribution decision, it was decided to test the relative effectiveness of the messages both individually and as a campaign. However, it was also clear that the VTM and multiple threat

messages were directed at similar audiences and, therefore, the results of an independent test of one would be highly suggestive of the results which could be expected from an independent test of the other. Moreover, the VTM accident type has slightly more than twice the incidence of the multiple threat type and is a fairly stable proportion of the pedestrian accidents in all cities. Multiple threats are about 3% of all pedestrian accidents nationwide but vary from about 2% in Eastern and Midwestern cities to 10% in Western areas where drivers are more likely to stop for crossing pedestrians and thereby precipitate a multiple threat (estimates from Snyder and Knoblauch, 1971).

In light of these considerations, it was initially decided to utilize three cities for the test. One would receive all of the messages as a campaign and the other two would support independent tests of the VTM and dart and dash messages. To be considered for selection as a test city, a locale had to:

- 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.
- Have a cooperative and accessible school system (for the dart and dash messages).

Since NHTSA/FHWA was maintaining pedestrian accident data bases in six cities (Akron, Columbus and Toledo, OH; Washington, DC; Miami, FL; and San Diego, CA), these cities were prime targets as messages test sites. Akron had been set aside as a control site and Toledo was already being used for a dart-out training program test under another NHTSA contract. Thus, these cities were excluded from consideration as project activities might contaminate the ongoing efforts. Columbus only entered the NHTSA/FHWA data base in July of 1974. Therefore, a three-year baseline period was not readily available.

As information on the status of data collection efforts at the remaining sites became available, it became clear more of the sites would have to be excluded. Both Washington and Miami were only providing fragmentary reporting. Neither data set was sufficiently complete or consistently sampled. Therefore, it was not possible to obtain a valid and reliable statistical picture of pedestrian accidents at these sites. San Diego data were complete but displayed an unexplainable drop in multiple threats from 33 in 1973 to 18 in 1974. This was indicative of an unstable baseline for comparison purposes if the multiple threat messages were tested in San Diego. Moreover, the 1974 multiple threat incidence in San Diego was too small to permit a valid assessment of the effectiveness of the messages.

Considering these difficulties, it was decided to seek alternate sites for the experiment while retaining the same design. Immediate attention was therefore turned to the remaining cities included in the NHTSA/FHWA data collection system to determine their ability to support a campaign. However, none of these was suitable as a campaign city. As mentioned, Akron had already been set aside as a control and both remaining cities (Columbus and Toledo) had insufficient numbers of multiple threats. As single sites,

Columbus appeared viable for the children's messages and San Diego seemed suitable as a replacement for Miami as a VTM site.

Since none of the NHTSA/FHWA cities was suitable for a campaign or the multiple threat messages, other cities not part of the then ongoing pedestrian accident data collect were examined. West coast cities were favored as they tended to have a higher incidence of multiple threats. This examination led to the choice of Los Angeles as a possible campaign city. Los Angeles was experiencing approximately 3,000 pedestrian accidents per year of which almost 10 percent (based on figures from Snyder and Knoblauch, 1971) were multiple threats.

After meetings with appropriate officials in the Los Angeles Police Department and the Los Angeles Unified School District and contacts with Los Angeles media representatives, it was determined that Los Angeles was suitable as a campaign site. Accident data could be made available for a three-year baseline and the program period in the form of police accident reports. These reports were sufficiently detailed to permit categorization into the accident types of interest by coders thoroughly familiar with the Snyder and Knoblauch (1971) typology.

With the addition of Los Angeles as the campaign city, San Diego was free to become the site of one independent test. Further, it was determined that the missing baseline data in Columbus, OH could be recovered through the police records files. Hence, it was decided to test the messages as follows:

Message	City
Child Dart and Dash	Columbus, Los Angeles
VTM	San Diego, Los Angeles
Multiple Threat	Los Angeles

The target date for airing all messages in the test cities was February 1, 1976. Prior to that date, baseline knowledge and behavior data were collected according to the plan described later in this report. Moreover, contacts were made with all TV and radio stations, major movie theater chains, and the Columbus and Los Angeles school systems to screen the messages for them and secure final approval of the study. After receipt of these verbal assurances, all materials were distributed.

In mid-February, the Columbus Board of Education, prompted by pressure from the local AAA and others, withdrew support from the program and refused to show the "Willy Whistle" film in their school system. A meeting in Columbus on February 18, 1976, attended by the Dunlap project director and the NHTSA contract technical manager failed to regain the school system's support. The basic issue of contention involved the depiction of children crossing midblock and between parked cars. Despite much substantive data to the contrary, it was feared by Columbus officials that the approach taken in the "Willy Whistle" film might encourage midblock crossings and/or undermine the faith the children have in an educational system that had been teaching "cross at the green" for years.

The withdrawal of the school system's support removed one major source of exposure of the target audience to the child dart and dash messages, i.e., the school classroom. Moreover, it was feared that those in Columbus opposed to the project, who included a local TV news anchorman, would lobby to prevent showing of the TV spots. Thus, rather than continue in Columbus in a basically hostile environment, it was decided to cease all program activities in that city and recall all media materials for possible use elsewhere.

As mentioned earlier, the reactions of the officials in Columbus were not unique. It was therefore decided to prepare the intersection version of the dart and dash materials and test it in Columbus where data collection activities had already been planned and partially executed. This left the project, however, without a test of the original version of the Willy Whistle dart and dash materials in a non-campaign setting.

In order to accomplish an isolated test of the non-intersection version of the Willy Whistle materials, an additional test site had to be selected. Since none of the remaining NHTSA/FHWA data base cities were suitable, a search was made for an appropriate test location. Specifically, a city of moderate size (to insure a sufficient sample of accidents) with good police accidents reports was sought. Milwaukee, WI met all of the requirements and agreed to participate if the Willy Whistle long film was modified as discussed above. Therefore, Milwaukee was added to the experiment and the final distribution of messages was as follows:

City	Messages
Los Angeles	Dart and Dash (original non-intersection) VTM (English and Spanish) Multiple Threat
San Diego	VTM (English and Spanish)
Columbus	Dart and Dash (intersection version)
Milwaukee	Dart and Dash (modified non-intersection version)

This design provided an isolated test of the VTM and dart and dash messages; a campaign test of all three messages; and a comparison of the intersection and non-intersection versions of the dart and dash messages. While the cities selected were purposefully chosen, there was no compelling reason to assume that they were atypical of medium to large U.S. urban centers. Thus, it is reasonable to extend the results of this study to the urban U.S. in general.

IV. CONCLUSIONS

The other volumes of this report address the quantitative findings of this research in considerable detail. These findings lead to the conclusion that messages of the type produced by this study are capable of reducing pedestrian accidents. In terms of the model of public education presented in Chapter II of this volume, it can be concluded that the sum of the defined losses was less than 100 percent. No attempt will be made in this volume to summarize these quantitative results or their implications for pedestrian safety. Those topics are thoroughly addressed in the other volumes and summarized in the Technical Summary to all three volumes. However, the outcomes of this study also have implications for the process of media development and these conclusions are reasonably within the purview of this volume.

First and, perhaps, foremost it must be concluded that the media development process utilized in this study is a viable and productive approach to the development of safety messages. The use of accident data to "drive" the process within the framework of a theoretical model appears to have contributed greatly to the success of the messages. While no specific quantification of the contribution of the approach to the results is possible, the authors believe it played a major role. The available accident data were employed at virtually every step of the development and evaluation processes to provide guidance for critical decision-making. It was hypothesized that a faithful portrayal of the circumstances of each of the accident types would enhance the effectiveness of the messages by making it easier for members of the target audiences to relate to them. All of the results of this study suggest acceptance of this hypothesis.

A second conclusion relative to the media development effort is that a true synergistic situation was created. The production team consisted of the Dunlap staff, whose primary experience was in research, advertising professionals from the firm of Saxe-Mitchell, Inc., and a group of independent media producers (director, cameramen, editors, etc.). Each of the participants felt that the products which emerged from the collaborative effort were significantly different from those which any of the single entities would have produced. The messages contained simple, pertinent behavioral advice because of the commitment to achieving fidelity to the available accident data. The involvement of researchers in the actual scripting and shooting of the films or recording of the radio spots helped insure that the behavioral advice was always the most important and prominent part of the messages.

Research findings and behavioral advice alone would likely have been too dry and boring to attract and hold the attention of the target audiences. The skill of creative advertising professionals was needed to package the advice in appealing vehicles. The execution of the media forms had to convey the content and the entertainment value in a faithful and compelling manner. This necessitated the inclusion of top quality media professionals on the study team. It certainly appears that the combination of these disciplines embodied in the specific individuals who participated in this study achieved true synergism. The approach led to the successful "selling" of safety both to the various target audiences and to the various media public service directors who had to decide to donate space and time to the materials.

Finally, the totality of the current effort leads to the inescapable conclusion, contrary to the current beliefs of many, that public information and education through public service messages, particularly on television, can be a viable and cost-effective safety countermeasure modality. Messages which are presented in an appealing manner so that they hold the interest of the audience and secure high exposure and which request a "low cost" behavioral shift appear capable of achieving that shift in enough of the target population to yield a meaningful accident reduction. Moreover, even when relatively expensive, high quality media production techniques are used, as was the case in this study, virtually any initial accident reduction which can be reliably detected statistically will more than repay society's investment in the messages. Repeated use and continued depression of accident occurrences will yield an even better cost/benefit ratio. The present results suggest that messages directed at children and "specialty" messages, i.e., those in Spanish, are most likely to achieve the exposure necessary to be effective.

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