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IDENTIFICATION AND TEST OF PEDESTRIAN. SAFETY MESSAGES FOR PUBLIC EDUCATION PROGRAMS.

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16. Abstract

A review of the literature and data from pedestrian accident research studies was used as input to an analysis which developed 14 message contents. Each of these is directed at a specific aspect of the identified pedestrian accident problem. Seven of the messages were pretested to measure behavioral change. Of these, five produced significant positive shifts in behavior. It is concluded that public education can influence pedestrian behavior and is therefore a viable countermeasure to pedestrian accidents. Six of the message contents are recommended as ready for immediate field testing. Finally, recommendations for media campaigns for each of the developed message contents are provided.

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SUMMARY

This report presents the findings of a two phase study entitled "Identification and Test of Pedestrian Safety Messages for Public Education Programs" supported by Contract No. DOT-HS-099-3-705 from the Department of Transportation, National Highway Traffic Safety Administration. The objectives of the study were to:

- Develop messages based on significant findings from pedestrian accident studies
- Analyze the target audiences for the messages and potential media channels to determine the optimum presentation strategy for a campaign based on the messages developed
- Pretest messages to ascertain if a behavioral change has resulted from an understanding of the message content.

Phase I was specifically addressed to the first two objectives. Message pretesting and the analysis of the resulting data were the tasks of Phase II.

Initial analysis of the available data on pedestrian accidents, particularly the ORI study (Snyder et al, 1971) led to the choice of 9 accident types to be addressed by messages. These are:

- Dart-out (1st half)
- Dart-out (2nd half)
- Pedestrian strikes vehicle
- Intersection dash
- Vehicle turn/merge
- Multiple threat
- Bus stop related
- Vendor--ice cream truck
- Freeway--expressway crossing

Further analysis of the accident data, particularly the behavioral errors committed and the characteristics of the people involved, led to the derivation of 14 separate message contents or sets of behavioral advice to be presented (12 messages, two of which have alternate forms). In total these 14 address each of the major problems inherent in the 9 accident types. The specific message contents are (1a and 2a are variations of 1 and 2 using the parenthesized word in place of the word "stop"):

Message No. 1 and No. 1a: (Dart and Dash Accident Types)

Pedestrians who move quickly out into the roadway do not have adequate time to look for oncoming cars and do not give drivers enough time to see them. Whenever you cross a street, particularly midblock, stop (pause) at the curb if there are no parked cars or at the outside edge of a parked car and look left, then right, then left again before entering the traveled portion of the roadway.

Message No. 2 and No. 2a: (Dart and Dash Accident Types)

Parked vehicles are very dangerous to pedestrians attempting to cross a street because they often prevent drivers and pedestrians from seeing each other in time to avoid an accident. When crossing near a parked vehicle, stop (pause) at its outside edge and look left, then right, then left again for oncoming vehicles before proceeding across the street.

Message No. 3: (Dart and Dash Accident Types)

Pedestrians who run into the street without first looking for oncoming vehicles do not give drivers adequate time to see them and have difficulty performing an adequate search. Furthermore, by running before they know it is safe, they reduce the time they have to react to an unexpected car in their path. When crossing a street, do not run until you have looked left, then right, then left again and you are sure no cars are close enough to endanger you. In other words, run out of trouble when you see it but never run into trouble.

Message No. 4: (Dart and Dash Accident Types)

Children five years old and younger at play generally do not pay attention to pedestrian safety. They run into the street without looking and often dart-out between parked cars. Furthermore, they are too young to understand the problems of driving and walking and therefore do not perform properly as pedestrians. Thus, when your children go out to play you must take an active role in their safety. Never let your young children walk or play near a street or roadway unless a responsible adult is close by and supervising your child's activities.

Message No. 5: (Bus Stop Accident)

When a pedestrian crosses in front of a bus, the bus blocks his view of cars and drivers' view of him. When crossing the street near a stopped bus, do not walk in front of the bus unless all traffic passing the bus and the bus itself must stop for a traffic light or stop sign. Otherwise, either cross behind the bus or wait until it leaves.

Message No. 6: (Freeway Crossing Accident)

Fully 40% of pedestrians crossing a freeway who are hit by cars are killed. Drivers do not expect pedestrians on a freeway. If you must cross a freeway, go to a pedestrian overpass or underpass. Never walk on or across a freeway.

Message No. 7: (Vendor Accident)

Children going to and from an ice cream truck are only thinking about their ice cream. They do not pay attention to oncoming vehicles. When the ice cream truck comes, don't just give your child money. Accompany him to the truck so he can enjoy his treat in safety while you concentrate on the traffic.

Message No. 8: (Vendor Accident)

Cars cannot see you and you cannot see them when you cross in front of an ice cream truck because the truck blocks everyone's vision. After you buy your ice cream, cross the street behind the ice cream truck so drivers can see you and you can see oncoming cars.

Message No. 9: (Vehicle Turn/Merge Accident)

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.

Message No. 10: (Vehicle Turn/Merge Accident)

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.

Message No. 11: (Multiple Threat Accident)

Cars which stop for pedestrians who are crossing in crosswalks can block the vision of drivers overtaking and passing the stopped car. When crossing in front of a stopped car, stop at the outside fender of each car that you must cross in front of and look left, then right, then left again for cars passing that car.

Message No. 12: (Multiple Threat Accident)

A car stopped for a pedestrian in a crosswalk can hide the pedestrian from your view. When overtaking a car stopped in the roadway, particularly at a pedestrian crosswalk, slow down and be prepared to stop. He may be hiding a crossing pedestrian, in which case the law requires you to stop.*

Four messages (numbers 4, 6, 11 and 12) were considered untestable for various operational reasons. All of the remaining messages were candidates for the pretests. However, costs precluded testing the entire set. Thus a subset had to selected. The criteria for this selection were:

- Magnitude of the accident problem addressed
- Feasibility of pretesting the message
- Relationship to other messages, e.g., were all important target groups being addressed
- Cost of conducting the pretest

On this basis, seven messages were chosen for the pretests. These messages and the results of the individual tests expressed in terms of percent reduction in unsafe behavior are shown in Table 1. The test paradigms used were:

- Message Nos. 1 and 1a (Children) - A pre-post design was implemented in three schools in Pittsburgh (two for Message No. 1 and one for Message No. 1a). On the first test day observers posted around the school rated the crossing behavior of the children in terms of course negotiation (stopping before entering the traveled portion of the roadway) and search (looking for oncoming vehicles). On the second day the same measures were taken after each child had seen a specially prepared film demonstrating the correct behaviors. The results showed a significant improvement in both search behavior and course negotiation for Message No. 1 and in search behavior for Message No. 1a.

- Message No. 1 (Adults) - A booth was set up in a large bank in Stamford, Connecticut. Patrons leaving the bank were divided into experimental and control groups. The former received the message as part of a programmed test instrument.

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*In the states of Connecticut, Iowa, Michigan, Missouri, Pennsylvania, South Dakota and Vermont the stop is not required by law.

Table 1

Summary of Messages Pretested and Results

MESSAGE NO.	ACCIDENT TYPE(S) ADDRESSED	TARGET AUDIENCE	% REDUCTION IN UNSAFE BEHAVIOR	
1	Darts and Dashes	Children	Course Search Conjunction	13% 12% 10%
1a	Darts and Dashes	Children	Course Search Conjunction	15% 11% 13%
1	Darts and Dashes	Adult	None	
5	Bus Stop	Adult		45%
7	Vendor	Adult	None	
8	Vendor	Both		24%
10	Vehicle Turn/Merge	Adult (Drivers)		11%

The latter received a different questionnaire to be completed at home and mailed back. Each subject was given a shopping bag containing a box of detergent as a gift. Controls and experimentals received different colored bags. Observers on the street noted the bag color and scored course and search behaviors. The results showed no significant differences in crossing behavior between the experimental and control groups.

- Message No. 5 - Three of fifteen buses on a route through Queens, New York were equipped with tape recorders and loudspeakers to play a 30 second message. Observers at four bus stops on the route noted the bus number and the crossing behavior of the subjects. The results, while not strictly conclusive, indicate a marked improvement in crossing behavior among those subjects who heard the message.

- Message Nos. 7 and 8 - A Good Humor Company route through the Bronx, New York was used on two successive Saturdays. On the first (pre) day crossing behavior was observed and each child was given a letter containing the content of Message No. 7 to take home to his parents. On the second (post) day, a jingle conveying the content of Message No. 8 was played and crossing behavior was again recorded. Message No. 7, the letter asking parents to accompany their child to the truck, was not effective. However, crossing behavior was improved by Message No. 8.

- Message No. 10 - Forty drivers were recruited, ostensibly to take part in a gas mileage test. These were divided into experimentals (those who were given the message as part of their test briefing) and controls (those who were not given the message). Each driver drove a specified route "rally" style on which four observers were stationed to record driver behavior. The results tended to show that the experimental group searched more adequately for crossing pedestrians than did the control group.

The results of the pretests and an extensive review of the relevant literature led to the development of media plans for each of the message contents. Table 2 summarizes these recommended media channels. Details of the plans for each message are given in Section VI of the report.

The conclusions of the study are:

Table 2

Summary of Recommended Media Channels for the Messages

		Media Types							
Message No.	Situation/Audience	Film*	60 sec. TV	30 sec. TV	10 sec. TV	Radio	Posters	News-papers	Special
1, 1a, 2, 2a, 3	Children	x	x	x			x		
1, 1a, 2, 2a, 3	Adult	x	x	x	x	x	x	x	
4	Parents			x	x	x	x		
5	Bus Stop		x			x	x		
6	Freeway		x			x			
7	Parents (vendor)					x	x	x	x
8	Children (vendor)		x				x		x
9	Pedestrian (vehicle turn/merge)		x				x		
10	Drivers (vehicle turn/merge)		x			x			
11	Pedestrians (multiple threat)		x				x		
12	Drivers (multiple threat)		x			x			

* Film means 35 mm sound footage with a duration of approximately 8 minutes.

- Pedestrian behavior can be changed by public education messages
- Both adult (including drivers) and child audiences can be influenced
- Existing child course and search behaviors appear to be excessively poor
- Public education appears to be a viable countermeasure to pedestrian accidents

Specific action recommendations for each message content vis-a-vis applicability to field test use are presented in Table 3.

Table 3

Message Recommendations

1. Recommended for Field Test

	Message No.	Accident Type(s) Addressed	Audience
Pretested	1	Darts and Dashes	Child
	5	Bus Stop	Adults
	8	Vendor	Child
	10	Vehicle Turn/Merge	Adult (Drivers)
Not Pretested	3	Darts and Dashes	Child
	12	Multiple Threat	Adult (Drivers)

2. Recommended for Further Research and Development

1	Darts and Dashes	Adult
2	Darts and Dashes	Child & Adult
3	Darts and Dashes	Adult
4	Darts and Dashes	Adult (Parents)
7	Vendor	Adult (Parents)
9	Vehicle Turn/Merge	Adult
11	Multiple Threat	Adult

3. Not Recommended for Action At This Time

1a	Darts and Dashes	Child & Adult
2a	Darts and Dashes	Child & Adult
6	Freeway Crossing	Adult

I. INTRODUCTION

This report details the activities and results of a study entitled "Identification and Test of Pedestrian Safety Messages for Public Education Programs." The project was performed by Dunlap and Associates, Inc. under contract number DOT-HS-099-3-705 from the U. S. Department of Transportation, National Highway Traffic Safety Administration (NHTSA).

The objectives of this study were threefold. First, it was intended to develop pedestrian safety message contents based upon significant pedestrian research and aimed at reducing critical behavioral errors and encouraging proper behavior by pedestrians. Subsumed in this objective was the need to perform an adequate review of existing research as reported in the literature and to distill its contents into meaningful messages. Also implied by this objective was a primary focus on behavioral change rather than on increased information level. This is logical because safety information which is not translated into action is of virtually no value in accident reduction.

The second study objective was to analyze the target audiences and potential media channels for each message to determine an optimum presentation strategy for a campaign based on the developed messages. Although the present effort did not implement such a campaign, it was essential that the background research and developmental effort be codified into guidelines for future large-scale application. This insures that the messages will be applied in a manner consistent with their foundations thereby maximizing the probability of effectiveness.

The third objective of the study was to pretest the effectiveness of messages of this type to ascertain knowledge gained and, primarily, behavioral changes by the target groups. Although not all of the messages were suitable for pretesting, a representative subset was pretested covering a range of potential target groups and types of behaviors.

The remainder of this report will describe: the methods utilized in the study; the results of the literature review; the background and development of the messages and their contents; the pretests, their conduct and results; implications of the pretest findings; media recommendations and study conclusions. Throughout these discussions, reference will be made to relevant terminology which must be understood by the reader. The following terms and their definitions should help prevent any semantic confusion as the balance of this report is perused:

- Accident Type - The category of pedestrian accident, as identified in the ORI Report (Snyder, et al, 1971), which a particular message is intended to influence.

- Behavioral Objective - The specific behavior to be engendered in the target group and the degree to which that behavior will be evidenced.

- Message - The deliverable or "end product" version of the message content, e.g., a finished film, poster or pamphlet copy, etc.

- Message Content - The specific information to be covered in a message, e.g., rules of safety, accident causality background, etc., not necessarily in final presentation form.

- Target Audience - The group to which the message is addressed, i.e., the listener, viewer, reader, etc., may be the target group or an intermediary who will influence the target group.

- Target Group - The individuals whose behavior is to be altered to reduce accident occurrences. The target group and target audience may be the same (e.g., pedestrians at intersections), one may be a subset of the other (e.g., riders on a bus), or they may be completely different (e.g., parents of children involved in vendor accidents).

II. METHOD

Phase I of this work effort covered the derivation of messages and the development of pretest plans. As part of this process, specific analyses of message content, target audiences and media were required. The actual task of pretesting the developed messages and analyzing the resulting data was the focus of Phase II.

The first step in Phase I involved the concurrent performance of a literature review and a detailed analysis of the data from previous accident research. For the literature review, initial emphasis was placed on reports of public education programs in pedestrian safety. However, it was quickly recognized that the number of such studies was small. Thus, the scope of the literature survey was expanded to encompass public education campaigns in the related safety areas of vehicle safety, industrial safety and public health. In addition, the general literature on behavioral research techniques, communication research and education was consulted. The findings of the literature survey and a discussion of their implications for this study are presented in Section III.

The data from the ORI Study (Snyder et al, 1971) represent the most complete existing picture of urban pedestrian accidents (see Section III for a more complete description of the ORI Study). It was therefore considered essential to perform a thorough analysis of these data to aid in the selection of accident types to address, the determination of the particular behavioral errors to attack, and the identification of relevant target groups. Since the original ORI Report did not contain all of the tabulations needed, a magnetic tape of the original case-by-case data was obtained from NHTSA. When utilized with a set of extremely powerful software available at the Columbia University Computer Center, this tape provided complete versatility to examine relationships among all of the variables in the ORI data file.

The findings of the literature review and ORI data analysis were utilized to determine which accident types should be addressed by messages and what the content of these messages should be. Two basic criteria were used to select accident types of interest. The first was the frequency of occurrence for each accident type. Obviously, those accident types which are most prevalent are of greatest concern in the development of countermeasures. The second criterion, most applicable to accident types of lower frequency, was the applicability of a public education countermeasure. Thus, those types which were special or highly distinct in terms of environmental conditions and/or behavior patterns were selected.

After the accident type foci were identified, attention was turned to the determination of the most desirable content for each message. Guidance for this task was provided by the data on behavioral errors from the ORI study. Simply, it was

necessary to develop behavioral advice which could be conveyed to the target groups in a message and counteract the identified errors. This process was constrained by two factors. First, the public education media have a limited "channel capacity." That is, the relatively limited exposure of and attention to public education campaigns mitigates against the successful presentation of complex messages. This, in turn, limits the ability of public education to engender radical shifts in behavior. It would appear that a public education message should be focused at the achievement of the smallest set of behavioral changes that will produce significant accident reduction.

The second constraint results from an absence of definitive research to indicate what correct behavioral sequences should be. Thus reliance must be placed on deduction from the committed behavioral errors. This is somewhat hazardous in that it may produce intuitively and even mechanically sound sequences which are, nevertheless, unacceptable to the general public. It is likely that many pedestrian population stereotypes exist, but, since they have not been completely identified, it is difficult to insure consistency with them.

Once the content of each message was established, the messages were enumerated in a "Why, When, What, Who" format. This permitted an examination of the important aspects of each message so that a pretest plan could be developed. Because of the commonality of target audiences across several of the messages, the pretest plans were divided into two parts. The first part, called a scenario, described the population to be addressed, the means of subject identification, the basic setting of the test and the general constraints inherent in employing the scenario. The second part of each pretest plan detailed the specific behavioral objectives and measures for each message, other message related test parameters, and the costs of the test. Cost estimation was essential because it was clear that the available budget would not support the testing of each message.

The final step in Phase I was to choose those messages which would actually be pretested. Some messages were immediately excluded on the basis of feasibility. For the remainder, test costs were weighed against the amounts of information to be gained from each test. The objective was to obtain the most useful and complete information for the available pretest funds. Section V discusses this selection process and presents the set of seven messages actually tested.

The second study Phase was devoted to the pretest of the seven selected messages. This process consisted of the following tasks:

- Selection of and coordination with an appropriate study site
- Production of each message content in a media form suitable for the test

- Development of measurement techniques for assessing behavioral change

- Recruitment and training of observers to implement the measures for each test

- Conduct of the tests

- Analysis of results

Results of the pretests were analyzed in two ways. First the entire distribution of behaviors for each test was examined to see if a significant shift had occurred. For some tests this was a pre-post comparison while in others there were separate experimental and control groups which could be compared. These results are discussed in Section V. Second, the range of behaviors observed for each test were partitioned into "safe" and "unsafe" groups. The calculation of the percent of unsafe behavior eliminated provides an estimate of the amount of accident reduction to be expected. These results are also given in Section V.

The final step in the study was to interpret the study results to derive media recommendations for each message (Section VI), answer the major research questions and develop recommendations for further direct action on the messages (Section VII).

III. REVIEW OF THE LITERATURE

One of the requirements of the statement of work and a necessary step in the development of a public education program is a review of previous efforts in the same and related fields. This review of the literature provided background data on various message approaches and their relative success as well as contributing to a general understanding of the underlying processes leading to a pedestrian accident. Of particular interest are those studies which help to define the specific causative factors and target groups involved in pedestrian accidents as well as media approaches attempted as countermeasures to these accidents. Ideally, these would all relate to pedestrian behavior in situ, i.e., on the street, and employ accident rates as an ultimate measure. However, accidents are rare events and, therefore, many studies have turned to intermediate measures such as correct crossing behavior as indicators of program effectiveness. Finally, for reasons of safety, cost or convenience, some studies have not been able to examine pedestrian behavior in a real-world situation. Instead, they have employed simulation or test scores to estimate the likely effectiveness of countermeasures in the true traffic environment. Each of these approaches can be implemented in a scientifically sound fashion producing results which could provide valuable inputs to the current study effort.

Although not directly related to pedestrian safety, public education programs in other fields, particularly highway and industrial safety, can also furnish valuable insights. In the simplest view, this effort attempted to create and measure behavioral changes using public education. In some cases, existing ingrained behavioral patterns had to be altered. In others, new information was to be provided in an effort to promote new behaviors in basically familiar circumstances. Thus, any analogous research, regardless of the field of endeavor, could supply useful techniques and guidance for both message presentation and evaluation.

The balance of this section discusses the most relevant entries in the literature surveyed for this project. Only specific studies are addressed. The general body of literature on experimental psychology and the theory of communications is not explicitly referenced. It was, however, reviewed and its principles can be found throughout the commentary and conclusions contained in this section. References and a complete bibliography can be found in Appendix A.

A. The ORI Study

Perhaps the most comprehensive study of urban pedestrian accidents was conducted by Snyder, et al (1971) at Operations Research, Incorporated (ORI). The basic focus of the study was an examination of pedestrian crash causation and the postulation of potential remedial actions to eliminate the causative elements. Over 2100 crash cases from 13 cities were given an in-depth analysis to identify precipitating events (function/event sequence breakdown), predisposing factors (specific variables which actually influenced the function failure), and target groups. By grouping cases which were similar with respect to these factors, an accident typology was derived. After analyzing the total cases grouped by accident type, countermeasures to reduce or eliminate the urban pedestrian accident problem were postulated.

In addition to the two volumes of the final report of the ORI study, NHTSA provided Dunlap and Associates, Inc. with a 9-track magnetic tape containing all of the ORI accident cases. Thus, it was possible to re-analyze the raw data to provide tabulations and statistics directly relevant to the current study effort. Variables such as age, race, sex, etc., which are crucial to a determination of message target audiences, could be examined in detail. The results of these analyses together with a more in-depth discussion of the ORI accident typology are contained in Section IV of this report.

B. Pedestrian Behavior - The Young and the Old

With the ORI study results (Snyder et al 1971) as background, it appears logical to focus particular attention on two specific pedestrian target groups, the young and the elderly. Since these two age groups are overrepresented in pedestrian accident statistics as reported by Snyder et al, an in-depth look at studies about their behavior in traffic is essential to developing public education countermeasures for accident reduction.

1. The Young Pedestrian

Researchers at the Psychological Institute for Children in Sweden are particularly interested in children as pedestrians and have conducted many field studies to make observations of children in traffic situations and at play (e.g., Sandels, 1970). In one study, Sandels, (1970) observed young children at play near apartment buildings where they lived. She found that many young children are allowed to play alone. Children as young as two and three years of age were out without a parent or supervisor. They play in dangerous areas, street lots and parking areas, with seemingly little awareness of the traffic in their surroundings. Behavior of the children age 4 to 7 years was quite immature, with no significant differences between children age 4 or children age 7. This seemingly contradicts the notion that sensibility of children

increases with age, at least during the early years. Sandels has, in fact, concluded that children do not have the ability to cope with traffic as pedestrians until about 12 years of age. In further research, Sandels (1970) has studied certain perceptual and cognitive limitations of children relevant to their ability to successfully negotiate in traffic and to accident causation. She found that children up to 9 years of age were poor at distinguishing left from right and that children up to 10 years of age had difficulty understanding traffic terms and the meaning of road signs. Road signs were confusing and often misinterpreted such that a sign indicating a playground area marked by a picture of a running child was interpreted by many children as a dangerous area where a child must run to avoid passing vehicles. Vision and audition was found to be surprisingly restricted in children. Sandels (1970) found that visual stimuli were only accurately perceived when presented in the central visual field of 20 six-year old children. Likewise auditory stimuli were only accurately discerned when presented directly in front of or behind the subjects. From these results one may conclude that children's peripheral vision and audition is poor and cannot be relied upon for detection of oncoming vehicles. The implications for drivers are that children are not likely to detect a vehicle approaching from the right or left even if the driver sounds the horn of his vehicle as a warning to children. The same experiment in vision and audition in older children was not conducted. However, it can be assumed that peripheral visual and auditory accuracy would increase with age. From these findings one would expect that childr below age 10-12 run a high risk when allowed to negotiate traffic alone. Also, these findings suggest that learning from instruction in road safety is restricted physically by vision and audition, and cognitively by comprehension of traffic signs and the directions right and left. Based on her research, Sandels (1970) developed the following message contents for use in a study to assess the most effective means of teaching road safety to nursery school age children:

1. Stop at the edge of the curb before entering the road.
2. Look right and left and listen before entering the road.
3. Walk straight across the road at a crossing.
4. Cross at a zebra crossing with a road sign and watch for turning vehicles.

The second and fourth message are particularly important in establishing good walking habits which, in turn, will increase the number of cues a child has when in the street. The aim of the message is to get a child to be looking all around himself to maximize perception of the traffic situation.

The dart-out type accident has been recognized as the one which is most common to children (Snyder et al, 1971). It is important to understand why children make a dart-out movement in order to prevent a dart-out or modify the behavior to increase a child's perception while in or near the street. In

further research, Sandels (1973-A) suggests some reasons which motivate children to make a dart-out movement. The child may be socially motivated by another person on the opposite side of the street he wishes to join. Similarly, he may be curious and want to investigate something of interest across the street. He could be in a hurry to get to some destination. A fourth reason is that children seem to put a lot of trust in the protection of a crosswalk and exercise little caution when in crossings. All of these reasons indicate the erratic behavior and extreme lack of forethought characteristic of young children. Thus, the investigators suggest that drivers should expect the unexpected from children and drive with extreme caution. Specifically:

1. Slow down when passing children on the road.

2. Look in all directions around you when driving.

3. Anticipate sudden exposure of children from the side of the road, near schools and play areas.

Children apparently think for the moment and are uni-dimensional in their behavior. Thus, instruction to young children to evaluate their situation when they are rushing to join their friend on the other side of the street, is of dubious value. A better approach is to encourage children to proceed more slowly and be constantly looking around while continuing across the street.

An important variable for children in traffic is the ability to judge their relationship to an oncoming vehicle. S. Salvatore (1972) has studied perception of speed by children ages 5-14 years. Forty subjects were asked to judge the speed of an oncoming car at distances of 500 feet and 250 feet on a country road. When correlated with radar speed readings, responses could be classified as: fast (over 40 mph), medium (32-40 mph), and slow (up to 31 mph). Findings related to sex and age were that:

1. Young children are better at judging fast speeds, and poorer at judging slow speeds (the speeds cars travel in residential neighborhoods).
2. Older children are poor at judging fast speeds.
3. Females tend to make more conservative judgments of speed.

Audibility of the vehicles was found to be a factor in speed judgment as was size of car. The louder cars and small cars were usually categorized as fast. Since more pedestrian accidents involving children occur at low

speeds in an urban environment when children are at play and not specifically observing vehicle speed, the study would be best if repeated in the inner city. However, some of its basic findings are notable from a developmental point of view in teaching pedestrian safety. Older children judged fewer vehicles as fast than young children, so they may be in greater danger in traffic. The girls, and young children were more conservative in their judgments; they viewed more vehicles as traveling fast. The results imply that older children should be helped to make more accurate estimates of speed while the conservative nature of younger children should be reinforced.

2. The Elderly Pedestrian

Elderly pedestrians, like children, are overrepresented in pedestrian accidents and are the highest group in pedestrian fatalities. As with children, some studies in pedestrian accidents concentrate specifically on the elderly (those over 65 years).

Yaksich (1964) studied elderly pedestrians in St. Petersburg, Florida to find out more about the nature of accidents involving elderly pedestrians, and of the behavior of the elderly in traffic. He found that even though the elderly are more law abiding, they are struck mostly at an intersection, in a crosswalk, and while crossing with a green light. This suggests two reasons for the high accident rate. First, the elderly are not fast enough to make a complete crossing of the intersection, and secondly, they decide to cross too late. Many accidents are due to turning cars which suggests that the elderly do not look around them when in the street. Other findings consistent with the above lend themselves to several countermeasure approaches:

1. Watch the correct light and cross straight when it turns green, without delay.
2. If the light has been green for a time before you arrive at the curb, wait for the next green light.
3. Look all around when crossing in order to detect turning vehicles.

Wiener (1967) has identified a problem peculiar to elderly pedestrians when crossing at a light-controlled intersection. Many make an error in judgment of which light to watch, and, instead of following the light in front of them, they watch the light perpendicular to where they are standing. Obviously, this mistake puts the pedestrian into the path of oncoming traffic. It could be corrected easily by educating them through posters, a lecture or verbal and visual materials showing the correct light to obey.

Wiener (1967, 1968) has further acknowledged that the elderly do fare badly in traffic as pedestrians although no one knows exactly why. The elderly are not necessarily restricted in mobility, yet they are not as sharp physically as young pedestrians. Through interviews and observations in Miami, he has found that some elderly pedestrians were confused about traffic lights and other traffic control devices and, thus, were consistent jay-walkers.

Sandels (1973-B) has recognized the limitations of the elderly in traffic; that they sometimes feel unsure of themselves, are uncertain of when to cross at a busy intersection, and are slower to react to sudden dangers. Her recommendations to drivers when in areas where there is a high proportion of elderly pedestrians are:

> "Drivers should exercise more patience with elderly pedestrians since their pace is slower and it takes longer for them to get across the street."

Since so many elderly pedestrians are struck by turning cars, the blame cannot be placed entirely on them. Sandels (1973-B) suggests:

> "Drivers should yield to pedestrians still crossing the street. Drivers should be looking ahead of their turn so as to see whether there is anyone in the street."

Investigators who have studied elderly pedestrian accidents and behavior have recognized two important features. First, elderly pedestrians are <u>not</u> generally incapacitated or immobile; they function as other pedestrians. Second, they do have some physical limitations in speed and certain senses, e.g., hearing. Thus a sympathetic approach to elderly pedestrians would only encourage inattention and disregard for traffic on their part. It is up to the pedestrian to understand his own limitations, and the driver to respect elderly pedestrians.

C. Countermeasure Campaigns

Understanding pedestrian accident causation is the first step in reducing pedestrian accidents. The epidemiological data supplied by certain studies, e.g., Snyder et al (1971), Sandels (1973A, 1970), Wiener (1967) and Yaksich (1964) provide the basis for developing countermeasures against pedestrian accidents. Some different campaigns for promoting pedestrian safety on a large scale conducted in the past report success in terms of accident reduction. The three major campaigns to be discussed each had a somewhat different approach to obtaining reduced pedestrian accidents. All have reported a reduction in accidents for a brief period of time, but there have been virtually no pedestrian campaigns conducted over several years which included a rigorous evaluation of the success or failure of the effort.

A comprehensive city-wide pedestrian safety program was started in San Jose, California in 1971 (Nickson and Walsh, 1972). The theme of the program was to develop and maintain "Safe Walking Habits." Pedestrians as target groups for the safety program messages were divided into three groups by chronological age; young pedestrians, middle age, and the elderly. It was assumed that the middle age and elderly groups knew the basics of pedestrian safety and needed a "reminder" type of campaign. On the other hand, young children, who were in the process of developing pedestrian safety skills, would profit from an intense teaching and reinforcing program.

Pedestrian accident data for three years were analyzed in order to develop safety messages for children. The accidents were analyzed by specific driver and pedestrian behaviors to identify accident causation and contributing factors. As found in other epidemiological studies of pedestrian accidents (e.g., Snyder et al, 1971), the proportion of children involved in accidents was very high (53%). Thus, a major emphasis of the San Jose program was the education of children in schools, from pre-school to high school. Message contents developed as countermeasures to identified behavioral errors of children were:

- Look both ways
- Don't cross from between parked cars
- Cross at corners, or in crosswalks
- Cross with the light
- Walk, don't run across the street
- Watch for turning cars in driveways and alleys
- Walk off the roadway, facing traffic
- Have children play off the street

The school safety program, presented in all grades, was built around these general messages and supplemented by some of the more familiar phrases such as: "Wear White At Night." Modifications in the curriculum were made depending on the grade level. For example, policemen and simple films were used in elementary grades, but junior high and high school grades developed their own curriculum which was presented by representatives of the student body. The messages used in the San Jose project are not very specific and appear to be like many other routine pedestrian safety messages. However, the program was designed so that innovative use of media and the quantity of safety propaganda presented were as important to learning as the message itself. All forms of media were used to reach all ages of pedestrians. Reminders of "Walk and Drive Safely--Pedestrian Safety Week" were printed on bumper stickers and posters. Booklets and films from the American Automobile Association and the National Safety Council were used along with

a short film of local residents. Radio and television announcements were made during the pedestrian safety week. On-the-spot reminders were distributed by the safety project volunteers. The reminders were cards or buttons on which were printed: "I Don't Jay-Walk;" or "Cross Only on the Green Light." These were distributed to pedestrians who had exhibited safe or unsafe walking behavior, respectively.

It was felt that the philosophy of self-protection was not a sufficient motivation for the practice of safe pedestrian behavior. Consequently, the program looked toward advertising concepts of attractiveness, up-dated media design, bright colors, and the coordination of media with target audience (children's posters used children and adult media used adults). In San Jose, it is obvious that the program planners believed the media selection and degree of exposure to be as important as the message content itself.

The pedestrian safety program in San Jose has not been in effect long enough for adequate follow-up. The preliminary findings, however, indicate a large reduction in pedestrian accidents. The comprehensive program in San Jose has adopted one approach to pedestrian safety through public education. Their approach has been to present a large volume of pedestrian safety literature to pedestrians of all ages. The heavy concentration of safety materials and instruction in the schools, on the streets and over radio, television, etc., has apparently created an atmosphere of special awareness for pedestrian safety. This approach may be characterized as a massive presentation ("blitz") of relatively simple messages with the intent of instilling a safety concept rather than specific safe walking rules.

A common, and obviously erroneous conclusion in evaluating a safety campaign is to rely on the amount and extent of public interest generated by a campaign as a measure of ultimate effectiveness. The true effect of the campaign will only be apparent after several years of follow-up accident data collection and analysis. Thus, while the San Jose effort appears promising based on initial data, its ultimate success will be to maintain, or even increase, its resulting accident reduction over the next few years.

In contrast to the San Jose campaign, which was an intense concentration of safety propaganda in an effort to create public awareness, is the more passive approach of pedestrian education and instruction employed in child-directed safety campaigns. In England, an organized effort in child pedestrian safety has been in effect since 1942 when the "Kerb Drill" was introduced. Recently, the Kerb Drill was reorganized into a new format, the Green Cross Code. The Code was designed for children over 7 years of age, to be presented in the schools and at home. The Green Cross Code is simply a set of rules or messages to be followed serially which were carefully chosen to avoid confusing young children. The Code includes the following steps:

- Find a safe place to cross, stop.
- Stand on the pavement near the curb.
- Look around for traffic and listen.
- If traffic is coming, let it pass.
- Look all around again.
- When there is no traffic near, walk straight across the road.
- Keep looking and listening for traffic while you cross. (RRL 1971)

It was felt that the new Code, although lengthier, was preferable to the older version because it presented principles of safety rather than rote-type instructions.

An intense campaign was conducted for three months to initiate this new Green Cross Code. The multi-purpose campaign was designed to reduce accidents for ages 7-9, encourage parents to train their children, and publicize the "Code" as an aspect of pedestrian safety. A Green Cross safety symbol was created, "Squawk" the parrot, a figure similar to "Tufty," a squirrel previously used as a safety symbol. The national campaign was aimed primarily at adults, teachers and parents through newspapers, television, films, posters, brochures, and public speeches. During the three months of the campaign, child pedestrian accidents were recorded and plotted against an expected number of accidents in the absence of a campaign. Results showed that the number of accidents was 11% lower than the expected value, a significant reduction. The reduction was greatest in the 5-9 age group (Morris, 1972). Unfortunately, follow-up studies are not reported, so it is not clear what continuing degree of impact the Green Cross Code had on childrens' behavior as pedestrians.

This approach is a combination of an attempt to create specific behavioral patterns and a general campaign for pedestrian awareness. Although not as intensive as the San Jose effort, multi-media approaches with repeated exposures were employed. In addition, parents were used as a means of getting a message to children. This adds an additional filter in terms of transmission efficiency but does aid comprehension by children since the parents are available to interpret the messages. Also, the concentration on specific behaviors, particularly for children, appears warranted in light of the findings of Sandels (reported earlier) which showed that comprehension of traffic situations by children is limited.

In Omaha, Nebraska, a child traffic training program is run every summer to acquaint pre-school children with different aspects of the traffic/pedestrian environment (Loftis, 1967). Each June, a two week session handles about 3500 children aged 5 and 6 who are about to enter first grade. The main

feature of the training program is a talking traffic light used as an instructional aid. The children are taught safety in many traffic situations including: bus riding, street crossing, walking on the sidewalk and correct crossing at a traffic light. In addition, they are given several practice sessions at a mock street corner to prepare them for real traffic situations. The only comment offered by Loftis relevant to the effectiveness of the program is that there has been "a favorable reflection in the pedestrian accident picture--- for the pre-school age level." There are no statistics given for child pedestrian accidents, so it is not clear what effect or contribution the program has on pre-school and primary level children. However, the use of a personified traffic light and an actual bus and sidewalks appears to be a valuable teaching approach for young children. Personifying familiar inanimate objects is a particularly popular approach to the training of children and appears to be an effective means of transmitting messages to them.

A third approach to pedestrian campaigns has utilized an awareness campaign coupled with increased enforcement. In an extensive campaign, Wiener (1968) conducted a safety program for the elderly in Miami. The aim was to inform the public of a pedestrian campaign which would enforce jay-walking laws. The message presented through the media was: "Jay Walking laws will be enforced." All types of media were used, since the elderly are not significantly restricted in any way which would prevent them from reading, viewing, or understanding safety messages. Radio, television and newspaper spots and posters announcing the starting date of the campaign were employed together with special effort by the Miami police to give lectures to groups of elderly citizens. In most cases, particularly at the program's outset, a verbal warning was given instead of a citation as notification of violation of a pedestrian ordinance.

The campaign produced a significant reduction in the number of illegal crossings by the target population. There was also a concomitant increase in correct crossings during the campaign, which were sustained, although to a lesser degree, for four months after the campaign. The presence of a policeman at the crossing also had a positive effect on behavior which diminished with time. Unfortunately, the relative effects of the education and enforcement efforts cannot be determined.

A much harsher combination of education and enforcement for pedestrian control was conducted by Denham (1957). The message presented to all pedestrians was that a pedestrian control project was in effect and that a fine for jay-walking would be strictly imposed. Newspapers, radio, television and sidewalk signs carried announcements of the consequences of jay-walking while police made speeches on the need for a pedestrian control program. The campaign apparently produced a significant reduction in accidents during the first month, but the positive effect began to decline after four

months. During the first month pedestrian accidents were reduced by 23% over the same month of the previous year, and pedestrian violations were reduced by 55%. After four months, accidents were reduced by 19% and violations by 23%. In the two aforementioned campaigns, the threat of enforcement and its consequences were an important aspect of the attempt to effect a reduction in illegal pedestrian walking habits. The Wiener experiment was geared more toward warning pedestrians of illegal acts than toward issuing citations. The Denham campaign involved a preliminary public awareness phase followed by increased enforcement of pedestrian violations. Both studies resulted in reduced pedestrian violations during the first month of activity followed by a gradual increase in illegal pedestrian acts. In the Wiener study, it is not known whether pedestrians were responding to the effort to increase pedestrian safety or to fear of breaking the law. The Denham study, however, points to enforcement as an effective motivator for safe pedestrian behavior. From the two studies, it is probable that the threat of legal action, as long as it is enforced, is probably one of the strongest motivations for adults to obey municipal pedestrian ordinances and thereby execute the safety behavior these ordinances promote.

D. Controlled Studies of Pedestrian Behavior

The ideal condition for measuring the effectiveness of a countermeasure program aimed at reducing pedestrian behavioral errors is, of course, to measure the behavior to be changed, conduct a campaign, then measure the same behavior after the countermeasure has been implemented. Obviously, work in the field is most difficult to control, and behavioral change often cannot be attributed directly to the campaign. In some situations, e.g., with children, it is both dangerous and impossible to conduct field studies. The Road Research Laboratory in England has studied child pedestrian behavior in the controlled conditions of a laboratory and in a traffic garden (a child-sized version of a street scene). In a set of experiments, Colborne (1971) examined different methods of teaching young children safe pedestrian behavior while in or near traffic. In one experiment, she tested the effectiveness of different training conditions for children ages 6-8 years. In the first experiment, 111 children were instructed in the correct way to cross a street when near parked cars. The children had been observed as tending to stay near to parked cars, presumably for protection from on-coming traffic. The message presented was a countermeasure to this tendency and told children to "cross away from parked cars." One test group of children were shown slides and then engaged in questions and answers about the presentation. The other group used a mock-up consisting of model pedestrians and cars in a simulated street situation. In both conditions the children showed improved safe pedestrian behavior, with the slide presentation being the slightly more effective medium than the simulation using toy models.

In another experiment(Colborne, 1971), 110 children age 7 years were taught proper road crossing at traffic lights. One group was given classroom instruction and the other group received practical training in the traffic garden. Children who learned through practical training did significantly better in a post test than the children who were instructed in a classroom. It was concluded that practical training was better since children have difficulty understanding the correct sequence of lights and when to cross. The authors felt that the best insurance of a safe crossing would be to have parents accompany their children, since at such a young age, 6 and 7 years, children are not sophisticated enough to cross at a light controlled intersection by themselves.

The superiority of a practical training situation for the teaching of safe child pedestrian behavior has been documented elsewhere by Sandels (1970). Sandels presented rules for safe pedestrian behavior to 80 children ages 5 to 8 years. The conditions for instruction were: classroom teaching indoors, practical training out-of-doors, and a combination of both. The out-of-doors training was better than indoors, and the combined instruction was best. Practical training out-of-doors along with instruction seems to be the most efficient way of getting messages to children with the greatest assurance of positive transfer to a real situation.

Work at the Road Research Laboratory (RRL) in England has also concentrated on the effectiveness of media and message design for presentation of pedestrian safety information to children. In one study, Colborne and Shepherd (1966) tested different poster designs on children ages 5 to 7 years of age. The first poster contained one picture with a caption; the other poster showed a series of pictures, each with a caption. The messages presented were:

1. The child should wait on the sidewalk instead of crossing the street to join his mother.
2. Mother should cross the street to join her child.
3. Do not allow your child to cross the street alone.

The first poster (single picture) was not understood by many of the children. Many of the younger children seemed distracted by details of the poster picture. The children misinterpreted the message about road safety and were more attracted to the pictures in the poster, such as the picture of a mother and child. Consequently, the second poster was constructed with a series of pictures each with a caption illustrating the same safety message. Understanding was better with the second poster for both 5 year olds and 7 year olds. The findings point to the use of a series of pictures showing the child what to do or not to do as preferable to just one picture. Also, the measure of understanding was liberal and did not necessarily represent full comprehension of the specifics of the message.

RRL has a comprehensive child pedestrian safety program for use by teachers in school and by parents at home. It consists of instruction for children in general road safety and utilizes a uniform set of pedestrian messages presented by animated safety symbols named Squawk and Tufty. Colborne (1971) reports that children as young as ages 3 and 4 can be given road safety instruction using this technique. A cartoon poster of Tufty presenting a simple message in pictorial format: "Tufty must not run into the street" was generally understood by young children. Comprehension was good in that most children knew the message was that Tufty must not run into the street. This poster differs from most in that there is no caption, only a simple picture of Tufty's mother catching him by the collar and stopping him from running into the street. Unfortunately, comprehension of such posters cannot be assumed to transfer to a real traffic situation. However, it does demonstrate that with pre-school training young children may be made aware of safety symbols and, hopefully, messages.

Parents can also complement the school safety program with instructions at home. Colborne (1971) recommends message contents for parents about their children based on her work with young children:

1. Young children do not have the ability to learn rules in sequence; teach them to look left and right as they cross the street.
2. Childrens' sense of speed is poor at young ages, so
    a. Always accompany your child across the street, or
    b. Do not allow young children to cross alone

The first of these messages appears as part of the Green Cross Code discussed earlier. The latter messages seem to be reasonable recommendations to parents of young children, especially children in the pre-school ages. It seems preferable to impart safety messages to parents than young children since a) young children are poor recipients of pedestrian safety instruction, and b) Sandels (1970) has shown that parents allow children as young as two and three years of age to play unsupervised. Thus, messages aimed at parents can potentially alter parental behavior as well as promoting parents to train their children through repetition.

Shaw (1967, 1971) who has collected demographic data from child pedestrians accident cases brought to Harlem hospital in New York, associates the environment of the child with his chance of exposure to traffic accident situations. The lower socioeconomic environment is one in which children play unsupervised in the streets, do not have secluded recreation areas or playgrounds and are not the focus of campaigns to prevent child pedestrian accidents.

Parents must accept responsibility for the safety of their young children, as it is obvious that children do not know how to conduct themselves in traffic. Sandels'(1972) recommendation to parents who are walking with children was: "Maintain a tight grip on children, since they are likely to run suddenly." Supervision of children may not only be absent, but also inadequate when it exists. Sandels found children as young as three and four years of age are allowed to play unsupervised. Her message to parents concerning supervision is: "Children 8 years of age and under should be supervised when in or near traffic."

The ineffectiveness of presenting safety information without instructional follow-up has also been demonstrated by Belkin (1956). He conducted a study on the effects of a multi-media safety information presentation on subsequent behavior and on the subjects' ability to remember the safety materials. Pedestrian safety information was presented to children ages 7 to 15 years at a children's theatre alternatively as slides, cartoons, booklets and as a talk by a policeman. Children were subsequently observed at nearby crossings to determine their behavior. Presentation of the materials had no effect on crossing behavior except at one crossing where a policeman was present. During the three weeks following the presentation of the safety materials, children were interviewed pertaining to the safety presentation to obtain a measure of recall. The only measure reported was that 80% of the children recalled at least one of the slides used in the presentation. It is interesting that children observed while the safety presentation was being made were highly selective in what they attended to. They seemed to watch the visual aspect of the presentation but only occasionally listened to the audio portion. The findings of the study do not present any surprising revelations. Although the nature of the safety materials is not enumerated, there is evidence that they were not particularly appealing to the audience. Further, Belkin does not speculate on why the safety lesson had no effect on childrens' behavior. Although the experimenters chose a theatre for presenting safety messages on the assumption that they would have a captive audience, the children could have interpreted the lesson in pedestrian safety as an interruption of the regular show. Lastly, the interest in recall and recognition of the safety materials may be of little value since neither recall nor recognition guarantee that the message will be put to practical use, particularly by children.

In another experiment, Belkin (1958) presented safety posters to groups of 65-75 year olds and 18-22 year olds. The messages shown were either positive or negative. A positive poster read: "Pedestrians! Give way to traffic on crossings when the policeman signals it on." A negative poster read: "Pedestrians! Never walk with your back to traffic." The posters displayed in a lobby were used to examine recall of a poster message and the use of the message in identifying faulty traffic situations in photographs. Although recall of the poster content was poor, both age groups showed good use of the message

contents in terms of identifying pedestrian and driver errors in pictures which were related to the safety posters. The findings indicate that the past experience of pedestrians is a more significant factor in Belkin's experiment than was learning from a poster. Instead of learning a poster message, the subjects relied on their past experience as pedestrians to aid them in identifying errors seen in the pictures presented. This indicates that posters for middle and elderly age pedestrians might best be used as constant reminders of safe pedestrian practices and cannot be relied upon as primary transmission devices. It also indicates that pedestrians can correctly analyze a traffic situation when divorced from it and given sufficient time to study its features. Unfortunately, these results provide no insights on how these same subjects would have acted in a real traffic environment. Tarrants (1968) states that the only safety poster he found to be effective was one which was displayed in close proximity to the site of the behavior. His findings also indicate that posters would be most effective as spot reminders of a correct behavior already learned.

In Belkin's study, the "use" measure was unrelated to use of the message in effecting a change of behavior in a traffic situation. The suggestion of posters as constant reminders is a worthy one since pedestrians, other than children, should already know the basics of safe pedestrian behavior but could benefit from a reminder at critical areas such as crosswalks.

E. Other Safety Education Campaigns

Campaigns to improve and encourage safety practices are, in general, similar. Since campaigns in pedestrian safety are relatively few in number, it is helpful to examine safety campaigns in other areas as a source of insights to the proper development of a pedestrian safety public education campaign. Safety campaigns generally approach a potentially dangerous situation with a recognition that there are specific unsafe behaviors which characterize accidents. The purpose of a campaign is to explain to a particular audience what must be done in order to prevent the unsafe behavior or maintain safe behaviors. A brief discussion of safety campaigns in areas other than pedestrian safety can provide some insight into the elements of an effective campaign.

A seat belt campaign conducted by Fleischer (1972) over a 30-day period used professionally prepared television and radio announcements. The presentations were broadcast in 10, 20, 30 and 60 second segments and aired at times allotted for public service advertisements. Name personalities like Steller and Meara were used to present all of the announcements. The nature of the broadcast was to present a message which was clear, easily understood, of high quality and had personal appeal to the audience. Measures of seat belt use were taken in three communities receiving the broadcasts before, during and after the campaign. The measured use of seat belts did not show an increasing trend during or after the campaign.

Another campaign concerning the promotion of seat belt use is interesting from an advertising point of view (Robertson, 1972). A baseline rate of use of seat belts before the start of the campaign was obtained. Television messages were developed by an advertising agency to be shown over a dual cable television system. The messages were of high quality, some winning awards in public service advertising categories. An emotional appeal was used throughout, e.g., a father lifting his son into a wheel chair, or a teenage girl with a very scarred face. The messages were timed so as to appear on television in temporal sequence with programs whose audience would be relevant to the message. Messages were aired over one cable of a dual cable television system and drivers from homes receiving messages comprised the experimental group. No messages were aired over the other television cable in a county of 230,000 population. The messages were aired for six months, during which time observers throughout the neighborhoods where the cable television system was installed noted actual use of seat belts. The results showed that the messages had no effect on seat belt use. There was no significant difference in drivers of households in which messages were presented and those in which no messages were received.

Manheimer, et al (1966) conducted a data-gathering study on seat belt use and attitudes associated with seat belts. During one year a survey was taken to determine whether seat belts were installed and if and how they were used. Acceptance of seat belts varied from high to low such that drivers: had belts and used them regularly; had belts and used them irregularly; did not have belts but were receptive to having them; and did not have belts and would not have them at all. Questions of a psychological nature characterized the users of seat belts as cautious and less impulsive. The responses to questions concerning reasons for not using seat belts included emotional safety arguments such as: "They act as a trap in an accident;" and convenience factors such as: "They take the fun out of driving," "they wrinkle clothes," and "are not necessary around town." These reasons had practically nothing to do with safety factors related to seat belt use. Rather, there seemed to be a lack of motivation to use them, in that drivers could not see any reason for their use and found the procedure of buckling and wearing belts annoying and unnecessary. It is worth noting that those interviewed who used seat belts did so realizing the safety benefit and/or had known of instances where seat belts had saved lives in an accident.

There is no clear reason why seat belt public education campaigns have been unsuccessful even when the messages were well designed. One possible drawback is that the message is usually presented over television when the target audience is not in their car. The lack of temporal and visual proximity of the messages appears to be a distinct fault of the campaign design. It has also been suggested that the practice of safety is a time and effort consuming act and that the consequences of avoiding a safety procedure are too remote to effect a behavioral change (Laner and Sell, 1960). Finally, seat belt use

may be sufficiently inconvenient to prompt drivers to consciously choose the less safe course of driving without them.

Some efforts to change drivers' behavior have been more successful than attempts to induce seat belt use. In an experiment to test the influence of a poster on the frequency of turn signaling, Blomgren (1963) based his design on presenting the message in close proximity to the behavior which was to be changed. A sign reading: "A good driver is courteous--he signals" was placed at the exit of a parking lot. Subsequent frequency of turn signaling was observed. The sign significantly increased turn signaling at the exit of the lot and also increased signaling of the same drivers at nearby intersections. Ten days after the sign was removed, the number of drivers signaling had not returned to baseline, and it was concluded that the sign had produced some learning.

Some positive results were also found by Hutchinson (undated) using television as a medium. In his program, he measured the effectiveness of a televised driver re-education program. Moving pictures were taken of driving errors at local intersections. The television presentations were a series of two to three minute broadcasts over an 18 month period, showing local drivers making errors at intersections with a subsequent showing of the correct driving procedure. Follow-up research to the televised broadcasts showed driver errors and accidents were significantly reduced. This same campaign design may be applicable to pedestrian safety and the display of incorrect and correct pedestrian behavior.

For many years opposing points of view have supported the issuing of citations on the one hand and written warnings on the other to negligent drivers. In order to shed light on this controversy, Fitts (1966) examined the effectiveness of police written warnings on subsequent driver behavior. He used two groups of drivers; one issued written warnings, and one issued citations. The subsequent driving behavior was observed and evaluated in terms of moving traffic law violations. Written warnings were found to be not as effective in reducing offenses as were citations. This finding may have similar implications for pedestrian safety and corresponds to the relative successes of Wiener and Denham reported earlier.

Other attempts at modifying driver behavior have utilized an intense increase of law enforcement officers on major highways (e.g., Hirleman, 1969; Huffman, 1961). The effect of increased highway patrol, it was felt, would result in fewer moving violations and also in fewer accidents. Results were encouraging in that there was a significant reduction in injuries and a decrease in the numbers of fatal accidents and total accidents. As in pedestrian countermeasures when the presence of a policeman influences more conformance with legal pedestrian behavior, the presence of a patrol car on the highway caused a reduction in speed.

Campaigns for the practice of industrial safety are similar to pedestrian safety in that incorporating some defined safety procedures in one's behavioral routine are supposed to result in fewer injuries and deaths. Laner and Sell (1960) tested the effectiveness of safety posters in a machinery plant. The purpose of the posters was to warn men to hook back chain slings when not in use. A loose sling was potentially dangerous since it could cause injury to men in the area and it could hook into and dislodge machinery. Posters were placed both in the shops where slings were used, and in other areas where "slingers" congregated, e.g., shop store, clocking-in area. The poster pictures were kept undetailed, with only the specific message "Hook that Sling" printed on the poster. Effects of the posters were significantly positive in all the buildings in which they were displayed. A follow-up count was taken after six weeks and showed a lasting positive effect attributable to the posters, with some plants even showing further improvement. Again, these results imply the benefits of a point-of-behavior presentation.

In another study on the effects of posters as smoking deterrents, less encouraging results were obtained (Auger, et al 1972). Wall size posters, and small sections on a mobile were hung in a lounge where smoking was permitted. The three groups studied were in rooms with a) posters and mobiles displayed; b) posters only displayed; and c) control (no display). Baseline and experimental data collected were the number and length of cigarettes left behind. There was no significant difference between the two experimental groups and the control group. The authors suggest that some other medium along with the posters and mobiles would have had a more significant effect in reducing smoking. This is questionable in light of the recent news stories showing the lack of effect of a 10 year Government sponsored mass media anti-smoking campaign.

F. Discussion

A review of the literature led to several conclusions relevant to the development and pretest of pedestrian public education messages in this study. These will be discussed below in terms of specific implications for developing message contents, approaching target audiences and selecting appropriate media channels. However, it must be recognized that these three facets of a pedestrian education program are highly interactive and must be addressed iteratively during the development of any public education program.

1. Message Content

Virtually every basic approach to the development of message contents has been attempted in previous campaigns. The range is from broad generalities intended to promote "awareness" to specific behavioral guidance based on studies of accident causation. No clear picture of relative effectiveness

emerges. This is partially the result of an absence of a rigorous evaluation in many programs. However, it is not unreasonable to assume that each approach is potentially effective if properly applied. Certainly, the results of the San Jose experience (general messages) and the Green Cross Code (specific messages) are indicative of the fact that success is possible with either approach. It must, nevertheless, be recognized that effectiveness of a message depends on more than the message itself. Thus, it is doubtful if the San Jose project messages would have been as effective if their presentation plan had not been as intensive.

The notion of messages creating a safety awareness which, in turn, promotes safe behavior, appears to have limited viability. There is evidence that it can be effective for adults but is of little or no value with children. It is clear that youngsters have significant limitations in a traffic environment. Their perceptual skills are not fully developed and they cannot conceptualize effectively. Thus, general safety messages, particularly applied remotely from a real traffic situation, are lost on children. Moreover, 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 a visual distraction, he is more likely to pick up where he stopped than to re-initiate the sequence.

It has long been popular in advertising circles to claim that "you can't sell safety." While this adage has generally been directed toward campaigns designed to sell products, it also appears to be applicable to public education programs. The experiences of Wiener and Denham tend to indicate that fear of enforcement is a far stronger motivation for behavioral change than is a desire to be "safe." This is especially true for adult populations and older children (over 12 years old). People simply do not think that an accident will happen to them. They recognize the problem but feel that it is always the "other fellow" who gets into trouble. Alternatively, they consider safety a matter of luck and beyond their control.

Messages conveying specific advice about how to act in a traffic environment are more directly aimed at immediate behavioral change. Unfortunately, their transmission efficiency is often very low. That is, few people exposed to the message actually pay attention to it or follow its advice. It has been suggested that this transmission problem can best be overcome by creating an involvement on the part of the message receiver. If he can personally relate to the situation described, he may be more likely to respond positively. Thus, messages containing specific behavioral advice may be most effective when they involve the target audience by describing familiar situations

and a logically acceptable rationale for adopting the desired behavioral pattern. Unfortunately, this approach is often carried too far by stressing the logical basis for a behavioral change and leaving the desired behavior unstated. Implied safety actions generally appear to be too remote to the target audience to prompt a behavioral change. Given the general disinterest of the public in safety, it is probably demanding too much to expect the receiver of a message to infer the correct conclusion from a rational argument.

It would be extremely naive to say that public education is totally a probabilistic endeavor and that any approach will derive its success totally from chance. Even though probability plays a major role in a safety campaign, much can be done to improve the chances of program success. First, messages can be made appealing to maximize their attention-getting value. Then, the target audience for the message can be carefully chosen on the basis of accident risk to maximize the exposure of all populations at risk to the good advice. In the context of this study this meant targetting messages to drivers as well as pedestrians. Third, the message can include a faithful reproduction of the real world to maximize the transfer of learning to the operational situation. Live demonstrations or staged films help accomplish this. Finally, the presentation media and the timing of the message delivery can be carefully controlled so that they are totally supportive of the message content. In fact, the message itself may often be of secondary importance in determining effectiveness. The San Jose message contents can best be described as uninspired. Nevertheless, the program has apparently produced a significant accident reduction as a result of the innovative and intensive use of media.

In this project, the findings of the ORI study were adopted as the primary input to the development of message contents. From the foregoing discussion, it is clear that this is only one of many foundations which could have been adopted. On the other hand, it is also evident that it should be possible to develop a potentially effective public education program based on the ORI results. Ultimate success can only be measured by accident reduction, a criterion beyond the scope of the present effort. However, the creation and measurement of a positive behavioral change in the target populations, the basic effectiveness measure of the current work, should be strongly indicative of potential accident reduction from a large scale presentation of the developed messages.

2. Target Audience

The choice of the ORI accident data as the basis for the contents of the messages dictated their appropriate target audiences. These will be those types of people who are typically involved in the various accident types addressed. The characteristics of these individuals will, to a great extent, determine the final form and presentation of the message contents and the

media chosen for transmission. The age and sex of the accident victims represent the primary information available about them. In addition, a limited amount of socioeconomic information can be inferred from the accident data. Race and location of the accident are the primary variables applicable to this analysis.

a. Sex

Sex has traditionally been a variable of interest in highway safety research. Although important when studying pedestrian accidents, it is not a prime consideration in the development of a message campaign for several reasons. First, and perhaps foremost, is the fact that message content is not really a function of sex. That is, the common behavioral errors are committed with sufficient frequency by both sexes so that limitation of a message to either sex as a target group would exclude a significant proportion of the population at risk. Second, age and sex are highly interactive, particularly for young children. Sandels (1970) and others have shown that parents are more likely to allow young male children to play near traffic than young females. Thus, an exposure differential is created. In addition, the play patterns of young males and females differ, with males more likely to engage in sports which could lead to distraction from proper pedestrian behavior. The ORI data confirm this when precipitating factors are viewed as a function of sex. Males are overly prone to have their search patterns distracted by play while neither sex is overrepresented in running errors.

The final consideration in excluding sex as a major factor in message development arises from the apparent ability to prepare a successful campaign aimed at both sexes. The topic of pedestrian safety is essentially asexual in nature. Therefore, men and women within the various age categories should be able to relate equally to a properly prepared message. Perhaps the only important operational consideration would arise when considering the language of adult messages and the casting of any films or commercials to present them. With the current popularity of the Feminist movement, it would appear wise to insure that the tone of these presentations is totally related to safety and cannot be construed as anti- or pro-Feminist by the audiences. Obviously, such considerations are essentially moot for young audiences.

b. Age

The ORI data and the review of the literature indicated that the age of a pedestrian should be the major audience variable of interest to this study. First, age is related to behavior which, in turn, correlates with accident type in the ORI typology. Second, age is directly related to an individual's capabilities as a message receptor. Reading and comprehension abilities generally improve with age, and experience in traffic situations increases with exposure. Thus, the age of a target audience is a critical determinant of both the content and structure of a message.

The emphasis on young and elderly target groups in the main body of the literature is only partially supported by the data from the ORI study. Children are heavily involved in pedestrian accidents, and the 5-9 year age group has the highest injury rate (Snyder et al, 1971, p. 4-2). These over-representations adequately qualify the young for special attention. The elderly, on the other hand, are only anomolous because of their high fatality rate (30% of the fatalities in the ORI data involved pedestrians over 65). No single accident type in the ORI typology can be classified as predominantly an elderly accident. This is in sharp contrast to the young age group, which constitutes the overwhelming majority of the victims in several of the more frequent accident types. To be sure, a contributing factor in the absence of an elderly accident type is the categorization of precipitating factors upon which the typology is based. However, there is no clear evidence that a revision of the derivation scheme for accident types would have necessarily resulted in a distinct type of accident in which elderly pedestrians exhibited unique behavioral errors. Thus, it would appear that the high fatality rate among the elderly can be attributed primarily to their inherent frailty. Further, the intense interest in the study of their behavior as pedestrians is likely the combined result of emotionality prompted by the fatality rate and the basic ease of studying elderly pedestrians because of their tendency to cluster in retirement communities.

It is therefore clear that age, by itself, is only a viable criterion for message development for young age groups. Youth are relatively homogeneous with respect to their capabilities to cope with a pedestrian situation. They are all lacking experience in and exposure to the wide variety of factors in the pedestrian environment. As age increases, it becomes less an indicator of pedestrian behavior than a barometer of other, more directly applicable factors. Through the middle years pedestrians possess both experience and comprehension and have not yet become frail. In the elderly, the probability of infirmity and decreased pedestrian human factors increases. These factors are far more crucial than simple chronological age. Ultimately, advanced infirmities can be totally incapacitating, thereby removing an individual from the population of pedestrians.

c. Socioeconomics

The major socioeconomic variables available from the ORI data base were race and accident location. The two together can be highly indicative of the socioeconomic strata accident victims represent. An examination of the race of accident victims in the ORI data leads to two observations. First, the proportion of Blacks is very much a function of city. Second, Blacks are a significant, even if not over-represented, segment of both the total and accident populations. In fact, if the other typical urban minority groups, e.g., Puerto Ricans, are added to the Blacks, the significance of the inner city segment of the population in pedestrian accidents is even greater.

The ORI data on accident location (type of area in which accident occurred) confirms the notion that many urban pedestrian accidents are occurring in the inner city and other lower income areas. Although commercial areas are the most frequent sites of pedestrian accidents (39%), multi-family and apartment house residential areas combined account for 27% of all accidents. This compares with roughly 21% of all accidents which take place in single family residential areas which presumably have residents belonging to higher socio-economic strata.

The operational implications of these results are particularly important for younger age groups in the target audiences. Reading levels for urban, inner city, children are generally lower than national norms, thus compounding the problem of conveying messages to the young target audience. In addition, the large proportion of inner city minorities of all ages necessitates media choices and presentation techniques, e.g., casting for a TV commercial, which can be effective for both inner city minorities and the more advantaged segments of the population.

3. Media

A review of the literature clearly indicates that the medium or media chosen for a public education campaign can play a major role in its success. In addition, the timing and repetitiveness of the media presentations is an important consideration. With proper manipulation of timing and presentation, it would appear that virtually any medium is capable of transmitting a safety message. However, they are not all equally capable of promoting a positive behavior change in a pedestrian environment.

First, and perhaps foremost, it is clear that media which make their presentations in close spatial and temporal proximity to the desired behavior changes are generally preferable. Safety is not usually a constant conscious concern of the average pedestrian. Thus, media which are localized to a pedestrian's point of decision have the greatest chance of breaking through his consciousness and creating a change. Moreover, the message need not be stored for long periods of time before it is used.

The benefits of localized media can be particularly strong when they are employed in multi-media campaigns. If a message is complex and not generally a part of the general knowledge of an average person, a more in-depth message than can be supported in localized media may be needed. Thus, a film, TV commercial or other medium with a greater information handling capacity

may have to be utilized as the primary education source. However, by augmenting these primary media with localized reinforcement at the point of behavior, a greater behavioral change can be anticipated.

As message complexity increases, and, in particular, as the characteristics of the desired behavior represent more of a radical departure from existing behavior, more reliance must be placed on the visual media (e.g., films, slides, video tape, demonstrations, etc.). Words are rarely as effective in promoting adoption of complex behaviors as are pictures and demonstrations. For all ages, but particularly for the young, it is far easier to mimic than it is to interpret. In addition, visual media, especially audio-visuals, tend to be inherently more attention grabbing than pure audio or printed media.

Finally, none of the evidence reviewed indicates that any of the public education media are capable of producing a large behavior change and sustaining it after a safety campaign is over. In other words, true behavior modification may be an overly ambitious objective of public education. However, public education through the media can produce behavioral changes within the life of the campaign, and it appears that, although behavior moves back towards baseline upon stopping the campaign, a small residual gain can be expected. Thus, two roles can be envisioned for public education. First, it can be effective by itself, but the effectiveness diminishes significantly when the campaign ceases. Second, it can serve as a supportive component in a total education and training program to reinforce a learned behavior and improve program effectiveness. In either capacity, it would appear that a cost-effective utilization of public education is possible.

This section has focused on the overall implications of the findings in the literature for the efforts to be undertaken in this study. The results of the literature review represent one component of the input needed to define the content of each message and its appropriate target group. In the next section, the data from the ORI study will be examined in detail leading to the actual derivation of message contents. Some of these, in turn, will be the subject of pretest discussions in Section V.

IV. DERIVATION OF MESSAGES AND MESSAGE CONTENTS

A. Selection of Accident Types

The primary source of information for urban pedestrian accidents is the ORI data referred to earlier (Snyder et al 1971). While this study did not systematically sample all urban pedestrian accidents in the United States, it did gather interview, accident report and on-scene data for more than 2,000 pedestrian accidents in thirteen major U. S. cities. This makes the ORI data the most complete in-depth data base for the urban pedestrian-vehicle crash problem. For this reason, the present analysis of pedestrian accidents started with the ORI data file.

The original ORI report (Snyder et al, 1971) presented data from 2,147 pedestrian accidents. These accidents were separated into nine accident categories or causal groupings based upon the characteristics, location, etc. of the accident. Individual accidents were further broken down into specific accident types within these broader categories. Table I. shows the total distribution of accidents from the ORI study by category and specific type. The first step in the analysis of these data was to examine these types to determine which should be addressed in the current effort. In other words, these data were examined to determine where pedestrian safety messages should and could be addressed to achieve an impact on the pedestrian-vehicle crash problem. As an aid to this and subsequent analytical steps, a computer tape of all the ORI Study accident cases was made available for this effort. This permitted complete freedom to study any of the 415 variables recorded for each case and their interactions.

At first glance, there were several categories of accidents which could be eliminated without any further consideration. The first of these was category "E. Miscellaneous." This category included an accident type involving the rear wheels of trucks and buses (N = 10 cases) and a catchall type referred to as "weird" (N = 26 cases). This catchall type included accidents in which the circumstances surrounding the crash were "highly" unusual, and thus could not be addressed by any general safety program. The next category eliminated was "F. Atypical Causes - Not Pedestrian Countermeasure Corrective" (N = 109). The accidents within this category were all outside the direct control of the pedestrian and were also felt to be outside the control of a pedestrian safety program targetted for drivers. Accidents included in this category involved "hot pursuit" (e.g., police vehicle chasing suspect vehicle), "driverless vehicles, "illegal antisocial acts" (e.g., fleeing scene of crime) not including jaywalking and pedestrian crashes which were the result of an "auto-auto crash." Category "G. Causes Not Studied" (N = 120) was also eliminated. This category included accidents in which the available data were either limited or conflicting

Table I

Pedestrian Accidents by Type from ORI Study

(Snyder, et al, 1971)

		Percent	Number of Cases
A1.	Darts and Dashes		
	Dart-out first half	24.0	518
	Dart-out second half	8.9	193
	Pedestrian strikes vehicle	4.0	86
	Intersection dash	8.3	180
A2.	Other Typical Pedestrian Situations		
	Multiple threat	3.2	69
	Pedestrian waiting to cross	.6	14
	Vehicle turn/merge	6.3	137
	Multiple pedestrian split	.3	7
B.	Situations with Specific Predisposing Factors		
	Vendor	1.5	32
	Pedestrian exiting from vehicle	.9	19
	Bus stop related	2.6	56
	Backing up	1.7	37
C.	Non-Street Locations		
	Non-pedestrian activity not in roadway	2.2	48
	Freeway-expressway from car	.2	4
	Freeway-expressway crossing	1.1	23
	Off-street parking	.9	19
D.	Atypical Pedestrian Activity		
	Non-pedestrian activity in roadway	2.2	48
	Pedestrian walking in roadway	1.1	24
	Working on vehicle	.3	6
E.	Miscellaneous	1.7	36
F.	Atypical Causes--Not Pedestrian Countermeasure Corrective	5.0	109
G.	Causes Not Studied	5.6	120
H.	Infrequent or Unidentifiable Pattern	17.3	374
	Total	100.0%	2,159 Cases

to the point where no conclusions could be drawn concerning the causes etc. of the crash. The last category eliminated was "H. Infrequent or Unidentifiable Pattern" (N = 374). This category was a catchall for accidents which were not sufficiently unusual to be classed as "weird" or for which enough data were available to remove the accident from the "Causes Not Studied" category but not enough data were available to actually classify the event. In other words, the accidents falling in this category were either unusual or not classified due to insufficient data.

The remaining accidents shown under A1. through D in Table I, were all candidates for the target of a pedestrian safety message.

The first criterion used to select accident types to which messages would be addressed was frequency. It was felt that the messages developed should be, at a minimum, targetted toward the most frequently occurring types of pedestrian crashes. An examination of the data in Table I reveals that the accident types in the category "A1. Darts and Dashes" represent, individually and collectively, the most frequently occurring, and, thus, should be included in the current effort. Of these, Dart-out first half alone accounted for 518 cases or 24.0% of the total sample. Dart-out second half accounted for 193 cases and Intersection dash accounted for 180 cases. The least frequent accident type under the "Darts and Dashes" was pedestrian strikes vehicle. However, even this accident accounted for 86 cases. Thus, all of the "Darts and Dashes" were selected as accident types at which messages should be addressed.

The remaining accident types occur far less frequently than the "Darts and Dashes." The single exception is vehicle turn/merge, which accounts for 137 cases. The next most frequent is multiple threat with 69 cases. Vehicle turn/merge was therefore selected for message development. Multiple threat was also selected, with the provision that it probably would not be included in the pretest since it is not really one of the major accident types. It was felt that none of the remaining types occur frequently enough to merit inclusion on the frequency criterion.

Accident frequency was the most important criterion used in deciding where messages should be targetted. However, a review of the ORI data suggested that there were certain special situations in the pedestrian environment that were particularly amenable to a public education approach to safety. For one reason or another the accident type presented a readily available behavioral solution and the situational factors surrounding the accident were so highly definable (or specific) that the target group would know exactly when and where to apply the behavioral solution. In other words, it was felt that an immediate, and significant, though possibly small, impact could be gained by targetting messages at certain special situations.

Such a special situation seems to be present in the bus stop accident (N = 56 cases). The stimulus, or the situation, is a stopped or parked bus. The bus acts as a screen such that the drivers of oncoming vehicles passing the bus from behind cannot possibly see a pedestrian crossing in front of the bus. The behavioral solution is to avoid crossing in front of a bus unless one is certain that all traffic passing the bus and the bus itself must stop for a traffic light or stop sign. Thus, it is a specific situation with a specific behavioral solution. Presumably, if pedestrians knew about the situation and the solution, they would act accordingly and an immediate safety benefit would be derived.

A similar special situation exists in the vendor accident (N = 32 cases). The stimulus is the vendor truck. As with the bus stop accident, the stopped or parked vehicle, this time the truck, acts as a screen. The drivers of oncoming vehicles cannot see pedestrians crossing in front of the truck and pedestrians cannot see the oncoming vehicles. Once again, the behavioral solution involves not crossing in front of the stopped or parked vehicle. An immediate safety benefit is possible if pedestrians knew about the situation and the solution and acted accordingly.

It was felt that a third special situation may be present in the freeway-expressway crossing accident (N = 23 cases). The stimulus or situation is the freeway itself and the behavioral solution is simply that pedestrians should not attempt to cross it. If a pedestrian must cross he should go to the nearest under or overpass. In one sense, this accident is clearly a special situation. The environmental factors are highly specific and the behavioral solution is simple and straightforward. However, it is not clear that an immediate safety benefit could be derived from a message aimed at this accident type since, presumably, pedestrians already know that they should not cross freeways. Nevertheless, they may not know just how dangerous this behavior really is. Therefore, a message in this area, including not only the situation and the behavior but a statement of the seriousness of the problem, might be effective.

Thus, the analysis of the ORI pedestrian accident data suggested that there were nine accident types which should be addressed, either because of their frequency of occurrence or because they presented special situations particularly amenable to a public education messages solution. The accident types are:

	No. Cases from ORI Data
Dart-out first half	518
Dart-out second half	193
Pedestrian strikes vehicle	86
Intersection dash	180
Vehicle turn/merge	137
Multiple threat (included provisionally)	69
Bus stop related (special situation)	56
Vendor - ice cream truck (special situation)	32
Freeway-expressway crossing (special situation)	23
Total	1294

Together, the number of cases or accidents represented by the selected types is equivalent to 60% of the total number of cases from the ORI data. Excluding the categories of "Miscellaneous," "Atypical-non corrective," "Causes Not Studied," and "Infrequent or Unidentifiable," the above nine accident types include 85% of the ORI data. In other words, the accident types selected for message development cover 60% of all the ORI sample and 85% of that portion of the ORI sample in which the accident was not unusual, highly unusual, non-corrective or otherwise not classifiable. The remaining ten accident types (14% of the classified, potentially corrective cases collectively) were excluded from further analysis. None of these remaining accidents met the frequency criterion, and none were deemed sufficiently "special" with specific behavioral solutions to be included on the basis of immediate impact.

B. Message Contents and Targets - Darts and Dashes

Each of the selected accident types were further examined to determine what the focus of any developed message should be. In short, what information or content should be contained in a safety message to help pedestrians and/or drivers avoid those kinds of crashes. The first set of such analyses were directed toward the darts and dashes.

The various types of dart and dash accidents are distinguished by where and how the crash occurred. A pedestrian entering the traveled portion of the roadway can be endangered from oncoming vehicles in different ways. First, he can step out and actually hit a vehicle crossing in front of his path. If this occurs,the accident is classified as a pedestrian strikes vehicle crash. Alternatively, the pedestrian may enter the traveled portion and be struck by an oncoming vehicle. This crash would be classified as a dart-out first half. Pedestrians who traverse the first half of the roadway can still be struck by vehicles coming in the opposite direction. These crashes are classified as dart-out second half accidents. Dart-out accidents occurring at intersections are classified as intersection dashes. It can be seen from these descriptions that the darts and dashes are all similar kinds of events. The primary feature distinguishing one from the other is where the event occurred. Otherwise, the factors identified in the ORI data as leading to or contributing to the crashes were highly similar across the various types.

The ORI study attempted to view a pedestrian crash as a system failure in the normal flow of pedestrian and vehicle movements. These failures were seen as a breakdown in the crash avoidance sequence of actions undertaken by pedestrians and drivers. The first step in the sequence was course selection. This included both the selection of an appropriate path or course and the negotiation of that course. The next step involved search processes. In other words looking for or searching for oncoming vehicles by the pedestrian and oncoming or otherwise endangered pedestrians by the driver. The

next step, referred to as detection, involved the result of the search. Specifically, did the pedestrian or driver become aware of the potential hazard? It was possible that the search function could be adequately performed yet still have a detection failure as in the situation where the driver or pedestrian was screened by a parked vehicle or other object. The next step was evaluation. Given that detection occurred, was the potential threat properly seen as a threat? The last step was action, or, simply, did the driver or pedestrian make the appropriate movements to avoid the crash?

The above sequence of steps was used to describe both driver and pedestrian system failures prior to the crash. Within each step, several more specific categories were available. For instance, under pedestrian course the actual failure could be further defined as a failure in course selection (e.g., crossing against a light; choosing a course which led to high exposure to vehicles, etc.) or course negotiation (e.g., running across the street). These specific system failures were viewed as the "Primary Precipitating Factors" of the crash. For any given crash, up to three primary precipitating factors or system failures were identified by the ORI study. For instance, one crash could have had system failures from pedestrian course "high exposure," "against light" and "running."

The ORI study also isolated other crash connected but not directly precipitating factors. These, referred to as "Predisposing Factors," indicated certain pre-conditions in the environment, vehicle or on the part of the pedestrians and drivers that increased the likelihood that a crash would occur. Driver and pedestrian disabilities and vehicle defects were included in this group of factors. The two most often cited predisposing factors, however, were "improper supervision of children" and "parked vehicles."

Table II shows the distribution of primary precipitating factors and the two most important predisposing factors by each of the accident types selected for message development. It can be seen from this table that the two most important factors leading to the dart and dash accidents are pedestrian course selection/negotiation and pedestrian search. In other words, it appears that for all of these types the problem is basically one of pedestrian errors or failures as opposed to driver errors. Therefore, the target group for the dart and dash messages should, at a minimum, include pedestrians.

Further analysis of the data shown in Table II revealed basic similarities among the several dart and dash accidents. Course selection errors in these accidents were often due to the fact that the pedestrian was running and/or presented a "short-time exposure" to oncoming vehicles. Similarly, search errors across the four dart and dash accident types typically fell in the same subcategories (primarily: search--inadequate, inattention, and distraction).

Table II

Distribution of Primary Precipitating Factors and Selected Predisposing Factors by Those Accident Types Selected for Message Development

Accident Type	N	Primary Precipitating Factors: Pedestrian Crs.	Ped. Srch.	Ped. Det.	Ped. Eval.	Ped. Act.	Driver Crs.	Driver Srch.	Driver Det.	Driver Eval.	Driver Act.	Predisposing Factors: Improper Supervision of Children	Parked Vehicles
(accidents)													
Darts and Dashes													
Dart-out first half	518	431	366	88	11	1	17	25	101	6	2	157	318
Dart-out second half	193	168	131	30	14	5	6	16	34	7	2	42	46
Ped. strikes vehicle	86	40	63	9	8	5	2	6	1	7	1	10	6
Intersection dash	180	181	108	15	22	4	16	38	16	4	--	30	17
Other Accidents													
Bus stop	56	31	27	16	3	1	7	13	19	2	1	2	2
Freeway crossing	23	36	6	1	5	--	--	--	--	--	1	1	--
Vendor	32	27	23	6	--	1	--	3	6	--	--	7	13
Vehicle turn/merge	137	7	63	8	14	1	9	144	22	5	1	--	7
Multiple threat	69	49	27	25	3	--	6	17	34	--	--	4	--

Note: = indicates that a message was developed to address this factor for the given accident type

– indicates that a message was developed to address this factor insofar as the failure occurred as the result of a vehicle screen

Given this similarity in causative factors and the basic similarity in the circumstances of the accidents it was felt that a set of messages could be developed, each of which could impact on all of the dart and dash accident types. An appropriate search message, for instance, could reduce the incidence of all types.

The ORI data suggested that there are five major causative factors in the dart and dash accidents. The first is the general problem of inadequate pedestrian search. The second and third are pedestrian course selection producing "short time exposure" and pedestrian "running." The fourth is "improperly supervised children." The fifth problem area is parked cars, which often lead to detection failures on the part of both pedestrians and drivers because they screen one from the other. Therefore, the aim of message development was to derive a set of messages which, collectively, would deal with all of the above factors.

At the outset, it was felt that the search factor was a generalized factor and should be included in many, if not all of the dart and dash messages. The remaining factors, short-time, parked vehicles, running and supervision were more specific and should receive separate treatment. Thus, at a minimum, four messages were needed.

The first message content developed attempts to deal with the problems of short-time exposure and pedestrian search. The behavioral error is that pedestrians do not give drivers time to see them and they do not search for oncoming vehicles. The solution to the problem is for the pedestrians to stop before entering the traveled portion of the roadway (i.e., curb or outside edge of parked vehicle) and search for oncoming vehicles. While stopping is the ideal solution, it was possibly unrealistic to expect a full stop on the part of many pedestrians. Therefore, a variation in this solution would be to simply ask pedestrians to pause before entering the traveled portion of the roadway. The specific message content for this message is given below:

Message No. 1 and No. 1a: (Dart and Dash Accident Types)

> Pedestrians who move quickly out into the roadway do not have adequate time to look for oncoming cars and do not give drivers enough time to see them. Whenever you cross a street, particularly midblock, stop (pause) at the curb if there are no parked cars or at the outside edge of a parked car and look left, then right, then left again before entering the traveled portion of the roadway.

Messages 1 and 1a are identical except that 1 asks the pedestrian to stop and 1a asks him to pause. The total message content tells the pedestrian the basic problem, when and where it occurs and the behavioral solution.

Message 2 attempts to deal specifically with the problem of parked vehicles. Once again, the search factor was added to the message because of the general nature of the search problem. The specific message content is as follows:

Message No. 2 and No. 2a: (Dart and Dash Accident Types)

> Parked vehicles are very dangerous to pedestrians attempting to cross a street because they often prevent drivers and pedestrians from seeing each other in time to avoid an accident. When crossing near a parked vehicle, stop (pause) at its outside edge and look left, then right, then left again for oncoming vehicles before proceeding across the street.

As in the first message, the pedestrian is asked to stop in Message No. 2 and asked to pause in Message No. 2a. The message content describes the situation and when and where the behavioral solution is to be applied. It will be noticed that Message No. 2 is highly similar to Message No. 1. The difference is that Message No. 2 attempts to provide a "hook," or more clearly defined situation in which the behavioral solution is to be applied. This "hook" may be valuable in evoking the desired behavior and may produce a larger response than the more general form of Message No. 1.

The third message developed attempted to deal with the specific problem of running into the street. Once again the general concept of adequate search was included. The specific message content is as follows:

Message No. 3: (Dart and Dash Accident Types)

> Pedestrians who run into the street without first looking for oncoming vehicles do not give drivers adequate time to see them and have difficulty performing an adequate search. Furthermore, by running before they know it is safe, they reduce the time they have to react to an unexpected car in their path. When crossing a street, do not run until you have looked left, then right, then left again and you are sure no cars are close enough to endanger you. In other words, run out of trouble when you see it but never run into trouble.

As in the previous messages, Message No. 3 attempts to explain the problem as well as when and where the behavioral solution should be applied. This message is also similar to Message No. 1, but, as in Message No. 2, attempts to deal with a more specific aspect of the dart and dash problem. Once again, there is the question whether the more general Message No. 1 is sufficient or this more specific message is required to obtain the desired behavior.

The fourth message developed to address the darts and dashes attempted to deal with the problem of improperly supervised children. The problem here is that young children are allowed to play or walk near traveled roadways outside the direct control of an adult. The solution is to provide more adult supervision either by the parents or other adults. The specific message content is as follows:

Message No. 4: (Dart and Dash Accident Types)

> Children five years old and younger at play generally do not pay attention to pedestrian safety. They run into the street without looking and often dart-out between parked cars. Furthermore, they are too young to understand the problems of driving and walking and therefore do not perform properly as pedestrians. Thus, when your children go out to play you must take an active role in their safety. Never let your young children walk or play near a street or roadway unless a responsible adult is close by and supervising your child's activities.

These four messages deal with the major causative factors involved in the dart and dash accidents. The next question is who should receive the messages. For Message No. 4, the answer is trivial since the message is specifically targetted to the parents of young children. The other messages, however, are intended to be delivered directly to the involved pedestrians. For the darts and dashes, the typical involved pedestrian is a young male between the ages of four or five and ten or eleven. Table III shows the distribution of pedestrian age and sex by accident type. It can be seen from this table that 47% of the pedestrians involved in darts and dashes were between the ages of 5 - 9 and 78% were 14 or younger. Also, across all darts and dashes, 66% of the involved pedestrians were male.

The above percentages clearly indicate that the primary target group for the dart and dash messages must be the young male pedestrian. However, the darts and dashes are overwhelmingly the most frequently occurring accidents. Therefore, while only 20% of the involved pedestrians were 16 or older, this still represents 196 pedestrians. Similarly, there were 324 involved female pedestrians even though females represented only 34% of the involved pedestrians. Therefore, it would probably be advisable to deliver the dart and dash messages to all pedestrians, even though special emphasis should be placed on the young male.

C. Message Contents and Targets - Other Accidents

The dart and dash messages were each developed to address the range of dart and dash accident types. The remaining messages were developed on an accident type by accident type basis, since each of the remaining types appeared to present distinct crash situations with distinct behavioral solutions.

Table III

Percentage Distribution of Pedestrian Age and Sex by Accident Type from ORI Study (after Snyder et al, 1971)

Accident Type	N*	Age Unknown	1-4	5-9	10-15	16-25	26-45	46-65	Over 65	Male**	Female
Darts and Dashes											
Dart-out first	520	1%	23%	52%	12%	2%	5%	3%	2%	66%	34%
Dart-out second	194	2	16	48	11	8	4	8	3	65	35
Ped. strikes vehicle	87	9	14	31	14	5	9	6	11	75	25
Intersection dash	180	4	9	38	14	12	8	8	6	64	36
Total	981	3	18	47	13	6	6	5	3	66	34
Other Accidents											
Bus stop	57	7	2	12	16	11	23	16	14	48	52
Freeway crossing	23	4	-	9	17	13	35	13	9	86	14
Vendor	32	6	9	66	12	3	-	3	-	52	48
Vehicle turn/ merge	139	3	1	2	2	17	18	27	29	42	58
Multiple threat	69	1	3	16	23	14	20	7	14	48	52
All cases in ORI data	2162	4	10	28	11	12	13	12	10	63	37

Based on Dunlap and Associates, Inc. run of ORI data tape.

*Excludes 2% unknown.

The first of these messages addresses the bus stop accident. This accident, discussed earlier, was included in the current effort on the "special situation" criterion. The presence of a stopped or parked bus provides a strong environmental stimulus and the behavioral solution is relatively straightforward. The specific message content developed is as follows:

Message No. 5: (Bus Stop Accident)

> When a pedestrian crosses in front of a bus, the bus blocks his view of cars and drivers' view of him. When crossing the street near a stopped bus, do not walk in front of the bus unless all traffic passing the bus and the bus itself must stop for a traffic light or stop sign. Otherwise, either cross behind the bus or wait until it leaves.

This message attempts to solve the specific problems of pedestrian course selection resulting in pedestrian and driver detection failures. As shown in Table III the pedestrians involved in this accident type are distributed relatively equally across both sexes and the age ranges. Therefore, the target for this message must be all pedestrians.

The next message developed dealt with the freeway crossing accident. This accident, also included on the "special situation" criterion, presents the most readily apparent behavioral solution. Simply, pedestrians should not cross the freeway. For the 23 freeway crossing accidents in the ORI data, 36 pedestrians course failures were identified (N. B., up to three specific factors could be identified for any one crash). It was felt, however, that pedestrians are well aware of both the situation and the solution. Therefore, the problem in message development was to motivate pedestrians to apply the solution. The specific message content attempting to provide this motivation is as follows:

Message No. 6: (Freeway Crossing Accident)

> Fully 40% of pedestrians crossing a freeway who are hit by cars are killed. Drivers do not expect pedestrians on a freeway. If you must cross a freeway, go to a pedestrian overpass or underpass. Never walk on or across a freeway.

The target group for this message is obviously pedestrians who might walk on or across a freeway. The ORI data, (see Table III) shows that these pedestrians are overwhelmingly male (86%) and are typically middle aged. However, several younger pedestrians are also involved.

The vendor accident was the third accident included in the "special situation" criterion. As shown in Table II, the primary factors leading to this type of crash fall under pedestrian course and pedestrian search. The solution to the

problem is similar to that with the bus stop accident. Namely, pedestrians should cross behind the truck. The vendor situation also allows for the possibility of testing a message directed toward the problem of child supervision. It was felt that the child supervision message presented earlier (Message No. 4) would not be feasible to pretest under the current contract. However, a supervision message applied to a specific situation, such as the vendor accident, might be possible to pretest and might provide an indication as to whether the more general supervision message would be effective. Further, there is some indication that a message directed at this problem in the vendor situation itself would be beneficial since this predisposing factor was identified in 22% of ORI vendor accident cases.

The specific message contents for the two vendor accident messages are as follows:

Message No. 7: (Vendor Accident)

> Children going to and from an ice cream truck are only thinking about their ice cream. They do not pay attention to oncoming vehicles. When the ice cream truck comes, don't just give your child money. Accompany him to the truck so he can enjoy his treat in safety while you concentrate on the traffic.

Message No. 8: (Vendor Accident)

> Cars cannot see you and you cannot see them when you cross in front of an ice cream truck because the truck blocks everyone's vision. After you buy your ice cream, cross the street behind the ice cream truck so drivers can see you and you can see oncoming cars.

The first message, Message No. 7, is specifically targetted to parents. The second message will be targetted to young vendor clients. As shown in Table III, fully 75% of the pedestrians involved in this type of accident were nine years old or younger. There are no differences due to sex (52% male; 48% female from ORI data).

The next accident type addressed was the vehicle turn/merge. This accident was included in the current effort because of its frequency of occurrence. As seen in Table II, the primary factors leading to this accident are pedestrian search and driver search. Therefore, two separate messages, one targetted to pedestrians and one to drivers are required. The content of the pedestrian message is as follows:

Message No. 9: (Vehicle Turn/Merge Accident)

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.

The vehicle turn/merge accident is, more than any other accident type, an adult pedestrian problem. Fully 91% of the involved pedestrians were 16 years old or older (see Table III). The ORI data also show that females may be overrepresented. The distribution was 58% female and 42% male. However, the size of this difference is probably not sufficient to warrant any special message targetting on the basis of sex.

The second problem area, or causative factor, in the vehicle turn/merge accident is driver search. Thus, a second message was developed. The content of this message is as follows:

Message No. 10: (Vehicle Turn/Merge Accident)

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.

The target group for this message would be all drivers. However, across all accident types in the ORI data the drivers were predominately male (81% male). The vehicle turn/merge was no exception, with 83% of the involved drivers being males. While this probably only reflects differential exposure between the sexes, male drivers must be of particular interest. Driver age data from the ORI study indicated a slight overrepresentation of younger drivers (37% were 25 or younger), but otherwise were distributed relatively equally across the age ranges for their accident type. Therefore, driver age is not a major variable in targetting this message.

The last accident type addressed in this effort was multiple threat. Once again, as seen from Table II, this accident involves both pedestrian and driver failures, or precipitating factors. The pedestrian failures involve course, search and detection. The problem is that vehicles stopping to let a pedestrian

cross in front of them block or screen the pedestrians from other moving vehicles. The behavioral solution for the pedestrian is similar to the solution presented in the parked car message (Nos. 2 and 2a). The specific message content is as follows:

Message No. 11: (Multiple Threat Accident)

> Cars which stop for pedestrians who are crossing in crosswalks can block the vision of drivers overtaking and passing the stopped car. When crossing in front of a stopped car, stop at the outside fender of each car that you must cross in front of and look left, then right, then left again for cars passing that car.

The "stop" variation only was used in this message. The pretest results from Messages 1 and 1a (see Section V) indicate that this version is probably the most appropriate. The target group for this message would be all pedestrians, since, as can be seen in Table III, this accident involves all age ranges and both sexes in relatively equal proportions.

The driver failures leading to these multiple threat accidents were largely search failures (see Table II). The problem is that the driver of the overtaking vehicle does not adequately look for pedestrians who may be crossing in front of the stopped vehicle. The solution is for drivers to be aware of the hazard, slow down and be prepared to yield the right of way to crossing pedestrians. The specific message content is as follows:

Message No. 12: (Multiple Threat Accident)

> A car stopped for a pedestrian in a crosswalk can hide the pedestrian from your view. When overtaking a car stopped in the roadway, particularly at a pedestrian crosswalk, slow down and be prepared to stop. He may be hiding a crossing pedestrian, in which case the law requires you to stop.*

The target group for this message is all drivers. The ORI data suggest that driver age is not a major targetting consideration since drivers from all age ranges were involved. Again, however, there was an overrepresentation of males (74% male drivers), probably reflecting differential exposure.

In summary, nine accident types were selected for inclusion in the current effort. The causal factors involved in each accident were examined and a determination was made as to what information should be provided so as to enable pedestrians and/or drivers to avoid a pedestrian-vehicle crash. The result of this

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*In the states of Connecticut, Iowa, Michigan, Missouri, Pennsylvania, South Dakota and Vermont the stop is not required by law.

analysis was twelve message contents each addressing one or more of the major factors in the causation of the particular accident type. As seen in Table II, the developed message contents address, directly or indirectly, most of the major factors identified in the ORI study. Eight of the developed messages are targetted for pedestrians, two for drivers and two for parents of young children. The next section of this report will discuss how a subset of these contents was chosen for pretesting, the paradigms used and the results of the tests.

V. THE PRETESTS

A. Test Plan Development and Message Selection

Phase II of the project was concerned with measuring the effectiveness of the message contents presented in the previous section. Twelve basic message contents and two variations (1a, 2a) were developed and targetted for pedestrians, parents of young children and drivers. The next step was to determine which messages would actually be tested. In some cases feasibility constraints might limit the ability to pretest. Moreover, available contract funds would not support a pretest of all messages. Thus, it was necessary to outline how samples of the various target groups could be acquired, how the information could be provided to the target group, how message effectiveness could be measured, and the costs for each message pretest.

Ideally, message effectiveness would be measured in terms of accident reduction. Measurement of accident reduction, however, was outside the scope of the effort. The primary purpose of the present effort was simply to pretest the developed messages to determine if actual accident reduction is likely should the message be implemented on a larger scale. Therefore, efforts were concentrated on two areas. First, an effort was made to ensure that message transmission had occurred. In other words, all possible steps were taken to ensure that the target group received the information contained in the message. Second, was the determination of whether or not this information produced a behavioral change in the target group. The assumption implied in this approach was that changes in behavior consistent with the changes described in the message would produce a significant reduction in accidents. This reduction, however, could not be measured in the current effort since the message was not applied to a large enough audience for a long enough period of time to collect meaningful accident statistics.

The twelve basic messages are targetted for three broadly defined groups: pedestrians, parents and drivers. Within these groups there are certain critical distinctions. For instance, within the pedestrian group some message contents are targetted for children (e.g., the running message) while others address adult pedestrian problems (e.g., the vehicle turn/merge message). Further, the messages dealing with the "special situation" accidents: bus stop, vendor and freeway crossing, should be delivered as nearly as possible to individuals involved in the situation as opposed to the general public. In short, it is clear that no single pretest paradigm could have been used to test all of the messages. Analysis of the target groups and desired behaviors indicated that at least seven paradigms or pretest scenarios were required if all twelve messages were to be pretested. One paradigm would have been needed to sample, deliver the message and test each of the following target groups:

		Message Number(s)
1.	Adult urban pedestrians	1, 1a, 9, 11
2.	Child urban pedestrians	1, 1a, 2, 2a, 3
3.	Parents of young urban children	4
4.	Pedestrians near bus stops (special situation)	5
5.	Child pedestrians near vendor trucks (special situation)	7, 8
6.	Adult, primarily male, pedestrians near freeways (special situation)	6
7.	Urban drivers	10, 12

The ideal paradigm or scenario developed for the conduct of the pretests would be completely naturalistic. In other words, the target group should be sampled, provided with the message and measured in the normally occurring flow of pedestrian and vehicle traffic with no environmental manipulations. Also, there is a need to identify exactly those target group members who received the message and those who did not. There was no attempt in the current effort to use mass media, therefore, only a relatively small number of the target population actually received the message and, during measurement, it was essential to know exactly who they were. Further, each paradigm or scenario had to guarantee message transmission or at least allow for its measurement (i.e., did the target group receive and understand the message) as well as the measurement of the behaviors of interest.

The first target group for which a paradigm needed to be developed was the adult urban pedestrians. After considering the message contents to be pretested (Nos. 1, 1a, 9 and 11) and the requirements discussed above, it was decided that a downtown store or similar location would provide the required test setting. Sampling could be conducted by simply requesting shoppers to participate in the testing of certain materials. These materials could be programmed instruction workbooks in which the message content could be included in the material reviewed by shoppers. In this way the message could be presented and information transmission could be tested at the same time, since programmed instruction is an information-test-more information based on test results-test etc. cycle. Half of the shoppers would get the message being tested and half would not, thus establishing experimental and control groups. Upon completion of the workbook, each shopper would receive, as a reward for participation, a brightly colored shopping bag containing useful products. Experimental subjects would receive one color and controls another. Observers could be stationed on the street to record pedestrian behavior as subjects left the store. They would distinguish pretest subjects from non-subjects by the fact that the subjects would be carrying the shopping bags.

However, the observers would not know which colors were being used for experimentals and which for controls. A detailed discussion of this scenario as it was actually implemented can be found below in the section on "Message No. 1--Adults."

This basic scenario could have been used for the pretesting of message contents Nos. 1, 1a, 9 and 11. Messages 1 and 1a (stop and search; pause and search before crossing) can be handled easily with this scenario since all that is required is that pedestrians cross a street upon leaving the store. Message No. 9 (vehicle turn/merge) requires that pedestrians cross at an intersection when a turning vehicle is present in order to be pretested. This could have been handled with the store scenario, but would have required a much larger sample since only a few adult pedestrians could have been expected to encounter the precise environmental situation required for testing as they left the store. Message No. 11 (multiple threat) could also have been handled, but the sampling problem was even more severe. In order to measure the behavior associated with this message the pedestrians must cross midblock (or at an uncontrolled intersection), and a vehicle must stop for these pedestrians. A high initial sample would have been required to generate a sufficient number of pedestrians facing this exact situation, especially in the Northeast, where it is not customary for vehicles to stop to allow a pedestrian crossing. The alternative would have been to stage the multiple threat event. However, this would have required precise timing, it might not have been fully naturalistic and would have subjected the pedestrian to unnecessary risk. Therefore, the technique of staging or otherwise manipulating the environment was discarded as an approach to this study.

The next target group of interest was the child urban pedestrian. To a certain extent, this group could have been sampled with the same scenario as used for adults by selecting a store or other location frequented by children. However, it was felt that a more efficient approach to the problem would be to use an urban school system. Children could be provided with the message and information transmission could be measured directly in a classroom situation. Observers stationed in the neighborhood surrounding the school would record the crossing behavior of all children leaving the schools on one day before message presentation and on the day it was presented. This would establish pre and post measures for determining behavioral change.

This scenario could have been used for the pretesting of message content Nos. 1, 1a, 2, 2a and 3. Messages 1 and 1a (stop and search; pause and search before crossing) could be handled easily with this scenario. Again, all that is needed for behavioral measurement is that the children cross a street upon leaving school. Message contents 2 and 2a require that parked cars be present when the child crosses. Appropriate school selection might ensure a sufficient number of children crossing near parked cars. In addition, the school scenario is quite efficient and can generate relatively large numbers of subjects without greatly increasing costs. Message content No. 3 (running) could also be handled.

However, the nature of the message and, thus, the behavior to be measured is such that a very large number of subjects would be needed to pretest this message. The behavior of running into the street simply is not as common as a normal crossing (1 and 1a) or even crossing near parked cars (2 and 2a). Nevertheless, the efficiency of the school scenario suggests that this message could have been pretested.

The parents of young urban children constitute the next target group of interest. Several alternatives were considered for sample selection, message delivery and measurement. Unfortunately, none of the alternatives, short of mass media followed by a large-scale observation of parents and children on the street and a house-to-house survey, fully satisfied the criteria for an adequate pretest. The major problems were verification of message transmission and identification of those children whose parents received the message. It was therefore decided that the pretesting of message content No. 4 (supervision of children) could not be handled in the current effort. However, supervision of children was identified as a major variable in accident causation. Therefore, it was felt that some means should be found to pretest at least some form of a message in this area. Message content No. 7 (child supervision around vendor trucks), to be discussed below, was included primarily for this purpose.

The next three target groups (bus stop, vendor and freeway) were all generated from "special situation" accident types. In one sense, all of these target groups could have been handled in the school or store scenarios since each is merely a subset of all urban child pedestrians and/or all urban adult pedestrians. Such a treatment, however, would not take advantage of the potential benefits offered by the special situations. Specifically, localized media, more highly defined target groups and specific situational characteristics. Therefore, separate scenarios were developed for these three target groups.

The first special situation target group is pedestrians near bus stops. For the purposes and convenience of pretesting, it was decided that this group should be further limited to disembarking bus riders. The scenario developed involved the installation of tape playing equipment on a bus. The message was played for bus riders and, at selected stops, observers were stationed to record the crossing behavior of individuals leaving the bus. Three of the buses on a particular route had the equipment, the rest did not. Street observers did not know for any given bus whether it was experimental or control. They merely recorded the bus number and the crossing behavior. The details of how this scenario was implemented are discussed below under "Message No. 5 - Bus Stop."

The next special situation is the vendor accident. Two message contents, number 7 (parental supervision around vendor trucks) and 8 (cross behind the truck) apply to this accident type. The developed pretest scenario utilized a pre versus post experimental design as in the school tests. On day 1 observers

would ride in an enclosed serving van operating in an urban area. These observers would record the number of crossings made in front as opposed to behind the truck and the number of adults present. They would also provide each vendor client (child) with a leaflet. The leaflets would contain the supervision message and the clients would be told to give them to their parents. On day 2, the same van would cover the same route except that now the crossing message would be delivered from the vendor truck. The observers, again stationed inside the truck, would record crossing behavior and number of adults present. The truck would be followed at selected stops by interviewers. Their job would be to interview parents and clients to determine if information transmission had occurred. Details on implementation of this scenario are given below under "Message No. 7 - Vendor."

The last special situation is freeway crossing. Unfortunately, a suitable pretest scenario could not be developed for this accident type since the behavior in question occurs infrequently. Consideration was given to finding a site where pedestrians have been known to attempt crossings in the past. However, if such a site was found and the number of crossings were indeed large, the appropriate countermeasure would be the construction of a pedestrian walkway or a large fence and not a public information campaign. Therefore, it was concluded that the only adequate test of this message would be to apply it via mass media and measure accident reduction. This approach was clearly beyond the scope of the current effort.

The last target group of interest was urban drivers. The first scenario developed to sample, deliver the message and test these people was similar to the store scenario discussed above. A downtown parking lot, carwash or similar location would be utilized. Drivers, as they returned to their cars, would be asked to participate in the testing of programmed instruction materials. The message content as well as the test for information transmission would be contained in the materials. Half the drivers would receive the message and half would not, thus experimental and control groups would be established. An observer inside the parking lot would note the exact make, license, and color of the car the driver entered. He would radio, by walkie talkie, this information to observers on the street. However, he would not tell the street observers which cars were operated by experimental subjects and which by controls. The street observers would record the behavior of interest. Obviously, the implementation of this scenario depends on the identification of precisely the right location and securing permission to use it. Since this was considered difficult, an alternate scenario for drivers was developed.

In the second scenario, drivers are solicited to participate in a mileage test. They are told that we are interested in testing a wide variety of new and old, small and large vehicles to determine the kind of gas mileage the average car and driver on the average road can get. Each subject attends a briefing on the project. At

half of the briefings (experimental) subjects are provided with the message to be tested. The other half (control) receive no message. The briefings are designed to relate the ostensible purposes of the project, and describe the route they are to take in the test. On the day of the test all cars are filled with gas and marked with an identifiable sticker (or number). They begin the test at 5-10 minute intervals (rally style), with alternating groups of experimental and control vehicles. At points along the route the now identifiable cars are observed by staff members who do not know which cars are experimental and which are control (pseudo double-blind technique). They simply take down the make and model of the vehicle (or the vehicle number) and record driver behavior. At the end of the route the cars are again filled with gas to maintain the ruse that a mileage test has been conducted.

This scenario provides a direct, highly controlled, completely realistic experimental versus control comparison for behavior change. Subjects could be recruited quite easily with the inducements of a full tank of gas, scientific measurement of their gas mileage and a small sum of money.

Message content No. 10 (driver-vehicle turn/merge) could be pretested using either of these scenarios. Message content No. 12 (driver-multiple threat) could also be tested with either. However, as discussed earlier, the multiple threat situation does not occur very often in the Northeast. Therefore, large sample sizes would be needed to achieve the necessary amount of behavioral data. Thus, it was not felt that message content No. 12 should be pretested in the current effort.

In the previous discussion, the potential scenarios for testing each of the messages presented in Section IV were outlined. Message Nos. 4, 6, 11 and 12 were not deemed suitable for a pretest for various operational reasons already outlined. Thus, 8 messages, plus the two alternate versions of Message 1 and 2, could have been pretested if resources allowed (a total of 10 message contents). The projected cost of pretesting all of messages, however, was greater than the available budget. Thus, a subset of the 10 testable message contents had to be selected. Three basic criteria were used to make this selection. First, certain of the messages were related to more than the major study objective of producing a behavioral change as a result of public education. For example, Messages 1a and 2a were included in the total list of messages to ascertain if "pause" is a more palatable behavior for pedestrians than "stop." Likewise, Messages 2 and 2a were included, although essentially the same content as Messages 1 and 1a, to determine if the added stimulus or "hook" provided by specific reference to parked cars would aid in producing a behavioral change. Thus, it would be desirable to include both Messages 1 and 1a or 2 and 2a to test the "pause" versus "stop" hypothesis and either Messages 1 and 2 or 1a and 2a to examine the notion of a "hook."

The second criterion was related to target audiences. Messages 1 and 1a are applicable to both adult and child audiences. Since both groups are important in

this research, the inclusion of at least one of the messages for both scenarios was necessary. This permitted the examination of differential responses as a function of age.

The final criterion involved cost-effectiveness. Message No. 9 (vehicle turn/merge for pedestrians) was testable but relatively very costly because of the large samples needed to obtain an adequate number of data points. Hence, its inclusion would likely have displaced the testing of three other messages because of the total cost constraint. It was considered more valuable to the total effort to eliminate this single message in favor of testing more of the other messages. Message No. 3 was eliminated for the same reasons. Conversely, both Messages 7 and 8 (vendor parents and vendor clients) could be tested for the same, relatively low cost. Thus, this was deemed an efficient selection.

Based on the application of these criteria, the following set of messages was chosen for pretesting:

Message	Audience
1	Children
1	Adults
1a	Children
2	Children
5	Adults (bus riders)
7	Adults (parents)
8	Children (vendor customers)
10	Adults (drivers)

Both age groups for Message No. 1 were included to test the age effect. Inclusion of Messages Nos. 1 and 2 for children would have provided information on the value of a specific stimulus or "hook" in a message. Message No. 5, the bus stop message, could be tested at a reasonable cost and is a well defined situation. Message Nos. 7 and 8, concerning vendors, were extremely cost-effective to test, and the testing of Message No. 7 could provide insight on the effectiveness of parental supervision messages in general. That is, the results of Message No. 7 pretesting (discussed below) shed light on the results which could have been anticipated from a pretest of Message No. 4 (general child supervision). Finally, Message No. 10 (drivers in the vehicle turn/merge) was included because it was both reasonable to test in either potential scenario and could provide information on the response of drivers to pedestrian safety messages.

Unfortunately, as pretesting progressed, the test of Message No. 2 had to be dropped. Basically, there was an insufficient incidence of crossings near parked cars at the school sites being used. Thus, it would have been impossible to gather enough data to actually test message effectiveness. Further, the rarity of the parked car crossing event was not entirely a chance factor. Children in

the Pittsburgh school system (the test site) are continually taught to cross at the corner away from parked cars. Moreover, because Message No. 2 only addresses parked car crossings, school officials were reluctant to permit its test. Hence, additional testing of Message No. 1 was substituted for the test of Message No. 2 and the total set of pretested messages was reduced to 7.

B. Pretest Methods and Results

1. Overview

During the planning for and implementation of the various pretests, several overriding factors had to be considered. These were:

- Realism
- Measurement validity and reliability
- Message transmission
- Subject identification
- Elimination of biases

a. Realism

Each pretest had to be realistic and, to the extent possible, naturalistic so the test results could be generalized to the total population-at-risk. Obviously, people receiving each message would know that they were the targets for this information. However, every attempt was made to insure that they remained unaware that they were subsequently to be observed. Further, all of the pretest media presentations were planned so that they were representative of the types of public education programs which could ultimately be implemented on a large scale. In some cases, e.g., the vendor and bus messages (Nos. 8 and 5), actual mass implementation of the pretest media would be costly but possible. In others, e.g., Message No. 1 in the schools, the pretest presentation was one typical form the eventual program could assume. In all instances, message delivery was through a "typical" medium which might be routinely encountered by the target audiences. Thus, a realistic response to the message content was produced with relatively little contamination from the test procedures themselves.

b. Measurement Validity and Reliability

After each message was delivered, test subject behavior was measured to determine if a positive change had resulted. In some cases, pre-delivery behavior represented the reference point while in others a matched control group was employed to establish a baseline. The actual process of behavioral measurement necessitated the development of measurement techniques which were valid with respect to the specific behaviors each message attempted to engender. Thus, as part of the total process, each measurement scheme was, itself, pretested to insure that it adequately addressed the target behaviors.

Actual measurements for all pretests were made by teams of field observers. Given the inherent variability in the human sensory and cognitive processes, it was essential to guarantee that each measurement system was reliable. That is, the variability of responses across observers had to be relatively low so that measurements were replicable. Reliability was insured through two processes. First, all observers received intensive training in the use of the various measurement systems. This promoted a complete understanding of all concepts by the various observers. Second, each group of observers was tested by having them score staged pedestrian events covering the range of values likely to be encountered in the field. This simulation was continued until the variability among observers was acceptably low.

c. Message Transmission

The primary objective of the study was to determine the behavioral impact of receipt of the messages by the target audiences. As such, degree of transmission of the message, i.e., the efficiency of conveying the information to the target audience, was not a variable in the research. In fact, one of the main foci of the pretest plans was to insure transmission to all members of the target audience. However, the objective of achieving 100 percent transmission could not be realized in all tests. Thus, some of the paradigms employed included a measure of message receipt so that the effects of less than perfect transmission could be discerned.

Two general procedures were employed to maximize transmission. These were repetition and reinforcement. In some instances there was no opportunity for direct interaction with the subjects. However, it was possible to repeat the message a sufficient number of times to be reasonably sure that it was universally received and understood. In other tests during which there was face-to-face interaction with the subjects, it was possible to reinforce the message through a brief verbal explanation. Generally, the messages were all presented at least twice followed, where possible, by verbal questionning to estimate transmission and subsequently by reinforcement if needed.

d. Subject Identification

The subjects for this study were all more-or-less typical urban pedestrians of varying ages. As such, they were basically undifferentiated from other pedestrians around them. Thus, each pretest plan had to address the need to identify or "mark" the subjects so the observers would be able to spot their targets. Further, the identification scheme utilized had to be relatively covert so the subjects would not realize they were marked for observation.

Three basic identification procedures were developed and used depending on situational specific factors. The first involved actually marking the subjects or their vehicle so that they were readily identifiable but did not realize

that the marking was taking place (see for example Message No. 1 - Adults). Actual marking of subjects was not always possible either because of a large sample size or because marking would have destroyed realism. However, it was sometimes possible (e.g., Message No. 5 - Bus) to identify the subjects by their position, i.e., where they came from or where they were going. Finally, when specific marking was impossible, subjects were identified by using the universe of potential subjects at a given place and time (e.g., Message No. 1 - Child). Thus, every person of the target age was, by definition, a subject if he was at the place of the test while the test was conducted.

e. Elimination of Biases

The surreptitious marking of subjects was one way to eliminate any bias among subjects resulting from the knowledge that they were being observed. However, another potential bias could have arisen if the tests were not run "blind," i.e., if the observers knew who were experimental subjects and who were controls. Thus, every test paradigm was designed so that the observers were totally unaware of subject classes. Specifically, when experimental and control groups were used and when a pre - post design was employed, care was exercised to insure the elimination of any bias caused by the observers' knowledge of the test conditions. In actuality, most of the tests were "pseudo-double-blind." In a true double blind experiment neither the observer nor the deliverer of the message would know the group assignment of the subjects. Since most of the "treatments," i.e., the messages, were essentially self-administered and both the subjects and observers did not know the experimental conditions, a situation approaching double-blind was actually achieved.

The remainder of this section describes the actual procedures utilized for the pretests and the specific message-by-message results obtained. These results lead to conclusions on the basic effectiveness of the individual messages. Analyses of the interactions among messages and the implications of these results for the development of a public education program on pedestrian safety are also presented.

2. Message No. 1 - Child

a. Message/Audience Description

Message No. 1 combines information on proper search procedures (left-right-left) with course negotiation behavioral advice for situations with and without a parked car at the curb. In its child version, it is targeted for the urban child, particularly the 5 to 12 year olds who walk and play on city streets. The most obvious source of a defined sample of children in this age range is an urban school system. Thus, arrangements were made with the Pittsburgh Board of Education to permit pretesting using selected Pittsburgh elementary schools.

The choice of Pittsburgh was made largely on operational considerations. Almost any major urban center would have yielded a set of reasonable test sites. However, the Pittsburgh schools had already been carefully screened for another NHTSA pedestrian safety effort. With this background information readily available, the selection of the three schools needed for pretesting (two for Message No. 1 and one for Message No. 1a) was greatly facilitated. Further, the Pittsburgh Board of Education was already aware of NHTSA's efforts and therefore readily agreed to cooperate.

An analysis of the media forms applicable to young children for a message such as the one to be tested quickly revealed the need for a visual presentation. Conceptualization of safety information from the spoken or written word alone is not good among children in this age range. Thus, either a staged form of presentation or a film was needed. the staged presentation was discarded because it could not depict the correct behavior in situ unless the children were taken outside the classroom, a practice not generally to the liking of school administrators. Further, it would be difficult to stage multiple simultaneous presentations without introducing variability in message delivery as a function of the presenter. Hence, a film of the message with accompanying sound track was prepared.

The Super 8 mm format was chosen for film production because it could be handled by the project staff within the available budget. Although the image quality is somewhat poorer than 16 mm, it was considered acceptable for small groups in a classroom setting. The production process involved the development of a shooting script, actual filming, editing, duplication and the ultimate dubbing of a sound track using a professional narrator and sound studio. The resulting film is described in Table IV.

b. Test Procedure

The message was delivered in the Woolslair Elementary School (Grades K-5) on May 1, 1974 and in the Colfax School (Grades K-8) on May 8, 1974.

Table IV

Message No. 1 Film Description

Running time: 1 minute 59 seconds

	Scene	Narration
1.	Boy and girl playing with ball on sidewalk, then stopping and walking toward the camera.	It's getting late...And it's time to go. It's time for smart girls and boys to remember...
2.	Tight shot of childrens' legs walking to the curb and stopping at the curb.	You always stop here, at the curb...
3.	Wide shot of children standing at the curb (from back).	To watch out for cars before you cross the street.
4.	Wide shot of childrens' back. Zoom in to tight shot of heads looking left, right, left.	Always stop. Look one way, then the other way, then back again.
5.	Camera panning left, right and left to show what children should have seen.	Look one way, then the other way, then back again. You want to be sure no cars are coming from any direction.
6.	Side shot of childrens' legs walking to the curb and stopping.	Remember, stop here at the curb.
7.	Tight back shot of childrens' heads looking left, right and left.	Look one way, then the other, then back again.
8.	Wide shot of children crossing the street.	It's the only safe way to cross the street.
9.	Tight shot of children standing at the curb.	Look! Here you are again back at the curb.
10.	Camera pulls back to show parked cars.	This time there's a car parked there. That parked car blocks your view of the street from the curb.

Table IV(continued)

Scene	Narration
11. Tight shot of back of childrens' heads.	Say kids!...Hey kids!
12. Children turn heads toward camera and look at the narrator (hidden).	Before you cross the street this time, how do you watch out for cars that might be coming?
13. Wide shot of children at curb. Slow zoom in as children walk to edge of parked car and stop (girl placing her left hand on the outside fender). They then both look left, right and left.	Smart boys and girls stop right here where they can see better, and look one way, then the other way, then back again.
14. Camera panning left, right and left at the edge of the parked car to show what the children should have seen.	Look one way, then the other way, then back again. You want to be sure no cars are coming from any direction.
15. Medium shot of children leaving edge of parked car and crossing the street.	It's the only safe way to cross the street.

On the day prior to administration the dismissals were observed and behavior scored by a team of 8 observers stationed at previously defined street locations. At Woolslair there was only a single dismissal at 2:45 p.m. Colfax dismissed twice each day, at 11:20 a.m. for lunch and at 3:10 p.m. when the school day ended. Thus, Woolslair students were viewed only once while Colfax children could have been observed three times (leaving school at lunch, returning to school after lunch and leaving school at day's end). All measurements were repeated on the day of message presentation so that pre and post scores were obtained. At Colfax, all message presentations were completed prior to the lunchtime dismissal.

Woolslair is located in the Lawrenceville section of Pittsburgh, an old, lower income neighborhood bordered by industrial areas. The surrounding streets are narrow with low to medium traffic densities and change from residential to commercial as distance from the school increases. Except for the corner of 40th Street and Liberty Avenue on which the school is located and at which a crossing guard is stationed, the streets surrounding Woolslair generally present a low pedestrian threat. In fact, many of the children routinely play in the side streets because of the absence of open spaces between the row houses which characterize the neighborhood.

Colfax is located on Beechwood Boulevard between Phillips and Douglas Avenues in the fashionable, middle to upper income Pittsburgh area known as Squirrel Hill. Traffic densities on the surrounding streets are generally medium to high with reasonably high vehicle speeds fostered, to some extent, by the relatively wide streets. The pedestrian threat is somewhat higher than around Woolslair.

The presentation of the message was made by three senior Dunlap staff members following a set script. Three separate presenters were needed so that each classroom in the schools could be covered during the morning hours. It was considered desirable to complete all presentations before lunch because the attention of young school children is best in the morning. The classroom was selected as the presentation site rather than an auditorium because it allowed a more intimate presentation to an homogeneous age group of children. Further, the technical limitations of the small Super 8 mm film format dictated the need for a small viewing audience that could sit close to the screen and loudspeaker.

Each presentation, lasting approximately 20 minutes, consisted of the following:

- A verbal introduction by the presenter to describe the film as advice on how to cross the street safely based on research into why pedestrian accidents occur.

- A first viewing of the film.

- Discussion of the two main points of the film--course (stop at the curb or edge of the parked car) and search (look left, right, then left). The safety reasons for each suggested behavior were also given. The children were then told to watch the film again and be prepared to answer questions on the correct course and search steps.

- A second viewing of the film.

- A question and answer period, during which the class was asked to "vote" by raising their hands if they thought the answer was correct or wrong. The questions were:

  - When you cross the street and there is no parked car at the curb, what is the first thing you should do? (Answer--stop at the curb.)

  - What is the second thing you should do? (Answer--look left, right and left or look one way, then the other way, then back again.)

  - When you cross the street near a parked car what is the first thing you should do? (Answer--stop at the outside edge of the parked car.)

  - What is the second thing you should do? (Answer--look left, right and left, etc.)

If the wrong response was given, the question was repeated until a consensus for the right answer was reached. This insured that the message was received by all of the viewers.

The discussions and questionning were supportive of the message in the film. However, experience in the classroom indicated that an overwhelming majority of the audience understood the message after the second showing of the film but before the detailed question period. Thus, a polished version of the pretest film for viewing in the classrooms or even over mass media is likely to produce results in the same direction as those outlined below.

c. Measures

Message No. 1 has two objectives, both of which were measured in the pretest. The first objective was to produce proper course negotiation among the target audience. The second objective was to produce proper search behavior.

A five point scale was used in the measurement of each objective. The observers were trained to score a five for the correct behavior, a one for totally incorrect behavior, and varying levels in between corresponding to partially correct behavior. Each child crossing in view of an observer was scored on each objective. The data collection form used is shown in Figure 1.

The correct course negotiation behavior is to make a full stop before entering the traveled portion of the roadway. Typically, this means making a full stop at the curb. However, should parked cars be present, the full stop should occur at the outside edge of the parked car. The observers were thus trained to score as a 5 (on the scale) a full stop at the curb when there were no parked cars and a full stop at the outside edge of the parked car when parked cars were present. A 4 was scored when the subject merely paused, or came to a momentary stop before entering the traveled portion of the roadway. A 3 corresponded to a hesitation, with no stop and a 2 was scored if the subject did no more than merely slow down before entering the traveled portion of the roadway. Subjects who never broke stride and simply proceeded directly across the street were scored as 1. Demonstrations were conducted during observer training to illustrate each of the points on this scale and training was continued until all observers understood each scale value.

The correct search behavior is to look one way, then the other way, then back again before entering the traveled portion of the roadway. As with course negotiation, this behavior was scored in the immediate vicinity of the curb when there were no parked cars and in the immediate vicinity of the outside edge of the parked cars when parked cars were present. A 5 was scored if the child looked left-right-left, or right-left-right. In either case the child was looking "one way, then the other way, then back again" even though the left-right-left sequence is far safer and is the sequence depicted in the film. Reports from observers indicate that the left-right-left behavior predominated. A 4 was scored if the child looked both ways, in either order, but failed to look back again. A 3 corresponded to left only and a 2 was scored for right only. The lowest score, 1, was assigned if the child did not look for oncoming traffic at all prior to entering the travelled portion of the roadway. Each search behavior was demonstrated during observer training and training continued until each observer understood and could score appropriately each scale value.

d. Results

As mentioned earlier, Message No. 1 was pretested in both the Woolslair School and Colfax School. At Woolslair, the children ranged from kindergarten to fifth grade and observations, pre and post, were made following the afternoon dismissal. There is no noon dismissal at Woolslair. At Colfax, the children ranged from kindergarten to eighth grade and observations pre and post were made at both the noon and afternoon dismissals.

Male			Female		
Course Parked Cars	Course Curb	Search	Course Parked Cars	Course Curb	Search

Codes:

Course	Search
5 = Stop	5 = LRL or RLR
4 = Pause	4 = LR or RL
3 = Hesitate	3 = L
2 = Slows	2 = R
1 = No change	1 = None

Date:_____
Observer:_____
Location:_____
Start time:_____
End time:_____

Figure 1. Message No. 1 Data Collection Form.

A five point scale was used in the measurement of each objective. The observers were trained to score a five for the correct behavior, a one for totally incorrect behavior, and varying levels in between corresponding to partially correct behavior. Each child crossing in view of an observer was scored on each objective. The data collection form used is shown in Figure 1.

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Course	Search
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1 = No change	1 = None

Date:_____
Observer:_____
Location:_____
Start time:_____
End time:_____

Figure 1. Message No. 1 Data Collection Form.

The results of this pretest are summarized in Table V. All data for the course negotiation scale were summed across course-parked cars and course-curb, since very few parked car crossings were actually observed. This does not necessarily mean that these children did not cross between parked cars, only that relatively few parked car crossings were observed from the observer locations selected. Also it should be remembered that all of the observations tabulated in Table V are not strictly independent. The children on the post-measurement are essentially the same children who were observed in the pre-measurement. Further, even within one data set, the same child could occur more than once. For instance, for the noon Colfax data a single child could be observed on his way home to lunch and again as he came back to school. Also, depending on the route the child followed to reach his home, he could pass more than one observer location and thus enter the data more than once on a single trip. There is no way of knowing precisely the number of times any one child was observed. However, it is felt that with the large number of children involved and the consistency of effects across schools that the problem of independence does not affect any of the conclusions presented below.

The first result is that the message did produce a significant change in course negotiation behavior. As can be seen in Table V, 53% of the children did not even so much as slow down when entering the traveled portion of the roadway on the pre-measurement, whereas only 44% did not slow down on the post-measurement. Overall, the distribution of scores, pre versus post was significantly different ($\chi^2 = 19.44$, $p < .001$ with 4 d.f.). On a dismissal by dismissal basis, the results showed that there was a significant difference between the pre and post measurements at Woolslair ($\chi^2 = 27.15$, $p < .001$ with 4 d.f.). There was also a significant pre versus post difference for the Colfax afternoon dismissal ($\chi^2 = 10.79$ $p < .05$ with 4 d.f.). The Colfax noon dismissal was in the predicted direction, 54% did not even slow down pre versus 50% did not slow down post, however, the pre versus post measurements did not differ significantly.

The second result was that the message did produce a significant shift in search behavior. Overall, on the pre measurement only 2% of the children looked "one way, then the other way, then back again." On the post measurement, this had risen to 9%. The overall pre versus post distribution of scores differed significantly ($\chi^2 = 70.74$, $p < .001$ with 4 d.f.). Significant changes were also seen for each of the three dismissals. At Woolslair, 3% of the crossings were correct on the pre-measurement as compared with 12% post ($\chi^2 = 18.86$, $p < .001$ with 4 d.f.). For the Colfax noon dismissal, the percentages were 2% and 8% respectively ($\chi^2 = 32.00$, $p < .001$ with 4 d.f.). For the Colfax afternoon dismissal the percentages were 2% and 9% respectively ($\chi^2 = 33.54$, $p < .001$ with 4 d.f.).

The Message No. 1 results were also analyzed as a function of sex. They showed that the distribution of scores for males was significantly different from the distribution of scores for females on the pre-measurement for course

Table V

Pretest Results Message No. 1 - Child

		Course											
		Pre-measurement						Post-measurement					
		1	2	3	4	5	Total	1	2	3	4	5	Total
Woolslair	Male	73	10	3	-	18	104	54	11	10	12	40	127
	Female	47	10	7	2	30	96	42	10	9	2	59	122
	Total	120	20	10	2	48	200	96	21	19	14	99	249
	Percent	60	10	5	1	24		39	8	8	6	40	
Colfax (noon)	Male	186	13	13	16	103	331	189	30	13	16	127	375
	Female	108	19	12	5	73	217	139	24	9	8	106	286
	Total	294	32	25	21	176	548	328	54	22	24	233	661
	Percent	54	6	4	4	32		50	8	3	4	36	
Colfax (afternoon)	Male	65	9	4	4	69	151	57	6	14	5	102	184
	Female	48	7	8	4	33	100	47	5	8	4	53	117
	Total	113	16	12	8	102	251	104	11	22	9	155	301
	Percent	45	6	5	3	41		35	4	7	3	51	
Total	Male	324	32		20	190	586	300	47	37	33	269	686
	Female	203	36	27	11	136	413	228	39	26	14	218	525
	Total	527	68	47	31	326	999	528	86	63	47	487	1211
	Percent	53	7	5	3	32		44	7	5	4	40	

Table V (Continued)

		Search											
		Pre-measurement						Post-measurement					
		1	2	3	4	5	Total	1	2	3	4	5	Total
Woolsair	Male	71	14	14	1	4	104	63	23	19	9	13	127
	Female	61	22	5	6	2	96	68	18	8	11	17	122
	Total	132	36	19	7	6	200	131	41	27	20	30	249
	Percent	66	18	10	4	3		53	16	11	8	12	
Colfax (noon)	Male	233	27	36	26	9	331	234	23	53	34	31	375
	Female	131	34	38	13	1	217	194	19	28	22	23	286
	Total	364	61	74	39	10	548	428	42	81	56	54	661
	Percent	66	11	13	7	2		65	6	12	8	8	
Colfax (afternoon)	Male	100	16	28	4	3	151	113	7	29	19	16	184
	Female	71	10	16	2	1	100	71	9	13	12	12	117
	Total	171	26	44	6	4	251	184	16	42	31	28	301
	Percent	68	10	18	2	2		61	5	14	10	9	
Total	Male	404	57	78	31	16	586	410	53	101	62	60	686
	Female	263	66	59	21	4	413	333	46	49	45	52	525
	Total	667	123	137	52	20	999	743	99	150	107	112	1211
	Percent	67	12	13	5	2		61	8	12	9	9	

negotiation summed across all dismissals ($\chi^2 = 10.99$, $p < .05$ with 4 d.f.). However, on the post measurement the two distributions were not significantly different ($\chi^2 = 4.17$, N.S. with 4 d.f.). The nature of the significant pre results was that females had better course negotiation behavior than males. This was also true on the post measurement but the result was not statistically significant. Concerning search behavior there was again a significant male versus female difference on the pre-measurement ($\chi^2 = 12.64$ $p < .05$ with 4 d.f.) but not a statistically significant difference on the post-measurement ($\chi^2 = 8.52$, N.S. with 4 d.f.). However, the nature of the significant pre result was unclear. Males more often occurred in both the 1 category (69% of the males versus 63% of the females) and in the 5 category (2% of the males versus 1% of the females). Females were relatively more often assigned the middle categories. In any event, after receiving the message, male crossing behavior was not significantly different from female crossing behavior in terms of either course negotiation or searching for oncoming vehicles.

A second approach to examining the Message No. 1 results is to look at the conjunction of course and search behavior for each subject. It will be remembered that both measures, course and search were taken for every crossing. Thus, it is possible to array the course negotiation results against search behavior. These results, pre and post, are shown in Table VI. The two distributions shown in this table differ significantly ($\chi^2 = 100.55$ $p < .001$ with 24 d.f.). It can be seen in this table that 5-5 behavior, in other words perfect course behavior and perfect search behavior on the same crossing increased from only 1% on the pre-measure to 8% on the post-measure. Alternatively, the worst situation, that is 1-1 behavior, decreased from 44% on the pre-measure to 37% on the post-measure.

All of the Message No. 1 results were also analyzed with respect to safe versus unsafe behavior. These results are summarized in Table VII. Concerning course behavior, it was assumed that if the subject did not at least pause before entering the traveled portion of the roadway that he was unsafe, i.e., scored 1, 2 or 3. Using this criteria it was found that 64% of the subjects had unsafe course behavior on the pre-measure as compared with 56% on the post-measure. This decrease, 64% to 56%, represents a 13% reduction in unsafe behavior and is statistically significant ($\chi^2 = 15.90$, $p < .001$ with 1 d.f.). Concerning search, it was felt that any subject who did not at least look both ways was unsafe (i.e., scored 1, 2 or 3). On the pre-measure, 93% were unsafe using this criteria. On the post measure, 82% were unsafe representing a 12% decrease in unsafe behavior which is statistically significant ($\chi^2 = 56.64$ $p < .001$ with 1 d.f.). Concerning the combination of both course and search, 95% of the subjects were unsafe with respect to one or both on the pre-measure as compared with 86% on the post-measure. This represents a 10% reduction in unsafe crossings, and is statistically significant ($\chi^2 = 50.33$, $p < .001$ with 1 d.f.).

Table VI

Pretest Results Message No. 1 - Child

Course Negotiation by Search Behavior

		Course				
		1	2	3	4	5
Search 1	pre	44%	2%	1%	1%	19%
	post	37%	3%	1%	1%	19%
Search 2	pre	4%	2%	2%	1%	4%
	post	2%	2%	1%	*	3%
Search 3	pre	4%	2%	1%	*	7%
	post	3%	1%	1%	1%	6%
Search 4	pre	1%	1%	1%	1%	2%
	post	1%	1%	1%	1%	5%
Search 5	pre	*	*	*	*	1%
	post	*	*	*	*	8%

N = 999 (pre)
1211 (post)

* = less than 1%

Table VII

Pretest Results Message No. 1 - Child

Pretest Reduction in Unsafe Behavior

Course

	Safe (scored 4 or 5)	Unsafe (scored 1, 2, or 3)	N
Pre	36%	64%	999
Post	44%	56%	1211

% reduction in unsafe behavior - 13%

Search

	Safe (scored 4 or 5)	Unsafe (scored 1, 2, or 3)	N
Pre	7%	93%	999
Post	18%	82%	1211

% reduction in unsafe behavior - 12%

Combined

	Safe (scored 4 or 5 on both course and search)	Unsafe (other)	N
Pre	5%	95%	999
Post	14%	86%	1211

% reduction in unsafe behavior - 10%

e. Discussion

The results for the Message No. 1 pretest clearly indicate that the message was effective in achieving its objectives. Significant improvements in both course negotiation and searching for oncoming vehicles were recorded at both schools. The message apparently was also effective for both male and female subjects, and appeared to have almost an equalizing effect on their comparative crossing behavior.

It should be noted, however, that the results reported here still leave a great deal to be done in improving child crossing behavior. During the post-measurment, fully 44% of the subjects did not even slow down before entering the traveled portion of the roadway and 61% of the subjects did not look at all for oncoming vehicles. Thus, it is concluded that while the message is effective it will be necessary to ensure several repetitions in any safety campaign, possibly followed by a second phase or second message reinforcing the basic course negotiation and search concepts. This would ensure persistence of the message, which was untested in the current design, as well as greater impact. The central problem is that child crossing behavior in the absence of the message is abyssmal. Following the message it improves but is still very bad.

3. Message No. 1a - Child

a. Message/Audience Description

Message No. 1a presents essentially the same information as Message No. 1. The one difference is that it does not specifically tell the child to stop at the curb or the edge of the parked car. Instead, the advice is to "slow down and take the time to look one way, then the other, then back again." This variation on the basic course negotiation theme was included in case the target audience thought that "stop" was too dictatorial or inconvenient a behavior to follow. It was reasoned that this "softer" alternative might be more palatable to those who resent authoritarian behavioral advice.

The message was tested in the Pittsburgh school system using a Super 8 mm film similar to the one produced for Message No. 1. The details of the film are described in Table VIII.

b. Test Procedure

The test of Message No. 1a took place in the Arsenal Elementary School on May 3, 1974. The entire test procedure, including presentation and observation was identical to the procedure for Message No. 1 described above. Naturally, the discussion questions were modified to reflect the advice of "slow down" or "pause" rather than "stop." The Arsenal School is located in the same Lawrenceville section of Pittsburgh as the Woolslair School. In fact, the two are only 4-5 blocks apart. However, Arsenal is situated on the corner of Butler

Table VIII

Message No. 1a Film Description

Running time: 1 minute 35 seconds

	Scene	Narration
1.	Boy and girl playing ball. They stop playing and run towards the camera. As they turn to cross the street they slow to a walk and look left, right and left before stepping off of the curb.	It's playtime! Smart boys and girls remember to slow down before leaving the curb and look one way, then the other way, then back again.
2.	Camera pans left, right and left to show what the children should have seen.	Look one way, then the other way, then back again. You want to be sure no cars are coming from any direction. So remember...
3.	Boy and girl again running toward camera, slowing and looking left, right, left before leaving the curb.	Slow down. Look one way, then the other way, then back again.
4.	Side shot of children crossing the street.	It's the only safe way to cross the street.
5.	Children running toward the camera and pulling up with a start as they see parked car.	Look! Here you come again and you want to cross the street. This time, there's a car parked there at the curb.
6.	Children turn to face narrator (hidden).	Now how do you watch out for cars that might be coming?
7.	Back shot of children walking to edge of parked car. Girl places her left hand on outside fender of car.	Smart boys and girls walk out to here where they can see better.

Table VIII (Continued)

	Scene	Narration
8.	Repeat of children walking to edge of parked car. This time, as they get to the edge they look left, right and left.	Walk out to here. Slow down. Look one way, then the other way, then back again.
9.	Camera pans at the edge of the parked car to show the left, right, left view the children should have seen.	Look one way, then the other way, then back again. You want to be sure no cars are coming from any direction. So remember...
10.	Back shot of children walking to edge of parked car and looking left, right, left.	Walk out to here. Wait a second. Look one way, then the other way, then back again.
11.	Back shot of children crossing the street.	It's the only safe way to cross the street.

Avenue and 39th Street, an extremely busy intersection completely devoid of traffic control devices except for the school crossing guard (a policewoman). The school borders on an area of heavy industry, particularly warehouses, which generates a heavy volume of truck traffic on Butler Avenue. In addition, 40th Street (one block up from the school) is the main access route to the Washington Crossing Bridge over the Allegheny River. This is a popular route to the North and causes large traffic jams on Butler Avenue at approximately the time of school dismissal (3 p.m.). Thus, the area around Arsenal presents a high threat to pedestrians. It was by far the most congested test area, in terms of vehicular traffic on the streets, the children had to cross.

c. Measures

Message No. 1a has the same search objective as does Message No. 1. The course negotiation objective is essentially identical, except that the behavior more closely resembles a 4 (pause, momentary stop) on the course scale than a 5 (full stop). However, a 5 or full stop is still the most appropriate behavior especially on the streets surrounding the Arsenal School. For this reason, and to gain comparability between results, the scales used to score crossing behavior, at the Arsenal school were the same as discussed under Message No. 1 above. Further, the data collection form used by the observers was also identical (see Figure 1).

d. Results

The data for Message No. 1a were analyzed in the same manner as the data for Message No. 1. These results are shown in Table IX. As with Message No. 1, there are problems with non-independence of observations. Also, the data were summed across course-parked car and course curb for the same reasons as listed under Message No. 1. The results indicate that the distribution of scores for the pre-measurement of course negotiation do not differ significantly from the post-measurement distribution ($\chi^2 = 4.22$, N.S. with 4 d.f.). The differences that do appear, however, are in the predicted direction and are not necessarily trivial. The number of children who did not even slow down before entering the traveled portion of the roadway dropped from 43% on the pre-measurement to 33% on the post-measurement. Nevertheless, this shift was not statistically significant and it appears that telling children to "slow down and take time" (1a) is not as effective as "stop" (1).

The search component to Message No. 1a was identical to the search component of Message No. 1. As with Message No. 1, the results showed significant pre versus post differences ($\chi^2 = 16.21$, $p < .01$ with 4 d.f.). Only 2% of the children looked both ways and back again on the pre-measurement as compared with 8% on the post-measurement. Thus, as at Woolslair and Colfax, the search message was effective at Arsenal. It is interesting to note, however, that at Woolslair and Colfax most of the difference was due to changes in the 1 and 5

Table IX

Pretest Results Message No. 1a - Child

	Course											
	Pre-measurement						Post-measurement					
	1	2	3	4	5	Total	1	2	3	4	5	Total
Male	67	15	11	17	40	150	30	8	8	4	24	74
Female	36	9	7	2	37	91	22	8	5	12	37	84
Total	103	24	18	19	77	241	52	16	13	16	61	158
Percent	43%	10%	7%	8%	32%		33%	10%	8%	10%	39%	
	Search											
Male	85	33	17	12	3	150	38	9	12	10	5	74
Female	46	20	9	14	2	91	49	7	7	14	7	84
Total	131	53	26	26	5	241	87	16	19	24	12	158
Percent	54%	22%	11%	11%	2%		55%	10%	12%	15%	8%	

categories. The number not looking at all was down pre versus post, and the number looking both ways and back was up. At Arsenal the differences occurred in the 2 and 5 categories. The number looking right only was down pre versus post and the number looking both ways and back was up. The number of children who did not look at all remained essentially unchanged at 54% and 55% respectively.

Analyses of the Message No. 1a data were also carried out as a function of sex. There was a significant male versus female difference in the distribution of course negotiation scores during the pre-measurement ($\chi^2 = 9.82$, $p < .05$ with 4 d.f.). The nature of this difference was that females were generally better than males before receipt of the message. They were also better following the message though the difference was not statistically significant ($\chi^2 = 8.09$, N.S. with 4 d.f.). No statistically significant male versus female differences were observed with respect to search behavior at Arsenal ($\chi^2 = 3.37$, N.S. with 4 d.f. for the pre-measurement and $\chi^2 = 3.34$, N.S. with 4 d.f. for the post-measurement).

The message 1a results were also analyzed with respect to the conjunction of course and search behavior. These results, pre and post, are shown in Table X. Statistical tests were not applied to these data because expected frequency in several cells of the Table is too small to allow a valid test to be applied. Nevertheless, it can be seen that the results are in the predicted direction. The worst behavior, 1-1, dropped from 34% pre to 28% post. Completely correct behavior rose from 2% pre to 7% post.

Analyses were also conducted on the basis of safe vs. unsafe crossings. As in the message 1 test, an unsafe crossing with respect to course negotiation was one in which the subject did not at least pause before entering the traveled portion of the roadway. The results, shown in Table XI, indicated that 60% of the subjects were unsafe pre versus 51% post for a reduction of 15%. However, this reduction was not statistically significant ($\chi^2 = 3.08$, N.S. with 1 d.f.). Concerning search behavior, 87% were unsafe pre (i.e., did not score 4 or 5) versus 77% post for a statistically significant ($\chi^2 = 6.72$, $p < .01$ with 1 d.f.) reduction of 11%. The combined behaviors showed 94% unsafe pre versus 82% unsafe post for a statistically significant ($\chi^2 = 14.38$ $p < .001$ with 1 d.f.) reduction of 13%.

e. Discussion

In summary, the search component of Message No. 1a was effective. This was identical to the Message No. 1 search component and the results indicated that it acted in the same fashion. The course component also produced results in the positive direction. However, these results were not statistically significant. It should be noted, however, that the combined behaviors, course and search, did show a significant reduction in unsafe behavior and that the reduction in unsafe course behavior, though non-significant statistically, was still 15%.

Table X

Pretest Results Message 1a--Child

Course Negotiation by Search Behavior

			Course				
			1	2	3	4	5
Search	1	pre	34%	2%	1%	4%	14%
		post	28%	5%	1%	1%	19%
	2	pre	2%	6%	2%	3%	8%
		post	1%	1%	3%	2%	3%
	3	pre	3%	1%	2%	*	5%
		post	2%	2%	3%	2%	4%
	4	pre	3%	1%	2%	*	4%
		post	1%	2%	2%	4%	6%
	5	pre	*	*	*	*	2%
		post	*	*	*	1%	7%

N = 241 (pre)
158 (post)

* Less than 1%

Table XI

Pretest Results Message No. 1a--Child

Percent Reduction in Unsafe Behavior

Course

	Safe (scored 4 or 5)	Unsafe (scored 1, 2 or 3)	N
Pre	40%	60%	241
Post	49%	51%	158

% reduction in unsafe behavior -- 15%

Search

	Safe (scored 4 or 5)	Unsafe (scored 1, 2 or 3)	N
Pre	13%	87%	241
Post	23%	77%	158

% reduction in unsafe behavior -- 11%

Combined

	Safe (scored 4 or 5 on both course and search)	Unsafe (other)	N
Pre	6%	94%	241
Post	18%	82%	158

% reduction in unsafe behavior -- 13%

4. Message No. 1 - Adult

a. Message/Audience Description

The information to be conveyed by Message No. 1 with a target audience of adults is identical to the material presented to children. However, the delivery medium was, of necessity, different. First, it was desired to have a pretest target audience of several hundred urban pedestrians covering a wide range of ages, races and ethnic backgrounds. Such an audience was not readily available to watch a film or see a live presentation. Second, in order to be naturalistic, it was necessary to deliver the message to the subjects as they proceeded through their normal routine. This suggested the establishment of a "booth" at a downtown store or bank with a normally high flow rate of pedestrians who might be stopped for a brief period and given the message.

These two constraints dictated the need for a pretest medium which could deliver the message reliably but quickly to adults as they passed through a busy urban location. This precluded audio-visuals because of the special environments needed for their display. Thus, a "programmed test" was developed which simultaneously measured subject knowledge of the correct pedestrian behaviors and delivered the message to insure that the subject departed the test site knowing the desired behaviors.

Figures 2 and 3 show, respectively, the front (questions) and back (answers) of the programmed test developed. It employed three multiple choice questions covering course negotiation with parked cars and search. The answers include a brief rationale for why each behavior is the safest for the pedestrian.

The target audience consisted of bank customers in downtown Stamford, Connecticut. A significant proportion of the total sample were low income residents of the town who came to the bank for food stamps. Minority groups were well represented as were the more affluent residents who characterize the Fairfield County, Connecticut area. More females than males were included in the test population (70% versus 30%). This was expected because of the downtown location of the bank and the shopping habits of local women.

b. Test Procedure

The pretest was conducted on April 15, 16, and 17, 1974 at the main office of the Union Trust Company Bank on Main Street in Stamford, Connecticut. The bank is located in the center of a long block, directly opposite a small island-like park area behind the Town Hall. Across the island from the bank are several large stores, a municipal parking lot and a number of small office buildings. Metered parking is permitted directly in front of the bank on Main Street, but all parking is prohibited on the opposite side of the street from the bank. Leaving

TRAFFIC SAFETY RESEARCH PROJECT

Please answer the three brief questions below concerning the proper way for a pedestrian to cross the street. Simply place a check mark next to the answer you think is correct. Please mark only one answer for each question. In each case there is only one best answer (correct or most complete). After you have answered all three questions, please turn the page over and check your answers. If you have any questions about the correct answers, please ask the researcher who gave you this form. THANK YOU!

1. When crossing a street with no cars parked at the curb, it is safest to:

- ☐ a. Run across the street as fast as possible
- ☐ b. Pause as you leave the curb
- ☐ c. Slow down but keep moving
- ☐ d. Stop at the curb
- ☐ e. Stop before reaching the curb
- ☐ f. Walk normally

2. When crossing a street in front of a parked car, it is safest to:

- ☐ a. Run across the street as fast as possible
- ☐ b. Stop at the curb
- ☐ c. Slow down but keep moving
- ☐ d. Pause at the curb
- ☐ e. Stop at the outside edge of the parked car
- ☐ f. Walk normally

3. The safest way to search for cars that might be coming before you cross the street is to:

- ☐ a. Look left then right
- ☐ b. Look left, then right, then left again
- ☐ c. Look right then left
- ☐ d. Look right, then left, then right again
- ☐ e. Look left only
- ☐ f. Look right only

Figure 2. Front of Message No. 1--Adult Programmed Questionnaire.

ANSWERS

1. When crossing a street with no cars parked at the curb it is safest to:
(d) Stop at the curb.

By stopping at the curb you give yourself enough time to look completely for any cars which might be coming before you move into the road. In addition, when you are stopped at the curb, drivers can see you, and they will realize that you are waiting to cross the street. It is absolutely essential that you can see oncoming cars and drivers can see you before you enter the street.

2. When crossing a street in front of a parked car, it is safest to:
(e) Stop at the outside edge of the parked car.

Again, it is essential that you can see and be seen. Since the parked car can block your view of traffic and a driver's view of you, it is best to move out to the edge of the parked car and stop. This places you in the safest position to look for oncoming cars while simultaneously allowing drivers to see you so they can exercise due caution.

3. The safest way to search for cars that might be coming before you cross the street is to:
(b) Look left, then right, then left again.

Cars coming from your left are closest to you. Because they will cross your path first, you must look for them first. Then, you must look for cars coming from your right to make sure it is clear in that direction. Finally, because cars on your left can be upon you very quickly, you should look back to the left before starting across the street. This final look to the left insures that no car has become a threat while you have been looking to the right. No matter where you cross, it is always safest to look left, then right, then left again to be sure you can make it safely across before you enter the lanes in which cars can drive.

Figure 3. Back of Message No. 1--Adult Programmed Questionnaire.

the bank, a pedestrian wishing to cross could do so midblock on Main Street (as most who crossed did, turn left and go to the intersection of Main and Atlantic or turn right to the intersection of Summer and Main. Thus, observers were stationed in the park to record midblock crossings and at the corner of Main and Summer and Main and Atlantic.

A table was set up inside the entrance of the bank and marked with colorful signs reading "Traffic Safety Research." Two or three project staff members were stationed at the table throughout the bank day (9 a.m. to 3 p.m.). They approached bank customers as they left the bank, asked them to participate in the research and assigned them to the experimental or control group.

Experimental subjects were asked to complete the programmed test which was given to them on a clipboard together with a pencil. They were asked to turn the sheet over and check their answers after they had completed all three questions. The staff members remained available to read the questions to those who had difficulty reading. They would also explain the answers to the subject if asked subsequent to completion of the test. After the subject finished the test and indicated he understood the answers, he was given a paper shopping bag containing a 20 ounce box of laundry detergent and some safety literature provided by NHTSA. Although ostensibly a gift for participating in the research, the actual purpose of the bag was to mark the subject for the observers. The detergent was included as an incentive to carry the bag out of the bank.

Control subjects were asked if they would take a questionnaire home, complete it and return it in a postage paid reply envelope. The questionnaires were concerned with proposed model regulations for pedestrian safety being developed by Dunlap on a companion project for NHTSA. If they agreed, the questionnaire was placed in a different colored shopping bag (white and orange were used and alternated day-to-day so the subject identification scheme was unknown to the observers). Control subjects also received the detergent and the NHTSA safety literature.

Throughout the three days of the test, the vast majority of people approached in the bank agreed to participate in the research. Those who refused were generally in too great a hurry to spend the few minutes needed to participate. In all, approximately 930 subjects were recruited and divided into roughly equal numbers of experimentals and controls. Slightly over half of the total number of subjects recruited crossed the street within view of the observers and therefore entered the behavioral data base. Thus, the test resulted in three sets of data:

- Crossings by experimental subjects (search and course measures)
- Crossings by control subjects (search and course measures)

- Test scores of experimental subjects which are indicative of the pedestrian safety knowledge of the total population-at-risk.

The results produced by these data are presented below.

c. Measures

Message No. 1 attempts to improve pedestrian crossing behavior. This behavior, course and search, is essentially identical to the behavior sought with children. Thus, the data collection form used by the observers was virtually identical to that used by the observers in the child pretest of Message No. 1. The only difference is that for this pretest, it was necessary to know the color of the shopping bag the pedestrian was carrying in order to be able to separate experimental subjects from controls. The actual data collection form is shown in Figure 4. Observer training and the meaning of each scale value was essentially identical to that which was reported for Message No. 1.

Three observer locations were used during the pretest. The first location was directly across from the bank. Crossings in view of this location were largely between parked cars. The second and third locations were located at the first intersection to the left and right of the bank, respectively. One observer was stationed at each of the three locations for each day of the test. The observers were at their assigned locations promptly at 9:00 a.m. The test ended at 3:15 p.m. on each day.

d. Results

The first set of results concern performance on the programmed test. It will be remembered that half of the subjects (experimentals) were asked to complete this test, and then were told the correct answers. Thus, performance on this test provides a baseline indication of the understanding pedestrians have of correct course negotiation and search behavior. The results showed that their knowledge prior to receiving the message is quite good.

ability to choose correct choice good

On question no. 1, course negotiation with no parked car, 58% of the sample chose the correct answer. The most common wrong answer (19%) was "b. Pause as you leave the curb," which may be a perfectly safe behavior under certain circumstances. On question no. 2, course negotiation with a parked car, 60% of the sample chose the correct answer. The most common wrong answer (24%) was "b. Stop at the curb," which can also be a safe behavior under the right circumstances. On the last question, searching for oncoming vehicles, 58% chose the correct response. The most common wrong answer (19%) was "d. Look right, then left, then right again." This answer probably indicates confusion as to left versus right, but in any event it is a far safer behavior than not looking or looking in only one direction. In short, it appears that the adult urban pedestrian was aware of safe crossing behavior prior to receiving the

Problem: we do not know traffic/environmental features also, how does this tie in with previous accidents?

Male				Female			
Bag Color	Course Parked Cars	Course Curb	Search	Bag Color	Course Parked Cars	Course Curb	Search

Codes:

Bag Color

O = Orange
W = White

Course

5 = Stop
4 = Pause
3 = Hesitate
2 = Slows
1 = No change

Search

5 = LRL or RLR
4 = LR or RL
3 = L
2 = R
1 = None

Date: _____
Observer: _____
Location: _____
Start time: _____
End time: _____

Figure 4. Message No. 1--Adult Data Collection Form.

message.

Following the test, each experimental subject was told the correct answer to each question and was also told why the correct behavior was safer than other behaviors. They then left the bank and, as was reported earlier, about half crossed the street in view of one of the observers. These observational data are shown in Table XII. The control data presented in Table XII are for those subjects who agreed to participate while in the bank, but were simply given a shopping bag and a mailback questionnaire. They were provided with no information on safe crossing behavior.

The results showed that the distribution of scores for course negotiation among experimentals was not significantly different from the distribution among controls ($\chi^2 = 4.43$, N.S. with 4 d.f.). However, the results were in the predicted direction. For controls, 16% did not even slow down before entering the traveled portion of the roadway as compared with 12% for experimentals. Also, 41% of the controls exhibited the totally correct crossing behavior (i.e., scored 5) as compared with 43% of the experimentals. Thus, the results are positive, but the magnitude of the effect is small and not statistically significant.

Essentially, the same situation exists when comparing control and experimental data for search behavior. The two distributions do not differ significantly ($\chi^2 = 1.72$, N.S. with 4 d.f.) yet the results are in the predicted direction. For controls, 7% did not look at all for oncoming vehicles as compared with 6% of the experimentals. In the "five" or completely correct category were 35% of the controls as compared with 39% of the experimentals. Thus, there was a small, not statistically significant, effect. These data were also analyzed with respect to safe versus unsafe behavior in the same manner as was done for the Message 1--Child Pretest. The results showed no reduction in unsafe behavior.

These data were also analyzed as a function of sex. The results showed that females generally had better crossing behavior than males. The distributions of course scores for controls, male versus female, was significantly different ($\chi^2 = 15.06$ $p<.01$ with 4 d.f.) with female controls scoring higher than male controls. For experimentals, there was also a male versus female significant difference ($\chi^2 = 10.44$, $p<.05$ with 4 d.f.) with females again showing better course negotiation behavior. The male versus female distributions for controls on the search variable were not significantly different. However, for experimentals, the distributions did differ significantly with again females performing better ($\chi^2 = 10.54$, $p<.05$ with 4 d.f.). Overall, the crossing behavior of adults in terms of searching for oncoming vehicles and course negotiation on the streets selected for observation is good. Females, however, are somewhat better than males, both in terms of course negotiation and search.

These data also allow for the separation of scores on the basis of whether or not a parked car was present. The center observation location,

Table XII

Pretest Results Message No. 1 - Adult

	Course											
	Control						Experimental					
	1	2	3	4	5	Total	1	2	3	4	5	Total
Male	16	15	5	8	19	63	12	21	8	13	23	77
Female	21	18	18	37	75	169	14	23	13	23	73	146
Total	37	33	23	45	94	232	26	44	21	36	96	223
Percent	16%	14%	10%	19%	41%		12%	20%	9%	16%	43%	
	Search											
Male	4	4	11	24	20	63	4	3	23	26	21	77
Female	12	11	37	47	62	169	9	11	28	32	66	146
Total	16	15	48	71	82	232	13	14	51	58	87	223
Percent	7%	6%	21%	31%	35%		6%	6%	23%	26%	39%	

directly across from the bank, measured midblock, parked car crossings. The other two locations were at intersections. Table XIII arrays the data from the cente (parked car) against the sum of the two other locations (intersection). It can be seen from this Table that crossing behavior did vary as a function of location. The distributions of scores for course negotiation among controls differed significantly parked car versus intersection ($\chi^2 = 13.74$, $p < .01$ with 4 d.f.). The intersection crossing more often involved a full stop. The same effect was seen in the experimental data for course negotiation and again it was statistically significant ($\chi^2 = 9.54$, $p < .05$ with 4 d.f.). Thus, course negotiation at these controlled intersections was superior to course negotiation midblock. In terms of search behavior, however, the effect was reversed. For both control and experimental subjects, the midblock or parked car crossings more often involved correct search behavior than the intersection crossings ($\chi^2 = 27.37$, $p < .001$ with 4 d.f. for controls; $\chi^2 = 20.97$, $p < .001$ with 4 d.f. for experimentals). It appears from these data that adults crossing at controlled intersections stop or at least pause before entering the traveled portion of the roadway but do not adequately search for oncoming traffic. Rather, they rely on the intersection controls to ensure that no cars are coming. Alternatively, at the midblock location, the search behavior was adequate, but many adults did not stop at the outside edge of the parked car.

e. Discussion

The pretest of Message No. 1 for adults did not show a statistically significant shift in behavior as a function of having been exposed to the messages. However, the results were in the predicted direction. Part of the problem appears to be that adults already have at least a partial understanding of safe crossing behavior prior to receiving the message. While this is desirable, it implies that the message should concentrate more on the need or urgency of already known behaviors rather than simply providing safe crossing information. Further, the crossings observed at these downtown locations were reasonably safe. In the child pretest of this message in residential locations, the crossing behavior was extremely poor. Thus, a great deal of improvement was possible. In any event, given generall safe behavior prior to the message (particularly among female urban pedestrians) and the fact that the safety concepts contained in the message were largely already known by the target audience, it is difficult to see how a significant shift in behavior was possible. What remains, however, is to reinforce these concepts and ensure that the behaviors carry over to non-commercial urban areas.

5. Message No. 5--Bus Stop

a. Message/Audience Description

The basic intent of the bus message is to increase the awareness of all pedestrians near a bus stop of the hazards of crossing the street in front of the bus. Since the advice is extremely specific to a particular environmental situation (urban bus stops), it was deemed optimal to present the pretest message at the point of the

Table XIII

Comparison of Adult Parked Car Versus Intersection Crossings

	Course											
	Control						Experimental					
	1	2	3	4	5	Total	1	2	3	4	5	Total
Parked Car	26	23	11	26	39	125	18	26	9	20	39	112
Percent	21%	18%	9%	21%	31%		16%	23%	8%	18%	35%	
Intersection	11	10	12	19	55	107	8	18	12	16	57	111
Percent	10%	9%	11%	18%	51%		7%	16%	11%	14%	51%	
	Search											
Parked Car	1	5	20	47	52	125	3	4	16	35	54	112
Percent	1%	4%	16%	38%	42%		3%	4%	14%	31%	48%	
Intersection	15	10	28	24	30	107	10	10	35	23	33	111
Percent	14%	9%	26%	22%	28%		9%	9%	32%	21%	30%	

behavior to be changed, i.e., at bus stops. Further, it would have been ideal if all pedestrians at the stops, not just disembarking bus riders, could have been exposed to the message. However, this could not be accomplished for the pretest for two reasons. First, the message itself is relatively complex and therefore requires a relatively long period of exposure to the target audience. The only viable medium to reach the entire potential target audience would have been "sandwich" signs or posters at the bus stop. It was felt, however, that these were not capable of transmitting the amount of information contained in the message. Simply, pedestrains could not be expected to take the time to read a complex message while passing a bus stop, leaving a bus or waiting for a bus.

Second, the use of signs or posters would introduce uncertainty into the degree of transmission. To determine if transmission had taken place, the subjects would have had to be interviewed. This would have been costly and time consuming and would definitely have biased behavior. Even if the interviews took place after the crossing behavior had been evidenced, the bias would still be present because of the necessarily high conspicuity of the interview process.

In light of the foregoing problems, the pretest target audience was limited to bus riders. This limitation provided a highly defined and "captive" group of subjects. Since the average bus ride lasts for a minimum of several minutes, there was an ideal opportunity to insure message transmission through repetitive presentations. Further, there was no apparent reason why this particular subset of the total target audience should not be representative. Finally, the identification and measurement tasks were greatly simplified by limiting the pretest audience to bus riders. It was simply a matter of selecting stops along the route and observing all disembarking passengers at those stops.

The defined audience and the need for repetition suggested the use of an audio presentation on the bus. The novelty of hearing a message on a bus not normally equipped with sound equipment would help guarantee attention. Further, if the message were pre-recorded, it could be easily repeated and each presentation would be standardized. It was, therefore, decided to prepare an audio cassette of the message to be played over loudspeakers on the bus. The actual message lasted approximately 30 seconds and consisted of the following dialogue spoken by a professional announcer:

> (2 second electronic beep)
>
> The sound you just heard is a reminder to call your attention to the following safety message. After you leave this bus, remember ... never cross the street in front of the bus unless you can see that all traffic is stopped. If you must cross before it leaves, cross behind the bus. Or, wait till it leaves so you can see passing traffic.
>
> Remember, crossing in front of the bus can be dangerous. You must be able to <u>see</u> passing traffic.

The tape was prepared in a sound studio and recorded at a high volume level to override the ambient noise encountered on the bus.

b. Test Procedure

A typical urban bus route was needed for implementation of the pre-test. Fortunately, the management of Queens Transit Corporation permitted the use of their system. Specifically, the "Q25-34" line was chosen. This route had its northernmost terminus in College Point (Flushing), New York and generally followed the major arteries of Kissena Boulevard and Parsons Boulevard to its southern terminus at 160th Street and Jamaica Avenue. Approximately 15 buses were assigned to the route, with extra buses or "trippers" added for the morning and afternoon rush hours.

A survey of the route produced four bus stops which were suitably configured to serve as observation points. Basically, stops on the "near" sides of intersections or at other locations where passengers were prone to cross in front of the bus were desired. In addition, the stops had to have a reasonably large expected number of disembarkations so that a sufficient sample size could be obtained. All four stops selected happened to cluster toward the south end of the route. Two stops were on the northbound run and two were on the southbound side of the street. The actual stops were:

Southbound:

- Queens Hospital Center - A midblock stop on a residential part of Parsons Boulevard opposite the Queens Hospital Center. Although the hospital entrance was behind the bus stop, it was felt that many riders would elect to cross in front of the bus. It was also anticipated that the pedestrian traffic at this stop would be highly erratic, generally conforming to shift change times and visiting hours at the hospital. In actuality, the incidence of pedestrian disembarkations at this stop was exceedingly low for the entire observation period. Thus, a separate analysis of the data from this stop could not be undertaken.

- Jamaica - The last southbound stop on the route was also selected. It is a midblock stop on 160th Street between 90th Avenue and Jamaica Avenue. In addition to being the last stop, it is also a transfer point for bus riders going to the subway. The subway entrance is on the corner of Jamaica Avenue and 160th Street, and therefore, is in front of the bus whenever it stops. Thus, front crossings predominate at this location. It should also be noted that 160th Street is a narrow, relatively quiet street which is almost exclusively used by buses

and cars going to a large municipal parking lot. As such, it presents a low threat to pedestrians, particularly those who are at the stop daily on the way home and therefore know that the street is too narrow to permit cars to overtake the stopped buses

Northbound:

- Queens College South - The Queens College complex is a large fenced-in campus on the west side of Kissena Boulevard. Near its southern end, is a gate leading into the facility. Across the street and just south (almost abreast) of the gate was the third experimental stop (midblock). Although there is a crosswalk behind the bus stop, it is sufficiently far away to render it unattractive to disembarking bus passengers. Thus, riders leaving the bus at this stop had no clear choice between front and back of the bus crossings. The flow was almost entirely lateral (across Kissena Boulevard). Front and back crossings were essentially equally convenient.

- Queens College North - The center or main gate to the college complex is opposite and slightly behind another midblock stop. This stop is very heavily used throughout the day by people going to the college and returning to the apartment complex on the east side of Kissena Boulevard. Although the natural tendency is for rear crossings at this stop because the gate is behind the bus, front crossings do occur with some frequency. These people may be going to the northern end of the campus or may simply find rear crossings inconvenient.

The pretest was conducted on Wednesday, March 27, 1974. Considering the number of experimental stops, the rider traffic on the route and the number of buses normally assigned to the route, it was decided to equip three buses with the tape players. These, then, became the experimental buses. The equipment was installed the night before the test and consisted of a portable cassette tape player and three high efficiency loudspeakers distributed throughout the bus. All other buses on the route became controls, i.e., the riders disembarking from these buses at the selected stops were control subjects.

The test crew consisted of three bus riders to play the tape and maintain the equipment, seven observers (one at the hospital and two at each other stop) and three senior Dunlap staff members. The senior staff people installed and removed the equipment, patroled the route to check observer progress, maintained constant liaison with the bus company, and spelled the bus riders and observers throughout the day.

The three experimental buses left the garage between 5:00 and 6:00 a.r

The observer at the hospital was deployed at 6:00 a.m. and all other observers were on station between 7:30 and 8:00 a.m. The three riders on the experimental buses began playing the message on the first southbound run after 6:00 a.m. This covered the early observations at the hospital which were intended to envelope a 7:00 a.m. shift change time. In actuality, there was little activity at any stops until after 7:30 a.m. One experimental bus broke down at approximately 8:00 a.m., but the tape equipment was quickly transferred to a replacement bus which was back on the route by 9:30 a.m. The test procedure called for the message to be played each time a passenger got on the bus while the bus was in the vicinity of the experimental stops.

The test ended between 5:00 and 6:00 p.m. As each experimental bus arrived at Jamaica Avenue during that time period, the audio equipment was removed. After all experimental buses were off the route, the observers were removed.

c. Measures

The objective of the message is to decrease the incidence of pedestrians crossing in front of a stopped bus. The pedestrian can avoid a front crossing in any one of a variety of ways. He may cross behind the bus, wait till the bus leaves and then cross or not cross at all at least in the area of the bus stop. Each type of behavior was coded by sex, time and bus. Figure 5 shows the data collection form used. Observers stationed at the four bus stops recorded the bus number, time and behavior of every individual who left each bus. These observers did not know which buses were experimental (i.e., on which the message was played) and which were control.

d. Results

The results were tabulated by time, sex, location and experimental vs. control. These overall results summed across all bus stops are shown in Table XIV. They show that there was no overall statistically significant difference between the experimental group (those who heard the message) and the control group ($\chi^2 = 4.83$, N.S. with 3 d.f.). In other words, the overall crossing behavior as indicated by the four categories, cross in front, no cross, etc., was not significantly different between the two groups. Further analysis of these data also showed that males were not significantly different from females in their crossing behavior in either group ($\chi^2 = 7.02$, N.S. with 3 d.f. for control; $\chi^2 = 2.40$ N.S. with 3 d.f. for experimental). Also, there were no statistically significant differences between female experimentals and female controls ($\chi^2 = 2.37$, N.S. with 3 d.f.) or male experimentals and male controls ($\chi^2 = 4.02$, N.S. with 3 d.f.).

The data were also analyzed as a function of time of day. These results, summed across male and female, showed that time of day was an important variable. Unfortunately, its relationship to message effectiveness is unclear.

Observer Name(s)_____

Bus_____ Time _____

	In front	No cross	Behind	Wait-Cross	Total
Male					
Female					

Bus_____ Time_____

	In front	No cross	Behind	Wait-Cross	Total
Male					
Female					

Bus_____ Time_____

	In front	No cross	Behind	Wait-Cross	Total
Male					
Female					

Bus _____ Time_____

	In front	No cross	Behind	Wait-Cross	Total
Male					
Female					

Figure 5 . Data collection form, bus stop message No. 5.

Table XIV

Pretest Results for Message No. 5 by Time and Sex
Summed Across All Bus Stops

	Control					Experimental				
Male	In Front	No Cross	Cross Behind	Wait/ Cross	Total	In Front	No Cross	Cross Behind	Wait/ Cross	Total
7 - 8:59 A.M.	28	31	116	20	195	1	5	15	4	25
9 - 10:59	29	25	127	7	188	8	11	9	0	28
11 - 12:59 P.M.	28	41	65	3	137	6	13	24	0	43
1 - 2:59	16	114	29	5	164	7	2	5	0	14
3 - 4:59	77	175	27	5	284	8	13	6	0	27
Female										
7 - 8:59 A.M.	85	43	169	29	326	2	4	22	11	39
9 - 10:59	52	58	162	20	292	5	16	17	1	39
11 - 12:59 P.M.	47	97	78	3	225	14	23	36	1	74
1 - 2:59	46	148	41	7	242	15	7	10	0	32
3 - 4:59	88	204	43	13	348	15	27	2	1	45
Total	496	936	857	112	2,401	81	121	146	18	366
Percent	21%	39%	36%	5%		22%	33%	40%	5%	

First, in the 7:00-8:59 a.m. time period, there was a statistically significant difference between the experimental and control groups ($\chi^2 = 18.67$, $p < .001$ with 3 d.f.). Only 5% of the experimental group crossed in front, while 22% of the control group crossed in front. In the 9:00-10:59 a.m. time period, the two groups were again different ($\chi^2 = 22.33$, $p < .001$ with 3 d.f.). This time the difference was largely due to the fact that 40% of the experimental group did not cross at all whereas only 17% of the control group did not cross. In terms of front crossings the two groups were essentially identical, 19% of the experimentals crossed in front and 17% of the controls. For the 11:00-12:59 a.m. time period, the two groups did not differ significantly. For the 1:00-2:59 p.m. period, they were again different ($\chi^2 = 44.05$, $p < .001$ with 3 d.f.) but this time in the opposite direction. Fully 48% of the experimental group crossed in front as opposed to 15% of the controls. For the 3:00-4:59 p.m. period, the differences were not significant. These results in terms of front crossings only are shown below.

	Control	Experimental
7-8:59	22% in front	5% in front
9-10:59	17% "	19% "
11-12:59	21% "	17% "
1-2:59	15% "	48% "
3-4:59	26% "	32% "

A second variable that produced significant, though difficult to interpret, results was stop location. All three stops (fourth location ommited here due to insufficient data) produced significant experimental versus control group differences. These results may be seen in Table XV. At the first location, the two groups were significantly different ($\chi^2 = 19.75$, $p < .001$ with 3 d.f.), and the nature of the difference was that more control subjects crossed behind the bus (59% vs. 37%) while more experimental subjects waited until the bus left before crossing (28% experimental vs. 10% control). Front crossings were 12% for both groups. Significant experimental versus control differences were also found for the Queen's College South location ($\chi^2 = 22.41$, $p < .001$ with 3 d.f.). Here, 10% of the control subjects crossed in front as compared with only 4% of the experimentals. At the last location, however, the results were reversed. Fully 43% of the experimental subjects crossed in front as opposed to only 34% of the controls ($\chi^2 = 4.74$, $p < .05$ with 1 d.f. collapsed to "in front" vs. "other" for each group due to insufficient N in the "cross behind" and "wait/cross" categories).

It is apparent that bus stop location is a critical variable with respect to message effectiveness. The Jamaica stop can be considered as presenting low threat. It is essentially a side street at the end of the route from which most bus riders go to the nearby subway. It is felt that most bus riders assumed that the message did not apply to this low threat situation. Both Queen's College North and Queen's College South are high threat situations. Further, since both are essentially midblocks, the former bus riders, now pedestrians, have a clear

Table XV

Pretest Results for Message No. 5 by
Bus Stop Location

Bus Stop		Control: In Front	Control: No Cross	Control: Cross Behind	Control: Wait/ Cross	Control: Total	Experimental: In Front	Experimental: No Cross	Experimental: Cross Behind	Experimental: Wait/ Cross	Experimental: Total
Queen's College North											
	N	61	98	293	48	500	7	13	21	16	57
	%	12%	20%	59%	10%		12%	23%	37%	28%	
Queen's College South											
	N	75	122	522	52	771	5	12	120	1	138
	%	10%	16%	68%	7%		4%	9%	87%	1%	
Jamaica											
	N	360	682	7	1		69	89	2	-	
	%	34%	65%	1%	-		43%	56%	1%	-	

choice of behaviors. Simply, there is no corner or intersection present where they can cross. At the north stop, more experimental subjects chose to wait, while at the south stop, there was actually a decrease in front crossing. In one sense, both results are indicative of message effectiveness, and it appears that hearing the message did alter behavior.

The Jamaica Avenue location was thus quite atypical of the normal bus stop. For this reason, analyses of safe versus unsafe behavior focused on the two remaining stops, Queens College North and Queens College South. Summing across these two locations, it can be seen that 61 and 75 control subjects, respectively, for a total of 136 subjects crossed in front of the bus. This represents 13% of the 1,051 control subjects who crossed the street at these two locations. For the experimental group, 12 subjects crossed in front representing only 7% of the 170 subjects who crossed. The reduction in unsafe behavior, control to experimental, was thus 45% (13% down to 7%) and is statistically significant ($\chi^2 = 4.75$, $p < .05$ with 1 d.f.). Thus, across these two locations, unsafe behavior was significantly reduced by the message.

In summary, the pre-test of Message No. 5 showed no overall experimental versus control differences. However, comparisons within subgroups and locations did produce significant results. First, for some reason, time of day is a key variable. This may be related to changing populations of bus riders (e.g., working people in the early morning, school children in the early afternoon) or changing patterns of pedestrian movement or both. Secondly, bus stop configuration is important, with the high threat and high pedestrian movement choice locations showing a positive result and the low threat, low choice location actually having a negative result. The conclusion, then, must be that Message No. 5 did alter pedestrian behavior, but its utility is dependent upon the environment and the audience.

c. Discussion

The results of this pretest indicate that the message as currently formatted needs revision prior to large-scale implementation. The message did change behavior, and these changes were in the positive direction at the high risk locations. However, the effects were not consistent and were even offset by negative results at the low risk location. It is felt that much of the problem was due to the complexity of the message and not necessarily the concept of point-of-behavior education. One solution, therefore, would be to use a more direct message This could be done by simply stating that crossing in front is dangerous and avoiding any mention of traffic being stopped, and even omitting the mention of alternatives such as waiting until the bus leaves. Such a message could be handled by a poster, although transmission efficiency might be low. Another solution might be to take the message away from the point of behavior and develop it into a longer format in which the full message could be properly detailed. Moreover, the current message is not suitable in the current format because widespread implementation

on buses is basically infeasible. Thus, it must be concluded that Message No. 5 has the potential to change behavior around bus stops, but it is in need of both content and presentation revision prior to large scale implementation. These revisions appear fully warranted by the fact that there was a 45% reduction in unsafe behavior at the high threat locations.

6. Message Nos. 7 and 8--Parents and Vendor Clients

a. Message/Audience Descriptions

Message Nos. 7 and 8 are specifically directed to the hazardous pedestrian situation which develops around motorized ice cream vending vehicles. Vendor clients, predominantly young children between the ages of 5 and 12, have a magnetic attraction to the ice cream truck. Since the primary focus of their attention is the ice cream and not the vehicular traffic threat, they often walk carelessly into the street without looking for cars. Further, at the young age typical of vendor clients, capabilities as a pedestrian are not fully developed. Thus, the vendor client is prone to becoming involved in pedestrian accidents.

Two basic public education approaches can be taken to reduce the threat around ice cream trucks. First, parents can be encouraged to accompany their children to the truck to guard their safety while they are attending to the ice cream. Hence, Message No. 7 was created. In its pretest implementation, this message consisted of a letter to the parents on a particular route of the Good Humor Company in the Bronx, New York. The letters (shown in Figure 6) were distributed in brightly printed envelopes (shown in black and white in Figure 7) containing a gift of a pocket appointment book-calendar. The envelopes were handed to the children on one Saturday's run with verbal instructions to take them home to their parents.

The second basic approach is to get the children themselves to alter their crossing behavior. In particular, there is a marked advantage if they cross behind the truck rather than at its front. Rear crossings place the child in view of oncoming traffic in the first half of the attempted crossing, thereby giving the driver more opportunity to take evasive action. It would also be desirable for vendor clients to execute the course and search steps recommended by Message No. 1. However, the ice cream and the truck itself present a significant attention conflict to the delivery of a message from an ice cream truck. Since message delivery at the truck was essential for the pretest so that the target audience could be readily identified and observed, it was decided to limit the content of Message No. 8 to the simple directive: "cross behind the truck." Moreover, the attention conflicts around the truck dictated the use of a "catchy" medium for delivering the message. Simply, the message had to be able to pierce the consciousness of children around the ice cream truck despite the considerable competition.

In light of the need for a compelling pretest presentation, a musical

Dear Parent:

Good Humor works as hard for your child's safety as it does to provide the family with high quality products. Each of our drivers receives special training in the supervision of children around ice cream trucks. However, our driver is only on your street for a very brief time. Before our truck arrives and after it leaves, your child does not have adult supervision unless you make provision for it. We want your child to be safe even when we're not around. Therefore, please make sure that you or another adult accompanies your child to our truck. That way, we can both be sure that all children are supervised before, during and after our truck stops.

THE GOOD HUMOR COMPANY

Figure 6. Pretest Form of Message No. 7.

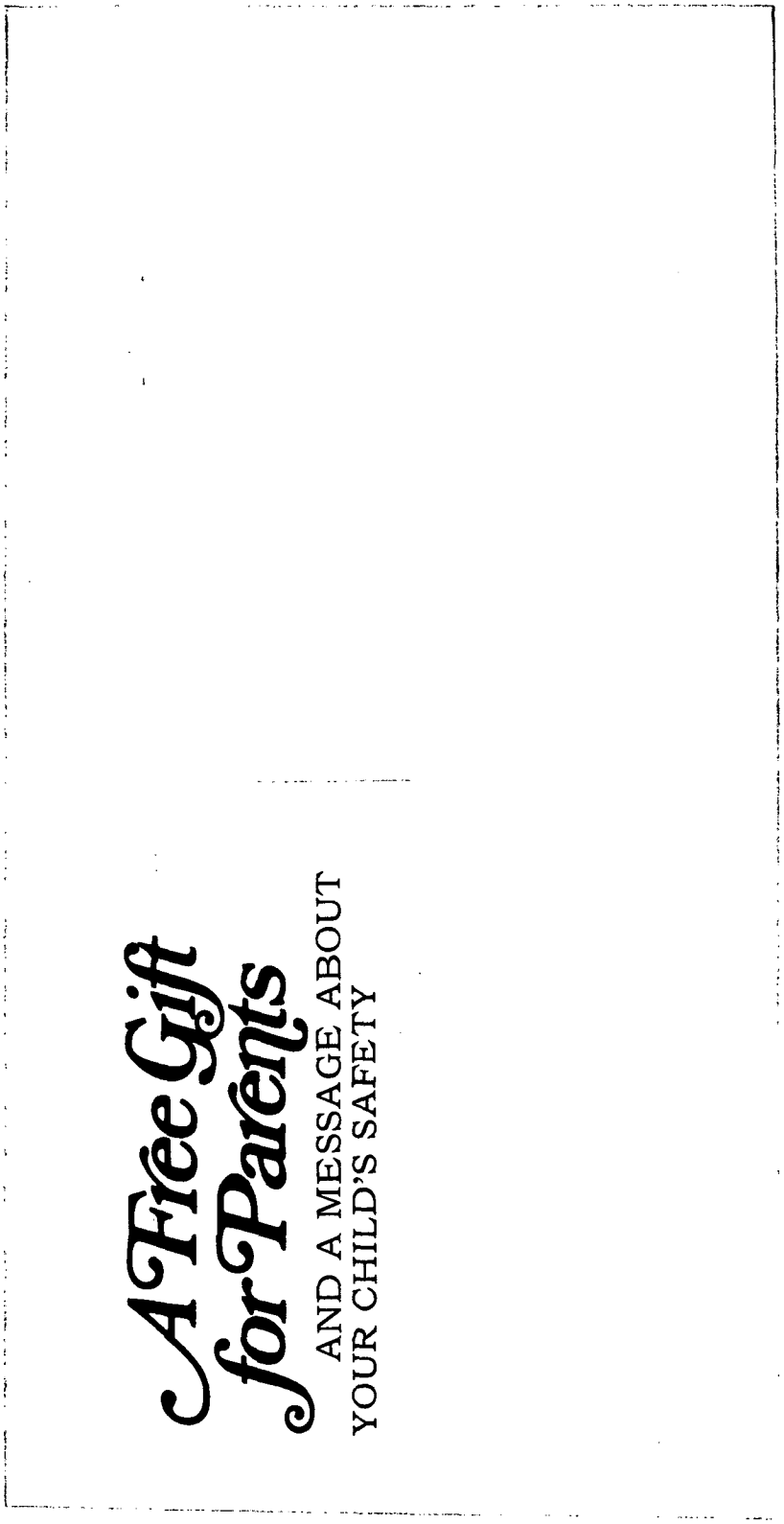

Figure 7. Outside of Envelope Containing Message No. 7 for the Pretest.

jingle of the message was prepared. The lyrics of this 29 second song are:

If you want to cross the street
Never count on luck
Never cross in front of the Good Humor Truck
To keep from getting hurt
That's what you must do
Cause you can't see the cars
And the cars can't see you.
If you want to cross the street
Never count on luck
Never cross in front of the Good Humor Truck.

The song is accompanied by piano music and a Moog Electronic Music Synthesizer. It was recorded for the project by Bob Nash Productions using a female vocalist. The recording was then dubbed onto endless loop cassettes for playing over loudspeakers which were installed on the test ice cream truck by the project staff. In actuality, the presented Message consisted of the 29 second song followed by 29 seconds of the instrumental background alone. This provided for a repeat of the verbal message approximately every minute while the truck was stopped.

b. Test Procedure

The tests of Message Nos. 7 and 8 were conducted on two successive Saturdays (April 20 and 27, 1974) on a regular Good Humor Company route through the Burnside-Sedgewick area of the Bronx, New York. On the first test day, two observers rode the truck to record baseline data. At each stop, the driver gave an envelope containing the message to parents to one child from each family. The child was instructed not to open the envelope and to make sure it got home to his/her mother or father. The route commenced shortly after noon and finished at 9:15 p. m.

On the second test day (April 27), the same truck was equipped with a pair of loudspeakers and tape playing equipment. Exactly the same route was traversed at essentially the same time. During this second run, the jingle was played continuously whenever the truck stopped to sell. Again, two observers were on the vehicle to record pedestrian crossing behavior. In addition, a "chase" car with two interviewers followed the truck from noon until approximately 5:00 p. m. After the truck departed from a stop, the interviewers questionned the clients (children) and parents to determine message transmission.

c. Measures

The behavioral measurement taken was simply a frequency count of the number of people who crossed in front of the truck, crossed behind and did not cross. On both days, pre and post, crossing behavior was tabulated only

for those people leaving the area of the truck. Crossing behavior upon leaving the truck is the central problem in these crashes. All data were separated into child and adult crossings. This provided a tabulation of the number of adults at the location which was needed to measure the effectiveness of the adult message and allowed for an adult versus child separation of Message No. 8 effects on crossing behavior. An adult was considered to be anyone in the mid-teens or older.

Message transmission was measured by interviewing people in the vicinity of where the truck had been after the truck left. Children were asked what the jingle meant. Any child mentioning anything about not crossing in front of the truck was scored as being correct. Children mentioning crossing safely were partially correct. All others were incorrect. The children were not probed beyond the initial question. Adults in the vicinity after the truck left were asked if they received a letter from the Good Humor Company during the previous week. If they had, they were asked what the letter meant. All interviewing was conducted after the truck left so as to ensure that the interview process did not interfere with the basic behavioral measures being collected by the observers on the truck.

d. Results

The behavioral data collected are shown in Table XVI. It can be seen from this table that the number of adults on day 1, the pre-measure, was 165 as compared with only 138 on day 2, the post measure. Thus, Message No. 7 asking parents to accompany their children to the truck was not effective. The ratio of children to adults was 3.78 (623/165) on day 1 and 4.48 (618/138) on day 2.

Message No. 8, however, appears to have had the desired effect. The number of children crossing behind the truck increased from 18% on day 1 to 24% on day 2. Front crossings remained unchanged at 12%, with the remaining children not crossing. The two distributions, day 1 versus day 2, were significantly different ($\chi^2 = 6.42$; $p < .05$ with 2 d.f.). For adults, front crossings decreased from 16% on day 1 to 12% on day 2 while crossing behind the truck increased from 17% on day 1 to 24% on day 2. However, the two distributions for adults did not differ significantly due to a much smaller N than with the children ($\chi^2 = 4.79$, N.S. with 2 d.f.). Table XVI also shows the combined data summed across both children and adults. These distributions also are significantly different ($\chi^2 = 8.79$, $p < .05$ with 2 d.f.).

The combined distribution, children and adults, was also analyzed with respect to safe versus unsafe behavior. Crossing in front of the truck was unsafe, behind was safe. The "no cross" category was excluded from this analysis. The results showed that 42% of the crossings were unsafe on day 1 as compared with only 32% on day 2. This difference was statistically significant ($\chi^2 = 5.50$, $p < .05$ with 1 d.f.) and indicates that Message No. 8 was effective, producing a reduction in unsafe behavior of 24%.

Table XVI

Pretest Results Message Nos. 7 and 8--Behavioral Data

	Children				Adults			
	Cross Front	Cross Back	No Cross	N	Cross Front	Cross Back	No Cross	N
Day 1 (pre-measure)	77 12%	112 18%	434 70%	623	26 16%	28 17%	111 67%	165
Day 2 (post-measure)	74 12%	147 24%	397 64%	618	12 9%	33 24%	93 67%	138

Total

	In Front	Cross Back	No Cross	N
Day 1	103 13%	140 18%	545 69%	788
Day 2	86 11%	180 24%	490 65%	756

The interview data, shown in Table XVII, helps to explain the results obtained on the behavioral measures. First, concerning Message No. 8, most of the children did not understand the jingle. Fully 56% of those children interviewed did not mention safety when asked what the song meant. Thus, a radical shift in crossing behavior could not be expected after a single exposure to this message. Concerning Message No. 7, it appears that either the letters did not reach the target group or if they did the effect was negligible. Only 5 adults remembered receiving the letter of the 43 interviewed. Those that did receive the letter, however, generally knew what it meant.

e. Discussion

Message No. 7 concerning adult supervision around vendor trucks was not effective. The reason for its non-effect, however, is unclear. It could be that the letters never reached their intended target audience in sufficient numbers to provide impact. Alternatively, the message may have reached the parents but they did not react to it. In any event, the pretest of this message was not effective and further work is required to determine why.

Message No. 8, on the other hand, did have the desired effect. For those individuals crossing the street in the area of the truck, 42% crossed in front on day 1 as compared with only 32% on day 2. These figures are summed across the 410 child crossings and the 99 adult crossings. While children are the primary victims in the vendor accident, adults are involved at a rate of about 10-20%. For children only, the reduction in front crossings was from 41% on day 1 to 33% on day 2. These results indicate a high degree of effectiveness for the message since the interview data shows that message transmission was achieved for only 30% of the children. Therefore, with repeated exposure to the message over time, it is felt that a high degree of accident reduction can be achieved.

7. Message No. 10--Drivers

a. Message/Audience Description

Message No. 10 is directed at all drivers, particularly those characteristic of the drivers involved in the vehicle turn/merge accident event. These are predominantly male (83% from the ORI data) and distributed across ages as follows:

Age	% of total type involvement
16-21	19%
22-25	17%
26-45	34%
46-65	21%
Over 65	8%

Table XVII

Pretest Results Message Nos. 7 and 8--Interview Data

Children	Message Meaning			
	Correct	Partially Correct	Not Correct	Total
	37 30%	17 14%	68 56%	122

Parents	Letter Meaning			
	Understood Letter	Did Not Understand	Did Not Receive A Letter	Total
	4 9%	1 2%	38 88%	43

Thus, the subjects recruited for the test, supposedly a gas mileage "rally" (described below), were chosen in an attempt to approximate this accident-involved driver population. Specifically, the experimental and control groups were distributed by sex and age as shown below:

	Sex	
	Male	Female
Experimental	16 (73%)	6 (27%)
Control	14 (78%)	4 (22%)

	Age (years)			
	16-21	22-25	26-45	46-65
Experimental	2 (9%)	2 (9%)	14 (64%)	4 (18%)
Control	0 (0%)	7 (39%)	8 (44%)	3 (17%)

Because the test conditions were disguised, i.e., subjects thought they were taking part in a gasoline mileage test, it was not considered appropriate to deliver the message via an audio of audio-visual medium. This would have aroused too much suspicion and would have been totally out of place at the pre-rally briefing during which the message was delivered. Hence, the message was delivered orally by a senior Dunlap project member as part of the normal briefing instructions. Specifically, subjects were told that recent research has shown that turning a corner in a busy urban environment can be particulary hazardous. Most urban traffic injuries are pedestrians, and many are hit by cars turning a corner. Thus, when making a turn a driver should:

- Look all around for traffic
- Look again (once more or one last look) in the direction of the turn to search for pedestrians
- Try to look for the pedestrian's eyes or face because they will tell you if he sees you or not and if he is likely to cross your path

The presenter reinforced the message by demonstrating the correct behavior in a right turn situation (apparently the most hazardous vehicle turn/merge situation).

b. Test Procedure

The test of Message No. 10 was conducted on May 17 and 18, 1974. Subjects were recruited locally to approximate the age and sex distribution discussed above. After recruitment, they were assigned to control and experimental groups so that each had approximately the same characteristics.

All subjects were told that they were to participate in a gasoline mileage test to determine how typical drivers perform in their own cars. They were asked to complete a brief questionnaire by giving their age and sex and describing their vehicle and knowledge of downtown Stamford, Connecticut, the site of the rally route. Each subject was given $10.00 as direct compensation plus a full tank of gas. They were allowed to choose the time and date (May 17 or 18) which best suited their own schedules.

The rally route was layed out so that it covered approximately 16 miles, beginning and ending at the same gas station in Darien. The route included three complete circuits of the major downtown section of Stamford, Connecticut. Four observers were stationed along the route, essentially incognito, to record turning behavior. They utilized small booklets to record the data because these booklets were considerably less conspicuous than clipboards. In all, each test participant made 9 turns which could be scored by the four observers. Eight of these were right turns and one was a left. Measurement of right turns predominated because there is indication from the ORI data (Snyder, et al., 1971) and the geometry of the situation that right turns are more prone to the vehicle turn/merge accident phenomenon than are left turns.

Subjects were dispatched for the test hourly in small groups, alternating groups of experimentals and controls. Each car was marked with large paper numerals on both front doors and in the top center of the windshield. These numbers were ostensibly (as far as the subjects were concerned) to identify them for the gas station. If questioned further, the test moderator admitted that observers would be on the route to record time at certain checkpoints. This would provide a time-for-distance measure to help control for varying traffic densities. This explanation was apparently accepted, as evidenced by the absence of open skepticism and the results of informal debriefings with several of the subjects after completion of the route.

Each group was given a 10 to 15 minute briefing concerning:

- The ostensible purposes of the test
- Procedures--where to get gas, when to leave, etc.
- The Route--a detailed turn-by-turn discussion using a map and checksheet
- Driving Instructions--how to produce "valid" gas mileage data, e.g., no air conditioning
- Safety Instructions
  - Stay within the speed limit

- Wear seat belts

- Obey traffic signals

- Message No. 10 (experimentals only)

Experimentals and controls were briefed identically except that the safety message (No. 10) was omitted from control briefings.

After the briefing, identifying numbers were taped to each car, and the drivers were sent to the designated gas station. At the station, the gas tank of each car was filled and the odometer reading recorded (primarily to maintain realism). The subjects were then dispatched on the route which took approximately 45 minutes to traverse. On their return, their cars were again filled with gas and the odometer reading recorded. They were then thanked for their participation and sent on their way.

c. Measures

Trained observers were stationed at four intersections in downtown Stamford, Connecticut. The route was such that each vehicle turned twice at three of the intersections and three times at the fourth intersection. Thus, nine observations should have been available for each subject. In fact, slightly less data were actually tabulated due to one vehicle breakdown and scattered minor problems in making the correct turns. Of the 360 data points that should have been tabulated, 343 actually occurred.

The observers tabulated head movements by the subjects as they made their turn. A 1 was scored if the driver did not look at all in any direction other than straight ahead. A 2 corresponded to a subject who looked away from the observer only, and a 3 was scored if the subject looked towards the observer only. A 4 was scored if the driver looked both ways and a 5 was scored if the driver was perfectly correct with respect to the Message. That is, he or she looked both ways and back again.

d. Results

The results of this pretest are summarized in Table XVIII. It can be seen from this Table that the experimental group did engage in better searching behavior than the control group but that the effects tend to be small. Analysis of these data was first conducted on a location by location basis. For these comparisons, the data were collapsed into three categories; 1 and 2, 3, 4 and 5, because there was not a sufficient number of observations at all the observation points or locations to permit a valid test using all five levels of the scale. The first category, 1 and 2, was unsafe behavior, the second, 3 on the scale, was marginally safe and the third category, 4 and 5, was safe. The results showed that at the first

Table XVIII

Pretest Results Message No. 10--Rally

	Experimental						Control					
	1	2	3	4	5		1	2	3	4	5	
Observation Point	(none)	(away only)	(towards only)	(both ways)	(both ways and back)	Total	(none)	(away only)	(towards only)	(both ways)	(both ways and back)	Total
1	2	8	16	9	5	40	3	9	12	7	5	36
2	7	5	17	8	6	43	10	3	12	9	2	36
3	3	11	18	2	3	37	13	4	11	3	2	33
4	15	12	9	20	8	64	14	9	19	11	1	54
Total	27 15%	36 20%	60 33%	39 21%	22 12%	184	40 25%	25 16%	54 34%	30 19%	10 6%	159

three observation points the distributions for experimental and control subjects did not differ significantly (χ^2 = .70, .65 and 1.78 respectively, N.S. with 2 d.f.). At the fourth location, however, there was a significant shift toward better search behavior in the experimental group (χ^2 = 9.51, $p < .01$ with 2 d.f.). Thus, at this one intersection, the message appeared to be producing the desired effect. Overall, the non-collapsed experimental and control distributions were not significantly different (χ^2 = 8.72, N.S. with 4 d.f.), nor were the collapsed distributions (χ^2 = 2.91, N.S. with 2 d.f.).*

The overall data from this pretest were also analyzed with respect to safe and unsafe behavior in the same manner as the data from earlier pretests. When category 3 (look toward observer only), is considered as unsafe, the results show that 75% of the turns made by the control group were unsafe as compared with only 67% of the turns made by the experimentals. This represents a reduction in unsafe behavior of 11%. Excluding category 3, and thus defining only categories 1 and 2 as unsafe, the results indicate that the reduction in unsafe behavior was 16%. Neither reduction, however, was statistically significant (χ^2 = 2.62 and 1.61, N.S. with 1 d.f. for the two approaches, respectively).

e. Discussion

The results for the Message No. 10 pretest are in the predicted direction and probably are indicative of true message impact. Overall, the experimental versus control distributions barely fail to meet the criteria of statistical significance at the .05 level. One of the four observation points, however, was statistically significant at the .01 level. Further, the overall reduction in unsafe behavior was somewhere between 11% and 16% depending on where the distinction is made as to exactly what is unsafe. Thus, while not conclusive in a strict sense, these results do suggest that driver behavior can be influenced by a safety message.

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* The χ^2 test is not completely appropriate for these data since the assumption of independence is only partially met. Each turn was an independent event; however, each driver enters the tabulations as many as nine times, once each for up to nine turns. For this reason, the median test was applied to the average of each driver's scores. The results were:

	Above Median	Tie	Below Median	N
Experimental	12	1	9	22
Control	6	3	9	18

While not statistically significant, these results do parallel the increase in performance for experimentals shown in Table XVIII.

VI. MEDIA RECOMMENDATIONS

A. General Considerations

The choice of a medium or set of media for the delivery of each of the developed messages must take into consideration numerous critical factors. These include:

- Message complexity
- Target audience
- Media characteristics
- Immediacy of the medium
- Limitations on media purchasing by Government agencies

Careful media production must consider each of these if transmission, i.e., number of target audience members who receive and understand the message, is to be maximized. Further, these factors often operate in opposite directions, thereby creating a need to trade-off among alternative solutions. For example, a complex message targetted for an inner city group of young children presents a unique problem. If the message is delivered in the detail needed to explain all of its concepts, the target audience will almost surely not attend to it. On the other hand, the simple, short presentation consistent with the attention span of children may not be capable of conveying the message content.

In a media campaign, opposing factors such as these can best be overcome by a high degree of creativity, multi-media approaches and message repetition. There is truly no formula for creativity in media design. It is simply a cultivated talent possessed by some gifted artists. Thus, the media recommendations contained herein will be conceptual and mechanical in nature and will not attempt to dictate the detailed creative aspects of message production. Ultimately, these will have to be addressed by each media producer/director team as they translate the concepts contained herein into printed or spoken words, pictures and film footage. However, the creative process must, of necessity be directed toward the goal of engendering the desired behaviors in the target audiences, i.e., successfully transmitting the message contents. Thus, any media team considering the implementation of these messages is strongly urged to become fully familiar with the accident epidemiological and behavioral considerations behind each message content. This is best accomplished by a thorough reading of this report and reference to both volumes of the ORI Report (Snyder et al, 1971).

Multi-media approaches and message repetition are both intended to help drive the messages into the minds of the target audiences. We are all constantly bombarded with a variety of media forms. We watch our TV, listen to the radio, read

a newspaper or magazine, see billboards and posters and talk with salesmen. Each individual time-shares his receptivity for advertising or, in this case safety messages, among the various media he peruses. Thus, a campaign which covers more than one of the media forms generally seen or heard by a target audience is, in essence, capturing a larger share of their attentive time. Similarly, repetition of a message can help achieve transmission and retention. However, repetition of, for example, the same TV spot can also annoy an audience and create a negative reaction. Thus, where numerous repetitions are necessary to insure message persistence or transmission it is desirable to have alternate message forms. This helps hold the interest of the target audience because they are exposed to a changing message vehicle while still being given the desired safety information.

Finally, the media recommendations to follow are based upon the experiences of the pretests where applicable. However, it must be recognized that the pretests themselves were small-scale efforts and, thus, media choices were both broadened and limited. The broadening of available media, particularly the use of immediate or point-of-behavior presentations, resulted from the limited nature of the tests. Hence, loudspeakers could be installed on three buses with ease while the extension of this plan to all urban buses would be prohibitively expensive as well as possibly intolerable to a bus rider who had to hear the message many times a day, five days a week. On the other hand, pretest media choices were limited by both available funds and the need to collect behavioral data to evaluate the messages. Thus, the true mass media could not be used, and polished materials utilizing high quality production techniques were beyond the scope of the study.

In light of these and other factors specific to a pretesting situation, not all of the media choices recommended herein parallel the pretest media. To be sure, the pretest media selections were realistic under the specific condidtions, and some were successful in producing the desired behavioral changes. However, the ultimate objective of the public education messages is to promote a significant reduction in pedestrian accidents. Therefore, media recommendations were created for large-scale distribution by NHTSA as a countermeasure rather than an experiment and are based on the reality that point-of-behavior presentations, although ideal in most instances, are not often feasible. This is because they are limited in their information transmission capabilities and often require cooperation of many outside groups, e.g., bus companies, which cannot be assured.

B. Specific Recommendations

The success of Message No. 1 (stop and search) with the audience of children essentially obviates the need for Message No.1a (pause and search). Stopping is the safest behavior and does not appear to be too much of a nuisance for or impostion on the target audience. However, the media plan for Message No. 1a would be identical to that for Message No. 1 except for the emphasis on pause or wait instead of stop. Further, Message Nos. 1, 2 and 3 (and the pause variations 1a and 2a) are really a media "package." Each deals with the same search message

("look left, then right then left") and some aspect of course selection or negotiation. In fact, Message No. 2 (parked cars) is nothing more than the second part of Message No. 1 with additional emphasis on the specific danger a parked car presents. Thus, Message Nos. 1, 2 and 3 have been grouped as a package. As will be seen below, this permits the innovative and cost-effective use of the cinematic media. However, the messages themselves in the package are applicable to both adults and children. Since these target audiences are radically different in terms of media approaches, the Message Nos. 1 - 3 package is the subject of two separate media recommendations.

Before presenting the specific recommendations, it must be noted that they all consist of multi-media approaches. In all cases there is one primary media form with the others in a secondary role to serve as a reminder of the information seen or heard in the primary presentation. In particular, the printed media are always secondary to cinematic and radio broadcast forms. Simply, the printed word is not as effective as a visual display or spoken message in conveying safety information. As a consequence, no finished printed media were produced. Outlines for the various posters, ads, etc. are described below but can only be implemented after the primary media form has been executed.

Multi-media presentations are traditional in advertising circles. However, the concept has been adopted in this context for its inherent efficacy and not merely to be consistent with the current fashion. Therefore, the following recommendations are intended to be media packages for the various messages. Analysis and experience indicate that they are optimal, although not necessarily uniquely so, approaches for NHTSA to follow given its restriction against the purchase of media time/space. Thus, they should be implemented as a package for each message or message group. Much would be lost if only some of the media for each message were actually developed.

Finally, recommendations are included for all messages, not only the pretested set. Obviously, specific test outcomes are missing for those that were not tested. In some cases, pretest results could be extended to provide guidance for media recommendations. In the remainder, the recommended approaches are based on the experience of the project staff and the information culled from the literature.

1. Message Nos. 1, 1a, 2, 2a, 3 - Children

The pretested versions of Message Nos. 1 and 1a give advice on the following basic pedestrian maneuvers:

- Crossing without a parked car nearby
- Crossing near a parked car
- Search

Had Message Nos. 2 and 2a been tested, they would have focused only on the last two behaviors. Message No. 3 would have addressed search and the additional behavior of running. However, you can run in front of a parked car or at a crossing with no parked cars nearby. Similarly, crossing without a car nearby can be accomplished midblock without a crosswalk, midblock with a crosswalk, at a corner with a light, stop sign or pliceman, etc. This wide variety of crossing situations in which the messages are applicable suggests a series of demonstrations. Further, these demonstrations should be visual, particularly for children, because conceptualization of these settings and behaviors is difficult. Hence, cinematic media are indicated supported by posters for distribution to schools and social clubs where children congregate.

The desirability of showing the full range of crossing situations and the use of cinematic media lead to an innovative production strategy. The heart of the cinematic package should be a film of approximately 8 minutes duration. This particular running time has been chosen because it is typical for "trailers" shown in movie theaters with feature films. The total film could be distributed for viewing during special children's matinees commonly run by movie theaters. In addition, the film footage should be edited with special voice-over commentary (multi-lingual if desired) to produce 30 and 60 second TV spots. Thus, the single production process would yield materials for TV and movie theatre viewing.

The total 8 minute film should follow the conceptual outline presented in Table XIX. It should include a "catch" phrase or "tag line" at the end to serve as a memory link with all other materials produced from it. Such a tag line might be "It's the only safe way to cross the street," which was used in the pretest message versions. However, more creative and shorter phrases are possible and should be considered.

A minimum of three 60 second TV spots should be edited from the total film. These should cover the contents of Message Nos. 1, 2 and 3. Respectively, these would show:

- Stopping at the curb, searching and crossing and stopping at the outside edge of a parked car, searching and crossing (Message No. 1)

- Stopping at the edge of a parked car, searching and crossing (Message No. 2)

- Running along the sidewalk, stopping and searching before crossing (Message No. 3)

Each of these spots should include the camera panning to show what the children have seen as they searched. The spots should close with the developed tag line. The description of the pretest Message No. 1 film presented earlier (Table IV)

Table XIX

Film Outline - Message Nos. 1, 1a, 2, 2a, 3 - Children

Running Time: 8 minutes

Medium: 16 or 35 mm color sound movie

Setting: Urban residential streets

Characters: Young boy and girl (approximately 8 years old) and a narrator, preferably an original animated character superimposed on the regular film

Sound: Voice over in a cartoon character fashion

Scenes: The animated character should introduce and demonstrate stopping and then looking left, right, left for each of the situations listed below. The children should then execute a safe crossing as per the instructions given for each situation.

- Midblock, no parked car, no crosswalk
- Midblock, no parked car, painted crosswalk
- Midblock, parked car, no crosswalk
- Midblock, parked car, painted crosswalk
- Corner, no parked car, no traffic control
- Corner, no parked car, signal light
- Corner with parked car
- Crossing with a policeman, policewoman or crossing guard in attendance
- One way street from right with no parked car
- One way street from right with parked car
- Running then stopping and searching at a corner
- Running then stopping and searching, midblock
- Running after a ball rolling between parked cars

Table XIX (Continued)

In addition, the following scenes should be included at least once each:

- Camera panning left, right, left to simulate what should be seen from the curb
- Camera panning left, right, left to simulate what should be seen from the outside edge of a parked car
- A threat development, i.e., camera pans left and it is clear, then left again to disclose an oncoming truck as a threat
- Children reinitiating the entire sequence after a threat has been detected, i.e., stop; look left, then right and see a car; pause; look left, right, left again until all looks disclose no threat. Voice over explains the need for continuing to look until all three looks show no threat

exemplifies the type of 60 second spot which should be developed. The individual scenes would, of course, need to be shortened to reduce the running time to 60 seconds. Also, as an example of an individual 60 second spot, Table XX describes the film prepared for the pretest of Message No. 2 but never tested.

Additional 30 second TV spots should also be edited from the main film. These should end with the tag line and cover very brief behavioral sequences including:

- Search only
- Stop at the curb and search
- Stop at the edge of a parked car and search
- Stop running and search

The total cinematic package for children will therefore cover the complete range of correct course and search behaviors. The 8 minute film will present the total package to "capture" audiences in theaters, classrooms and social clubs. The 30 and 60 second TV spots will saturate the TV screen with examples of the most frequently encountered situations. Together, the cinematic package should be able to reach a large proportion of the target audience in a particular media market, even when time slots are restricted to public service allocations.

Posters carrying the same tag line should be developed to augment the cinematic media. Simply, posters are the only other major medium with potential effectiveness for young children. This audience does not listen to radio with any frequency and does not regularly read newspapers or pamphlets. Two sets of posters would be desirable for display in schools and other areas where children congregate. The first, directed at the very young child (5-9 years) should be almost completely pictorial. The second, for children between 10 and 15 years old should contain some printed message. The basic use of the posters will be to remind the children of the lessons they have learned from the film or TV spots. Thus, the utilization of a good tag line will be essential.

Individual posters might depict:

- Stopping at the curb
- Stopping at the edge of a parked car
- Looking left, right and left
- Executing proper behaviors even in the presence of a signal light or police officer

These would not attempt to engender the correct behavior themselves but, rather, would serve a supportive role to the primary cinematic presentation.

Table XX

Proposed Message No. 2 Film Description

Running time: 55 seconds

	Scene	Narration
1.	Boy and girl running towards camera. They pull up to a stop when they see the parked car.	You're on your way home and you want to cross the street. You stop at the curb but there's a parked car there and parked cars can be dangerous.
2.	Children turn toward camera to listen to the narrator (hidden).	So, how do you cross the street?
3.	Children walk to edge of parked car and stop. Girl places her left hand on outside fender of the car.	Smart boys and girls walk out to here where they can see better.
4.	Repeat of children walking out to edge of parked car and stopping. They then look left, right and left.	Walk slowly out to here. Stop. Look one way, then the other way, then back again.
5.	Camera pans left, right and left at the car edge to show what the children should have seen.	Look one way, then the other way, then back again. So you can make sure no cars are coming from any direction. Remember...
6.	Repeat of children walking to the edge of the parked car and looking left, right and left.	Walk out to here. Stop. Look one way, then the other way, then back again.
7.	Medium shot of children leaving the edge of the parked car and crossing the street.	It's the only safe way to cross the street when there's a parked car there.

2. Message Nos. 1, 1a, 2, 2a, 3 - Adults

The implementation plan for these messages to an adult audience would be essentially the same as for children. The major exceptions would revolve around the characters in the cinematic materials and the extension of the media forms to include newspapers, radio and 10 second TV spots. These latter three media forms are useful for adult audiences but are inappropriate for children. In addition, the pretest results indicated that adults generally know the correct behavior but do not always execute it. Therefore, the narration for all the adult materials on these messages should place emphasis on the need to perform the maneuvers that are generally known to be correct. Simply, the concept is that one must do these things because they are the only safe way for an adult to cross the street.

The cinematic package for adults as for children will be based upon an 8 minute film. The film should depict the same scenes as for children (see Table XIX) with the following changes:

- The setting should be both residential and commercial streets
- The characters should either be "typical adults" or real-life scenes shot in the fashion of candid camera (this is effective but expensive)
- The narrator should be a well-known celebrity figure who relates well to an urban audience, e.g., Flip Wilson, Glen Campbell, etc.

The 60 and 30 second TV spots to be culled from the film should essentially parallel the recommendations for children. In addition, 10 second TV spots with relatively subtle messages are also effective with adults. Therefore, the following 10 second spots with only the developed tag line as voice over should be produced from the 8 minute film:

- Search
- Stopping at the curb
- Stopping at the edge of a parked car

The variety of TV messages for adults will serve to hold their interest. In addition, TV stations would be more likely to allocate the needed public service advertising time if they did not have to repeat the exact same spot each time.

Ideally, the adult campaign would begin with distribution of the 8 minute film to local theaters and civic groups and its airing on a special half-hour news/documentary show. Thereafter, the TV spots will serve both to reinforce the

message for those who have seen the film and also to convey it to new viewers. Supporting the cinematic messages should be radio spots, a variety of posters and newspaper advertisements.

The radio spots would reiterate the basic themes of the cinematic campaign. The same celebrity used in the film should do the narration for radio. In fact, many short radio spots can be produced directly from the sound track of the film. Each should end with the developed campaign sign-off or tag line. The purpose of these radio spots will be reinforcement and not initial transmission. Thus, their specific content must be developed after the film has been fully designed. However, they should, at a minimum cover:

- Proper search
- Stopping at the curb
- Stopping at the edge of a parked car
- Running

Posters and newspaper ads should also be developed as campaign reminders after the film has been scripted. Although adult audiences can generally read quite well, it will be best to limit poster copy to one or two sentences and the tag line. Newspaper copy can be longer but should still consider the limited attention readers will give to safety ads. The posters themselves should have two versions. One should be large and be displayed in public places such as train stations and sports arenas. The other should be small and distributed as car cards for trains and buses. This will keep the reminder of the message in view a maximum amount of time. A minimum of four posters covering the same topics as for children and four companion newspaper ads should be produced.

3. Message No. 4 - Parents

Message No. 4 covers the topic of parental supervision of children while at play on the street. Since this message is directed to parents only, and even more specifically to mothers as they are home during the day when their children are playing outside, it warrants special consideration. As a primary medium, 10 and 30 second spots should be created to aim for mid-morning TV soap operas, afternoon movies, and late night TV. Supermarket posters and radio would reinforce the message for this target group.

The staging for 30 second spots for this message should be a dramatic "do" and "don't" film concept. It should show the innocence of children at play without adult supervision. The impending moment of danger should be depicted with stop-action technique, as this is effective emphasizing the danger. The same scene should be re-filmed showing the same situation but with an adult close-by who intervenes in time. For example, an adult might be positioned on a bench at an urban housing project with children at play on the sidewalk. The

adult would stop a child at the same moment of danger shown in the first scene. The final seconds of the spot should be a tight shot of the parent's or adult's face with our message as the tag line. The 10 second spots should just show the first scene with its negative outcome and pose a question to parents such as: "Are you sure your children are safely at play?" On radio, the play scene should be simulated with sounds of the city and child voices saying certain key phrases like, "Throw the ball to me" or "You're throwing it too close to the curb." This audio scene could terminate in a moment of danger situation (the sound of a screeching car, perhaps) with a strong emphasis on the verbal message to parents. An alternate radio message should be a low key interview with a mother punctuated with the same background sounds of the city. It would consist of a believable question and answer kind of exchange about unsupervised children at play and its inherent dangers...almost a kind of "Do you know where your children are right now?"

The poster campaign should reiterate the theme developed on TV and radio. The importance of the theme or tag line is especially acute for this message because it must overcome a basic lack of interest on the part of parents. Children are allowed or even told to play outside to "keep them out of mother's hair." Thus, this message is not only conveying specific safety information, but also attempting to alter a parent's value system. As such, it must be a "grabber" and, even then, it is likely to be of only marginal effectiveness.

The poster campaign can employ photographs from the TV spot with strong headline copy surrounding the tag line. Separate posters for mothers, fathers and parents in general appear warranted. Thus, a total of at least three posters will be needed. This will help target the message to the specific motivations for allowing a youngster to play outside unsupervised. For example, mothers could be told "When you send Johnny outside to play so you can talk with the girls, this might happen," superimposed on a picture of a young boy lying in front of a car clutching his baseball. Similarly, fathers might be impressed by the same poster with a caption like: "While you were relaxing and watching the game, Johnny was playing his own game, a deadly one."

4. Message No. 5 - Bus Stop

This message presents specific behavioral advice for a specific pedestrian situation--crossing the street near a bus stop when a bus is there. The behaviors are similar to those applicable to the parked car situation except that there are three alternatives at a bus stop. Waiting until the bus leaves and then crossing is probably the safest activity. However, it is quite inconvenient and not likely to be followed. Crossing behind the bus is safer than crossing in front of the bus because oncoming drivers in the first half of the roadway can see the pedestrian. Unfortunately, this behavior may constitute J-walking at near-side bus stops. Finally, a crossing in front of the bus can be safely negotiated if the pedestrian stops at the outside edge of the bus and searches properly.

The inherent complexity of this message indicates the need for a visual demonstration. Supporting radio spots and posters on buses and attached to bus stop sign stanchions can add support to the campaign but are incapable of carrying the amount of information needed to serve as the primary vehicle. Thus, a 60 second TV spot is recommended as the main component of this campaign. An outline for this spot is presented in Table XXI. It should be noted that the development of a theme or tag line for the TV spot is absolutely essential to making the posters work.

The supporting radio material can be delivered in a 30 second message similar to the one utilized in the pretest. Since it is intended to support the TV presentation, it need not present all information in elaborate detail. It should, however, describe the three alternatives as did the pretest message and emphasize the tag line as an aid to recall.

Two types of posters are needed to augment the TV and radio messages. The first would be car cards for display inside a bus. Because of the many visual conflicts in this environment, these posters must be eyecatching and brief. They should key on the developed tag line and show only one of the three safe ways to cross at a bus stop. Thus, a series of three posters would be ideal, one each for front, rear, and wait-and-cross messages.

The second type of poster should duplicate the car cards for use on the outside of buses and on the street at bus stops. This latter group may have to be printed on a metallic or plastic base so they can withstand the rigors of weather and vandalism. Again, the message itself should be visually attractive but brief and easy to read. This will serve to cue a pedestrian's memory of what was learned from TV or radio.

5. Message No. 6 - Freeway Crossing

The message against freeway crossings would best be delivered at the point-of-behavior. That is, at the exact place a pedestrian decided to cross a freeway. Unfortunately, this is extremely impractical and even suboptimal. If such places of high exposure could be identified, the best countermeasure would be to erect a high fence or install an overpass. Thus, if this message is to be produced at all (a questionable undertaking at best), mass media will have to be used to attempt to create a consciousness of the hazards on a freeway among all pedestrians. Both radio and TV would be appropriate.

Considering the marginal utility of the message and, more importantly, the obviousness of the advice, it is difficult to propose specific media outlines. The only apparent motivation to avoid the situation arises from a fear of death. However, the use of fear campaigns in advertising has not proved to be particularly effective. Thus, the best approach might be to create a 60 second TV spot

Table XXI

Proposed Film Outline--Message No. 5

Running Time: 60 seconds

Medium: 16 mm color sound movie or videotape

Setting: Urban bus stop on near side of an intersection

Characters: Either a celebrity figure acting out all sequences or a celebrity narrator with "typical" pedestrians as actors

Sound: Voice over with urban street sounds in the background

Scenes: The following scenes should be shown once each for a pedestrian disembarking from the stopped bus and for a pedestrian walking down the sidewalk and wanting to cross at the intersection in front of the bus:

- Waiting until the bus leaves, then searching properly and crossing
- Crossing in front of the bus in a crosswalk by stopping at its outside edge, searching properly, then crossing
- Crossing behind the bus by stopping at its outside edge, searching properly, then crossing

Either the scenes or the narration should stress that the suggested crossing procedure for a front crossing is necessary even if the pedestrian is facing a green light or walk signal because drivers often stop well into a pedestrian crosswalk.

Tag Line: The film must end with a clearly recognizable closing line or theme which can be carried over into the poster campaign

showing an actor playing the role of a pedestrian on a freeway. The entire visual presentation would be developed to show the limited time a driver has to react to an unexpected pedestrian on a freeway. Only the voice-over would relate to the hazards involved. Thus, fear would be introduced in the sound track, but the visuals would deal only with concrete facts.

Radio might be used to support the basic TV spot by reiterating the thematic presentation. Also, since drivers will also hear and see this message, it should be stressed that a driver must always expect a pedestrian to be on the freeway. Otherwise, drivers might assume that the message had cleared the freeway of all pedestrians and reduce their search for them.

6. Message No. 7 - Vendor Parental Supervision

The situation covered by Message No. 7 is a special case of the general parental supervision advice to be conveyed in Message No. 4. Thus, the T.V spots prepared for Message No. 4 would be applicable to the media campaign for Message No. 7. The specific case of supervision around vendor trucks would be introduced through the use of seasonal radio spots timed to include the vendor selling season, posters for placement in supermarkets and other locations where parents congregate and the use of special media. If at all possible, the pretest idea of sending a message envelope home to each parent of a child purchasing ice cream from the vendor should be attempted. This medium would have to be developed further to make it acceptable to all ice cream vendors in all cities. However, the media concept is direct, and, therefore, a sound vehicle. In addition, specific literature about "Your Child's Safety" should be prepared to cover this message. This would be distributed at parent organizations, schools, civic clubs, etc.

The actual content of each of these media forms should follow the approaches outlined earlier for Message No. 4. However, in this case specific reference to the magnetic attraction of the ice cream and a child's lack of attention to traffic when the ice cream truck is near. Care must be exercised to insure that the safety message is clear and yet does not attack ice cream vending in general. Although the vendor accident is sufficiently prevalent to warrant attention, the approach need not lead to parents prohibiting their children from going to the ice cream truck. Rather, it should encourage them to insure that there is adequate supervision when young children are out on the street at any time and place added emphasis on the vendor situation.

7. Message No. 8 - Vendor Clients

The content of Message No. 8 tells the vendor clients to cross behind the truck to avoid being screened by it. The situation and the pretest results indicate the benefits of a point-of-behavior approach to delivering this message. The content is simple and easy to understand and delivery at the truck obviates the need for recall. However, compelling ice cream vending companies to play or show

the necessary materials is not considered a viable media channel at this time. Thus, the on-truck media are relegated to secondary status as support for the primary approach of a TV spot. Should the mechanisms for prompting inclusion of posters and special media forms on ice cream trucks become available, the point-of-behavior materials can be elevated to a primary role.

The developed TV spot should be of 60 second duration. The 60 second time span will allow for repetition of the basic message to cross behind the truck, a desirable feature for a child audience. An outline for the TV spot is presented in Table XXII.

The tag line for the TV spot should be carried over into a set of posters to be offered to vendor companies for display on the trucks and for distribution to schools, etc. These posters should be simple and give only the tag line together with the advice to cross behind the truck. The use of an arrow or other direction--indicating display is recommended on the truck as further encouragement of the correct behavior.

Several types of special media would also be appropriate for this message. In particular, an auditory presentation as employed during the pretests would be very effective if adopted by the vendors. The basic jingle used (see Section V) would be the recommended form. In addition, an innovative handout could be considered. The objective would be to find a toy-like object capable of deliverying a short message. Ideally, this toy would be for outdoor use and would contain the message as a picture. Examples include a plastic sun visor, a "talking card," or a plastic ice cream. The most appropriate vehicle would have to be selected after a perusal of the available materials. In any case, this "handout" approach might be something to encourage vendors to do on their own. This would relieve NHTSA of the development and distribution problems inherent in designing and using a giveaway from a vendor truck.

8. Message Nos. 9 and 10 - Vehicle Turn/Merge

Message Nos. 9 and 10 address the vehicle turn/merge accident type for pedestrians and drivers respectively. Since the dangerous situation is quite complex, visual media are indicated for the primary communication channel. Further, conveying the message to either drivers or pedestrians will require a complete description of the accident situation from both pedestrian and driver viewpoints. Thus, a single 60 second TV spot should be prepared to cover both messages. An outline for this spot is given in Table XXIII. The mixture of animation and real scenes will help emphasize the correct behavior. Animation can be broken down into step by step actions thereby exaggerating the somewhat subtle message content and getting the point across.

Table XXII

Film Outline - Message No. 8 - Vendor Clients

Running Time: 60 seconds

Medium: Color sound film or videotape

Setting: Relatively quiet residential street in a medium to low income neighborhood

Characters: Young boy and girl (approximately 8 years old), an ice cream vendor and his truck and a narrator (either unseen or the same cartoon character developed for Message Nos. 1 - 3).

Sound: Voice Over

Scenes: The narrator should set the scene by saying something like "here comes the ice cream truck" as the truck is seen driving into the neighborhood and stopping.

- The boy and girl should be shown on the opposite side of the street from the truck as the narrator says: "Here are John and Jane ready to buy their ice cream."
- The boy and girl should cross to the truck after stopping at the curb and looking left, right and left again.
- The boy and girl buy their ice cream and turn to leave the truck but look puzzled.
- The narrator poses the question: "How should they cross to get home safely?"
- Either the narrator (if the cartoon character) or the driver (if an unseen narrator is used) should show the children the correct way to cross, with the voice over repeating the instructions:
  - Go to the back of the truck
  - Stop at the outside edge of the truck
  - Look left, right and left again
  - Keep looking until it is clear all around
  - Go directly across the street

Table XXII (Continued)

- The narrator should then repeat the advice and explain the rationale for it as the children are seen executing the steps again.

- The final scene should show the children safely on the opposite curb eating their ice cream as the truck pulls away. The narrator should repeat the steps once more ending with a tag line.

Table XXIII

Film Outline - Message Nos. 9 and 10 - Vehicle Turn/Merge

Running Time: 60 seconds

Medium: Color sound film or videotape

Setting: "Typical" urban street corner with car making a right turn and pedestrian desiring to cross in front of turning car. To be shown both live and animated.

Characters: A driver and a pedestrian. Both should be "average" looking and almost ageless in appearance. Also, there should be cartoon character counterparts to the live models and a narrator (unseen).

Sound: Voice over

Scenes: The spot should open with a wide view of the street scene and the narrator explaining the attention conflicts for both drivers and pedestrians.

- In animation, the correct driver search procedure (look all around and then once more in the direction of the turn) should be demonstrated.

- In animation, the correct pedestrian action should be shown. This should include looking all around and at least one sequence of a pedestrian making sure a car has stopped.

- The correct driver and pedestrian actions should be repeated with the live characters as the narrator describes the sequences again and gives the rationale for the safe maneuvers. The narrator should close with a tag line.

Table XXIV

Film Outline - Message No. 11 - Multiple Threat for Pedestrians

Running Time: 60 seconds

Medium: Color sound film or videotape

Setting: Urban commercial area

Characters: "Typical" adults; 2 drivers in "average" cars plus a pedestrian and a narrator (unseen)

Sound: Voice over

Scenes: The spot should open with the pedestrian coming to a marked crosswalk which is not controlled by a signal, stop sign or policeman. The narrator should describe the scene and indicate that the pedestrian is about to cross.

- The first car (in the curb lane) stops for the pedestrian.
- Pedestrian walks in front of the first car and almost gets hit by the second car overtaking the first.
- Camera takes the position of the pedestrian's eyes as he moves from the curb. The narrator explains that the car screened the view of both the oncoming driver and the pedestrian.
- Pedestrian is seen back on the curb as the narrator explains that there is a safe way to cross in this situation.
- Pedestrian walks to outside edge of stopped car and stops as narrator describes the behavior.
- Pedestrian looks left, right and left at the outside edge of the first car as the narrator explains the rationale. As the pedestrian is looking, the second car goes by in a safe fashion.
- The pedestrian is shown repeating the entire sequence together as the narrator reiterates the advice and closes with a tag line.

Table XXV. This film should be analogous to the one for Message No. 11 (pedestrians in a multiple threat situation) except that the perspective of the visuals and the narration should be from the driver's point of view.

The supplementary radio spot should be brief but attention-getting. The basic behavioral advice to slow down when passing a car stopped in the roadway should be reiterated together with the developed tag line. This will not only relate the message to the TV spot for those who have seen it but also convey the safety information to the uninitiated.

C. Media Costs

The cost of implementing the recommendations just presented will involve two components. The first and major part of the costs will cover creative development and production of a master film, tape, etc. The second cost component involves duplication of the master to obtain sufficient copies for distribution. To a great extent, ultimate costs will depend on where and when actual production is undertaken. Media costs vary across the country and prices are rapidly inflating. Thus, the estimates which follow are based only on current costs in a particular media market (New York City). While not exact, these figures may be taken as a relatively liberal estimate of actual costs. That is, all production should be possible for no more than the estimates contained herein.

The following subsections list the costs of producing master copies of materials for each of the campaigns outlined earlier in this section. In addition, unit duplication costs for each type of material are given based on quantity prices.

1. Message Nos. 1, 1a, 2, 2a, 3 - Children

a. Cost of Masters

8 minute film shot in 16 mm color (35 mm prints to be made later) Animation included	$29,000
3 - 60 second TV spots from the film @ $3,000	9,000
4 - 30 second TV spots from the film @ $2,500	10,000
2 sets of Posters (14" x 22") @ 4 posters = 8 posters @ $1,000	8,000
Total of masters	$56,000

Table XXV

Film Outline - Message No. 12 - Multiple Threat for Driver

Running Time: 60 seconds

Medium: Color sound film or videotape

Setting: Urban commercial area

Characters: "Typical" adults; 2 drivers in "average" cars plus a pedestrian and a narrator (unseen)

Sound: Voice over

Scenes: The spot should open with a scene showing the perspective of the driver of a car overtaking another car stopped in the roadway. The narrator describes the scene and conveys a sense of complacency on the driver's part.

- As the driver is about to pass the stopped car a pedestrian comes suddenly into view necessitating violent evasive action to avoid a crash. The narrator describes the scene and indicates that the pedestrian should have been expected.

- Shift back to the opening positions only this time the camera is elevated and looking down on the situation and showing the pedestrian. The narrator indicates that this was what was really happening even though the driver could not see it because he was screened by the stopped car.

- The narrator describes the correct behavior of slowing down and being prepared to stop. The scene pans from the speedometer needle dropping to a shot of the driver's foot covering the brake.

- As the car passes the stopped car this second time, the pedestrian again comes into view. However, this time the driver is easily able to avoid a crash.

- The narrator reiterates the safe behavior as the entire sequence is shown unbroken. The narrator closes with a tag line.

b. Unit Duplication Costs

8 minute film - $100 per print
60 second TV spot - $12.50 per print
30 second TV spot - $9.50 per print
Posters - $.90 per poster

2. Message Nos. 1, 1a, 2, 2a, 3 - Adults

a. Cost of Masters

8 minute film shot in 16 mm color (35 mm prints to be made later) - no animation	$27,000
3 - 60 second TV spots from film @ $3,000	9,000
4 - 30 second TV spots from the film @ $2,500	10,000
3 - 10 second TV spots from the film @ $2,100	6,300
4 - Radio spots @ $2,300	9,200
4 - Posters @ $1,000	4,000
4 - 2400 line newspaper pages including photography, type and retouching @ $2,000	8,000
Total of masters	$73,500

b. Unit Duplication Costs

8 minute film - $100 per print
60 second TV spot - $12.50 per print
30 second TV spot - $9.50 per print
10 second TV spot - $6.50 per print
Radio spots - $2.00 per cartridge
Posters - $.90 per poster
Newspaper mats - $2.00 per mat

3. Message No. 4 - Parents

a. Cost of Masters

30 second TV spot	$ 8,000
10 second TV spot	3,500
2 - Radio spots @ $2,300	4,600
3 - Posters @ $1,000	3,000
Total of masters	$19,100

b. Unit Duplication Costs

30 second TV spot - $9.50 per print
10 second TV spot - $6.50 per print
Radio spots - $2.00 per cartridge
Posters - $.90 per poster

4. Message No. 5 - Bus Stop

a. Cost of Masters

60 second TV spot	$ 9,000
Radio Spot	2,300
3 - Posters (car cards) @ $1,000	3,000
3 - Street posters @ $1,000	3,000
Total of masters	$17,300

b. Unit Duplication Costs

60 second TV spots - $12.50 per unit
Radio spot - $2.00 per cartridge
Car cards - $.90 per card
Street posters - $5.00 - $10.00 per poster (metallic or plastic)

5. Message No. 6 - Freeway Crossing

a. Cost of Masters

60 second TV spot	$ 9,000
Radio spot	2,300
Total of masters	$11,300

b. Unit Duplication Costs

60 second TV spot - $12.50 per print
Radio Spot - $2.00 per cartridge

6. Message No. 7 - Vendor Parental Supervision

a. Cost of Masters

Special media (handout and printed material)	$ 4,000
3 Posters @ $1,000	3,000
Radio Spot	2,300
Total of masters	$ 9,300

b. Unit Duplication Costs

Special media - $.50 (a reasonable target value)
Posters - $.90 per poster
Radio Spot - $2.00 per cartridge

7. Message No. 8 - Vendor Clients

a. Cost of Masters

60 second TV spot including animation	$11,000
2 Posters @ $1,000	2,000
Special media (cannot be estimated at this time)	-
Total of masters	$13,000*

*Plus special media costs.

b. Unit Duplication Costs

60 second TV spot $12.50 per print
Posters - $.90 per poster
Special media - unknown but $.50 or less is a reasonable target

8. Message Nos. 9 and 10 - Vehicle Turn/Merge

a. Cost of Masters

60 second TV spot including animation	$11,000
Outdoor poster	1,000
Radio spot	2,300
Total of masters	$14,300

b. Unit Duplication Costs

60 second TV spot - $12.50 per print
Outdoor poster - $5.00 - $10.00
Radio spot - $2.00 per cartridge

9. Message No. 11 - Multiple Threat for Pedestrians

a. Cost of Masters

60 second TV spot (if not produced as part of Message Nos. 1 -3)	$ 9,000
Poster (same master for indoor and outdoor)	1,000
Total of masters	$10,000

b. Unit Duplication Costs

60 second TV spot - $12.50 per print
Indoor posters - $.90 per poster
Outdoor posters - $5.00 - $10.00 per poster

10. Message No. 12 - Multiple Threat for Drivers

a. Cost of Masters

60 second TV spot		$ 9,000
Radio Spot		2,300
	Total of masters	$11,300

b. Unit Duplication Costs

60 second TV spot - $12.50 per print
Radio spot - $2.00 per cartridge

VII. CONCLUSIONS AND RECOMMENDATIONS

The results of the various pretests and the review of the literature lead to a set of conclusions related to the objectives of the study and recommendations for future action on each of the messages.

A. Conclusions

Four conclusions have arisen from this study. These are:

- Pedestrian behavior can be changed by public education messages. The pretest results provide sufficient grounds to conclude that actual large-scale presentation of messages based on the contents developed in this study can produce a positive change in pedestrian behavior.

- Both adult (including drivers) and child audiences can be influenced by pedestrian safety messages. Both appear to respond well to special situations, e.g., bus stop and vendor. However, general messages, particularly those covering the dart and dash accidents, are most effective for children. There is indication that adults already have the requisite safety knowledge. Thus, general adult messages should focus more on motivations than on information.

- Existing child course and search behaviors as related to the dart and dash accident types appear to be excessively poor. Thus, even though public education can produce a significant reduction in unsafe behavior of these types, it must be augmented by other countermeasures against the child dart and dash problem.

- Public education appears to be a viable countermeasure to pedestrian accidents. Significant reductions in unsafe behavior can be accomplished, and the cost of large-scale message production is not very great.

B. Recommendations

Section VI contained detailed media recommendations for each of the developed message contents. These represent one approach which should be considered if a particular message is to be implemented in a large-scale program. However, it is obvious from the pretest results that not all messages are worthy of equal consideration. In particular, three groups of the messages evolve when viability for a field test application is considered. Since field testing to assess message

effectiveness is the logical next step in the developmental process, specific action recommendations for each message will be related only to desirability for inclusion in a field test.

The three categories of messages are:

- Recommended for field test
- Recommended for further research and development
- Not recommended for action at this time

Each of these will now be addressed in detail.

1. Recommended for Field Test

Four of the pretested messages have sufficiently demonstrated their efficacy so that they might be immediately included in a field test. These are:

Message No.	Accident Type(s) Addressed	Audience
1	Darts and Dashes	Child
5	Bus Stop	Adults
8	Vendor	Child
10	Vehicle Turn/Merge	Adult (Drivers)

Each of these messages produced some significant reductions in unsafe behavior during the pretests. Moreover, together they address 55.6% of the accidents in the ORI study (see Table I). Thus, they not only show promise of effectiveness, but also cover a significant subset of all pedestrian accidents.

In addition to the four pretested messages which can be recommended for immediate field testing, two of the messages not tested are also likely candidates. These are:

Message No.	Accident Type(s) Addressed	Audience
3	Darts and Dashes	Child
12	Multiple Threat	Adult (Drivers)

Message No. 3 is very similar to Message No. 1 except that running is highlighted as improper course negotiation. Thus, it may be concluded that the Message No. 1 pretest results are indicative of the likely outcome had Message No. 3 been pretested. Similarly, Message No. 12 is analogous to Message No. 10 in that it conveys a simple behavioral sequence for drivers to follow under specific circumstances. Therefore, the results for Message No. 12, had it been pretested, would likely have paralleled those for Message No. 10.

Finally, it should be noted that Message Nos. 2 (Children) and 9 which appear in the next category--Recommended for further research and development--are part of media packages with messages recommended for field testing (Nos. 1 and 3 and No. 10 respectively). Thus, while these two messages cannot be recommended for immediate field testing on their own merits, they can be cost-effectively included in a field test if the Message Nos. 1 - 3 package for children and the Message Nos. 9 and 10 campaign for adults are implemented.

2. Recommended for Further Research and Development

Seven of the developed message contents appear to need further developmental work prior to field testing. These are:

Message No.	Accident Type(s) Addressed	Audience
1	Darts and Dashes	Adult
2	Darts and Dashes	Child & Adult
3	Darts and Dashes	Adult
4	Darts and Dashes	Adult (Parents)
7	Vendor	Adult (Parents)
9	Vehicle Turn/Merge	Adult
11	Multiple Threat	Adult

Message Nos. 2 (Child and Adult), 3 (Adult), 4, 9, and 11 were not pretested and none of the pretests conducted shed sufficient light on their efficacy to warrant their immediate inclusion in a field test. The test of Message No. 1 for adult audiences produced ambiguous results. The behavioral shift was not significant but it was in the positive direction. The results were further confounded by the apparently good behavior displayed by the control group during the test and the apparently high existing knowledge level of the adult pedestrian. The test of Message No. 7 either did not accomplish message transmission or had no effect at all. Since these outcomes cannot be differentiated from the available data, the efficacy of this message remains in doubt. Thus, all seven of the messages in this category might still be viable countermeasures,but more research and development is needed to elevate them to field test status.

3. Not Recommended for Action at This Time

Three of the message contents are not recommended for additional action at this time. These are:

Message No.	Accident Type(s) Addressed	Audience
1a	Darts and Dashes	Child & Adult
2a	Darts and Dashes	Child & Adult
6	Freeway Crossing	Adult

The "pause" versions of Message Nos. 1 and 2 (1a and 2a) were included in the set of messages in case the "stop" behavior requested by Message Nos. 1 and 2 proved too inconvenient for the test audiences. However, a priori it was decided that "stop" was preferable to "pause." Hence, if the "stop" message produced significant results, the "pause" version would be excluded. Thus, Message Nos. 1a and 2a are not recommended for further action at this time.

Message No. 6 covers the freeway crossing situation which simply does not appear amenable to a public education countermeasure. Pedestrians apparently are aware of the dangers of crossing a freeway but do so anyway. Thus, knowledge of the hazard is not likely to produce a behavioral change unless placed at point-of-behavior as an immediate reminder. However, if places with high incidences of freeway crossings could be identified, more direct countermeasures than public education could be used.

APPENDIX A

References and Bibliography

1. PEDESTRIAN ACCIDENT EPIDEMIOLOY

"AAA Special Study of School Children," AAA Pedestrian Safety Report, American Automobile Association, Washington, D. C. June, 1968.

Accident Facts. National Safety Council, Chicago, Illinois, 1972.

Accident Investigation, An In-Depth Study of Pedestrian Versus Ice Cream Truck Related Traffic Accidents. Los Angeles City Unified School District, Los Angeles, California, June, 1972.

Ahola, Veikko, K. Eklund, and U. Leppanen. Traffic Week at Kouvola in 1968. Helsinki, Finland, 1968.

Auto-Pedestrian Traffic Accidents in Illinois - 1963, 1964, and 1965. State of Illinois, Division of Highways, Springfield, Illinois, May, 1964, 1965, and 1966.

Blake, Ronald. Pedestrian and Bicycle Accidents. State Department of Highways, Boise, Idaho, September, 1973.

The Child in Detroit Traffic, 1969 and 1972. Traffic Safety Bureau, Detroit Police Department, Detroit, Michigan, 1969 and 1972.

"Children and Road Safety: A Survey Amongst Mothers of Young Children," Road Research Laboratory, Office of the Population and Censuses , London, England, August, 1972.

Colborne, Helen V. "Road Safety and Pre-School Children," Safety Education, (Autumn, 1971).

Haddon, William, P. Valien, J. McCarroll, et al. "A Controlled Investigation of the Characteristics of Adult Pedestrians Fatally Injured by Motor Vehicles in Manhatten." Traffic Safety Research Review, (June, 1967).

Huelke, Donald, and Rollin Davis. Pedestrian Fatalities in Wayne County, Michigan. University of Michigan, Highway Safety Research Institute, Ann Arbor, Michigan, 1969.

Jacobs, G. D., and D. G. Wilson. A Study of Pedestrian Risk in Crossing Busy Roads in Four Towns. Road Research Laboratory, Crowthorne, Berkshire, England, 1967.

Johnson, R. T. Freeway Pedestrian Accidents: 1958 - 1962. State of California, Highway Transportation Agency, Division of Highways, Sacramento, California, June, 1964.

Mackie, A. M. "Accident Risk to Pedestrians On and Within 50 Yards of Zebra Crossings," Traffic Engineering and Control. V. 4 (December, 1962).

Mackie, A. M., and J. D. Jacobs. "Comparison of Road User Behavior at Panda, Zebra, and Light-Controlled Crossings," Traffic Engineering and Control. V. 6 (April, 1965).

Mackie, A. M., and S. J. Older. "Study of Pedestrian Risk in Crossing Busy Roads in London Inner Suburbs," Traffic Engineering and Control. (October, 1965).

Manual on Pedestrian Safety. American Automobile Association, Washington, D. C., 1964.

Missouri Pedestrian Guide. Central Missouri State College, Department of Education and Safety, Warrensburg, Missouri,

Older, S. J. and J. M. Basden. "Road User Behavior at a Pedestrian Crossing," Traffic Engineering and Control. (June, 1961).

Salvatore, Santo. The Ability of Elementary and Secondary School Children to Sense Oncoming Car Velocity. Washington, D. C. : Government Printing Office, 1972.

Sandels, Stina. "Prevention of Road Accidents to Children, People of Old Age, and the Handicapped Through Driver Education," Psychological Institute for Children, Stockholm, Sweden, 1973-B.

Sandels, Stina. "Young Children in Traffic," British Journal of Educational Psycholo V. 40 (2) (June, 1970).

Sandels, Stina. "Road Accidents to Children - What Makes Them Happen?" Psychological Institute for Children, Stockholm, Sweden, 1973-A. (mimeographed)

School Safety Program for the Birmingham District. Traffic Engineering Department, Birmingham, Alabama, October, 1968.

"The Senior Citizen in Traffic," Traffic Safety. August, 1960.

Shaw, Anthony, and P. Pascsio. "Child Pedestrian Accidents in Central Harlem," New York Medecine, (June, 1967).

Shaw, Anthony, and A. Rezwi. "Child Pedestrian Accidents in Central Harlem, 1968, Journal of Trauma, V. 11(4) (1971).

The Skandia Report. The National Road Research Institute, Stockholm, Sweden, September, 1971.

Snyder, Monroe. Pedestrian Safety, The Identification of Precipitating Factors and Possible Countermeasures, Volume I, II. Operations Research, Inc., Washington, D. C., January, 1971.

Snyder, Monroe. "Traffic Engineering for Pedestrian Safety: Some New Data and Solutions," Department of Transportation, Washington, D. C. (n. d.) (mimeographed)

Tarrants, M. E. "Myths and Misconceptions in Traffic Safety - Myth 4," National Highway Safety Bureau, Department of Transportation, Washington, D. C., May, 1968.

Wiener, Earl. "Why Does A Pedestrian Cross the Street?" Medecine, Science, and the Law, V. 7(3) (July, 1967).

Yaksich, Sam. A Study of Pedestrian Fatalities in Washington, D. C., 1948-1957. American Automobile Association, Washington, D. C., 1957.

Yaksich, Sam. An Analysis of Pedestrian Accidents inSt. Louis, Mo. Prepared for Automobile Club of Missouri, American Automobile Association, Washington, D. C., March, 1964.

2. PREVIOUS PEDESTRIAN CAMPAIGNS

Bartholomew, Warren, M. "Pedestrian Accidents in Service Areas of Selected City Recreation Facilities," Traffic Safety Research Review, (December, 1967).

Belbin, Eunice. "The Effects of Propoganda on Recall, Recognition, and Behavior I The Relationship Between the Different Measures of Propaganda Effectiveness," British Journal of Psychology, V. 47 (1956).

Belbin, Eunice. "The Effects of Propaganda on Recall, Recognition, and Behavior II Conditions Which Determine the Response to Propaganda," British Journal of Psychology, V. 47 (1958).

Byrd, Kerry, and Wallace Berger. Urban Pedestrian Accident Countermeasures Experimental Evaluation, Report on Task III. Falls Church, Virginia; Bio-Technology, Inc., June, 1973.

Colborne, Helen V. Two Experiments on Methods of Training Children in Road Safety. Road Research Laboratory, Department of the Environment, Crowthorne, Berkshire, England, (1971).

Denham, Paul. "Miami's Pedestrian Control Porgram," Journal of Safety Research, V. 1(3) (September, 1969).

Fleig, P., and D. Duffy. "A Study of Pedestrian Safety Behavior Using Activity Sampling," Traffic Safety Research Review, V. 11(4) (December, 1965).

Higgs, Mavis. Opinions on the Design and Measurement of the Effect of a Road Safety Leaflet. Transport and Road Research Laboratory, Crowthorne, Berkshire, England. (1972).

Kretchmar, A. A. "Seattle Promotes Pedestrian Safety," Traffic Digest and Review, (June, 1965).

Loftus, Micheal. "The Talking Traffic Light," F. B. I. Law Enforcement Bulletin, V. 36 (January, 1967).

Morris, J. P. Road Safety Publicity - Quantifying the Effectiveness of Public Service Advertising, London, England: Advertising Association, April, 1972).

"Research for the Green Cross Code," Road Research Laboratory, Department of the Environment, Crowthorne, Berkshire, England, (April, 1971) (mimeograph)

Terrell, Rommie. "How Charlotte Cut Its Traffic Toll," Traffic Safety, (January, 1964).

Weiner, Earl. "The Elderly Pedestrian: Response to an Enforcement Campaign," Traffic Safety Research Review, V. 12 (4) (December, 1968).

Walsh, L. B., and F. Nickson. "Pedestrian Safety for Urban Streets," V.I, II, III. City of San Jose Pedestrian Safety Project, San Jose, California, (June, 1972).

3. OTHER SAFETY CAMPAIGNS

Auger, T., E. Wright, and R. Simpson. "Posters as Smoking Deterrents," Journal of Applied Psychology, V. 56 (2) (April, 1972).

Lauer, S., and R. G. Sell. "An Experiment on the Effects of Specially Designed Safety Posters," Occupational Psychology, V. 34 (July, 1960).

"Cigarette Gains Go Up In Smoke," Business Week, Dec. 21, 1968.

4. ADVERTISING

"Advertising: TV - Training Kids," New York Times, Oct. 24, 1973.

Dick, L. M., and J. A. Fleischer. Developing a Radiol Television Campaign for Public Service Broadcast, University of Southern California, Industrial and Systems Engineering, October, 1971.

Griep, D. J. "Propaganda and Alternative Countermeasures for Road Safety," Accident Analysis and Prevention, V. 2 (1970).

Haskins, Jack. "Evaluative Research on the Effects of Mass Communication Safety Campaings: A Methodological Critique," Journal of Safety Research, V. 2 (2) (June, 1970).

Haskins, Jack. "Effects of Safety Communication Campaigns: A Review of the Research Evidence," Journal of Safety Research, V. 1 (2) (June, 1969).

Higbee, Kenneth. "Fifteen Years of Fear Arrousal - Research on Threat Appeals 1953-1968," Psychological Bulletin, V. 72 (6) (1969).

Hyman, H., and P. Sheatsley. "Some Reasons Why Information Campaigns Fail," Readings in Social Psychology. New York: Henry Holt and Company, 1958.

Kay, H. "Marketing Notes and Communications, Do We Really Know the Effects of Using "Fear" Appeals?" Journal of Marketing, V. 36 (April, 1972).

Malfetti, James. "Scare Technique and Fraffic Safety," Published by The Eno Foundation, Westport, Connecticut, (April, 1961).

Naisbitt, J. "The Great Holiday Massacre - A Study of Impact," Reprint from National Safety Council, 1960.

Plummer, Joseph. "A Theoretical View of Advertising Communication," Reprint from The Journal of Communication, V. 12 (4) (December, 1971).

Ray, M. L. and W. C. Wilkie. "Fear: The Potential of an Appeal Neglected by Marketing," Journal of Marketing, (January, 1970).

Ward, Scott. "Children's Reactions to Commercials," Journal of Advertising Research, V. 12 (2) (April 1972).

Wells, William, L. Clark, M. McConnille. "A Reaction Profile for TV Commercials," Journal of Advertising Research, V. 11 (6) (December, 1971).

5. PREVIOUS DRIVER CAMPAIGNS

Blomgren, J. W., Thomas Sheueman, and James Wilkins. "Effect of Exposure to a Safety Poster on the Frequency of Turn Signalling," Traffic Safety Research Review (March, 1963).

Council, Forrest M. "Seat Belts: A Follow-up Study of their Use Under Normal Driving Conditions," Journal of Safety Research, V. 1(3) (September, 1969).

Fitts, G. L. "An Evaluation of the Effectiveness of Police Written Warnings as a Deterrent to Traffic Law Violations," Unpublished Master's Thesis, University of Arizona, Tuscon, Arizona, 1966.

Fleischer, G. A. An Experiment in the Use of Broadcast Media in Highway Safety, University of Southern California, Industrial and Systems Engineering, (January, 1972).

Hirleman, F. H. Operation 101 Phase I Background and Accident Analysis, Department of California Highway Patrol, Sacramento, California, August 1969.

Huffman, Warren, J. Payne, A. Florio, et al. "The Effectiveness of an Emphasis Patrol by the Illinois State Highway Police in District 10 on a Selected Highway," Traffic Safety Research Review, (March, 1961).

Hutchinson, John, C. Cox, and B. Moffet. An Evaluation of the Effectiveness of Televised, Locally Oriented Driver Reeducation. University of Kentucky, Department of Civil Engineering, Lexington, Kentucky, 1968.

Koestner, N., E. Warmoth, and E. Syring. "Oregon Study of Advisory Letters: The Effectiveness of Warning Letters in Driver Improvement," Traffic Safety Research Review, (September, 1967).

McBride, Robin, and R. Peck. "Modifying Negligent Driving Behavior Through Warning Letters," Accident Analysis and Prevention, V. 2 (1970).

Manheimer, D.I., G.D. Mellinger, and H.M. Crossley. "A Follow-Up Study of Seat-Belt Usage," Traffic Safety Research Review, (March, 1966).

Robertson, L., A. Kelley, B. O'Neil, et al. A Controlled Study of the Effects of Television Messages on Safety Belt Use, Insurance Institute of Highway Safety, June, 1972.

Waller, Patricia, and P. Barry. Seat Belts: A Comparison of Observed and and Reported Use. University of North Carolina, Highway Safety Research Center, Chapel Hill, North Carolina, May 1969.

6. MISCELLANEOUS

Ball, S., and G.A. Bogatz. Reading With Television: An Evaluation of the Electric Company. Educational Testing Service, Princeton, New Jersey, February, 1973.

Barrett, G.V., and B.H. Fox. "Feasibility of Studying Driver Reaction to Sudden Pedestrian Emergencies in an Automobile Simulator," Human Factors, V. 10 (1) (1968).

Benepe, Barry. "Pedestrian in the City," Reprint Traffic Quarterly, January, 1965.

Blumenthal, Murray. "Dimensions of the Traffic Safety Problem," Traffic Safety Research Review, March 1968.

Brackett, H.R. Experimental Evaluation of Signing for Hazardous Driving Conditions - Flashing Beacons Used in Conjunction With Speed Reduction Signing, Evaluation of School Warning Signs, Virginia Council of Highway Investigation and Research, Charlotteville, Virginia, March, 1965.

Britt, Stewart. "Short Articles and Notes, Pedestrian Conformity to a Traffic Regulation," George Washington University, 1939. (Mimeographed).

Brace, John A., "The Pedestrian," Traffic Engineering. 3rd Edition handbook, Institute of Traffic Engineers, 1965.

Campbell, R.E., and L.E. King. "The Traffic Conflicts Technique Applied to Rural Intersections," Accident Analysis and Prevention, (1970).

"The Children's Television Workshop," Published by CTW, NBC-TV Studios, New York, 1973.

"Communication, Media, and Audience Effects Upon Attitude Change With Regards to Automobile Safety," Behavioral Research in Highway Safety, V. 1 (3) (Fall, 1970).

Dale, Charles Wm. "A Cost Analysis of Intersection Fraffic Controls," Traffic Engineering, (May, 1966).

"Drivers Discuss Walkers and Safety Persuaders," Traffic Operations, April, 1959.

Duff, J.T. "Road Accidents in Urban Areas," The Journal of the Institution of Highway Engineers, (May, 1968).

"Fatal Traffic Accidents on Colorado Streets and Highways, Section VIII," State of Colorado, Department of Highways, Denver, Colorado, 1964.

General Population Characteristics. U.S. Department of Commerce, Bureau of the Census, Washington, D.C., 1970.

Hicks, R. Cartwright. "How to Use Your Eyes When You Drive," Supervisory Management, V. 14 (April 1969).

Hummel, R.C., and J.M. Nagle. Urban Education in America - Problems and Prospects. New York: Oxford University Press, 1973.

Little, A.D. "Pedestrians," The State of the Art of Traffic Safety. Cambridge, Mass: Arthur D. Little, Inc. June, 1966.

Marconi, William. "The Relative Efficiency of Various Types of Traffic Signal Controls," Traffic Engineering, (1963).

Mayne, A.J. "The Problem of the Careless Pedestrian," Proceedings from the 2nd International Symposium in the Theory of Traffic Flow, London, England, 1963.

Miller, F.D., and Michael, H.L. "A Study of School Crossing Protection," Traffic Safety Research Review, V. 8 (June 1964).

Moore, R.L. "Pedestrian Choice and Judgement," "Men and Machines in Transport Systems," Presented at Ergonomics Research Society and Operational Research Club, February, 1952, Inquire Road Research Laboratory, Crowthorne, Berkshire, England.

Moore, R.L. and Olden, S.J. "Pedestrians and Motor Vehicles are Compatible in Todays' World," Traffic Engineering, (September, 1965).

Novak, Joel, and R. Shumate. "The Use of 'Control Groups' in Highway Accident Research," Traffic Safety Research Review, (June 1961).

Piaget, Jean. The Child's Conception of Movement and Speed. New York: Basic Books, Inc., 1970.

Sheppard, D. "Adoption of Innovations in Road Safety," Occupational Psychology, V. 45 (1971).

Statistical Abstract of the United States - 1972. U.S. Department of Commerce, Bureau of the Census, Washington, D.C., 1972.

Stop Murder by Motor. Published by American Trial Lawyers Association, January, 1966.

Waller, J., and R. McFarland. "Guidelines for Public Health Programs in Traffic Accident Control," American Public Health Association, February, 1967.

Wilde, Gerald. Road Safety Campaigns: Design and Evaluation. Road and Motor Vehicle Safety Ministry of Transport, Ottawa, Ontario Canada, October, 1970.

Williams, Leslie, and A. Mitchell, "Pedestrian Traffic Accident Analysis, Report with Recommendations," Providence Chamber of Commerce, Providence, Rhode Island, January 1943.

Yahsick, Sam. "The Pedestrian's Role in Traffic Control," Presented at the Tenth Pan American Highway Congress, Montevideo, Uruguay, February, 1967.

Materials from San Diego include:

Heims, B. Pedestrian Crosswalk Study.