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Elderly Driver Retraining

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16. Abstract This report documents a study of the traffic safety problems associated with elderly drivers. For the purposes of this study, "elderly drivers" are defined as drivers aged 55 years or older. The study involved five major activities. First, research was reviewed to determine what factors (e.g., deficiencies of performance, health, and knowledge) are most strongly related to the aging process and the accident experience of older drivers. Second, 20 driver education courses made available to older drivers were reviewed to determine what had been and was being done to address these problems. Third, an eight-hour program designed specifically for older drivers by National Retired Teachers Association/American Association of Retired Persons was evaluated. The evaluation design allowed project staff to collect data bearing on subjects' personal characteristics, vehicle use patterns, driving problems, and crash and conviction histories. Analysis indicated that the program was effective in increasing subject knowledge. No significant effect on accident rate was found, though the small sample size would allow a modest but significant effect to go undetected. Crash experience did appear to be a function of exposure and medical problems. On the basis of information gained through these three activities, an older driver instructional manual--suitable for distribution by a variety of agencies serving the older community--was developed. Also developed was a set of recommendations to guide the development, content, and instruction approach taken in future programs for older driver retraining.					
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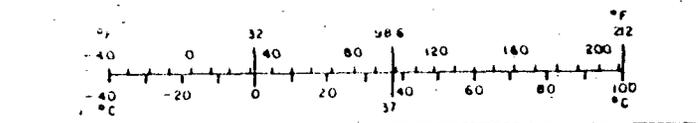
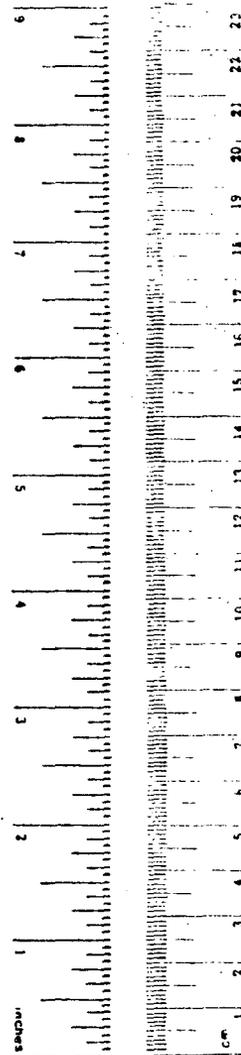
METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
in ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
VOLUME				
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft ³	cubic feet	0.03	cubic meters	m ³
yd ³	cubic yards	0.76	cubic meters	m ³
TEMPERATURE (exact)				
F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

Approximate Conversions from Metric Measures

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



1. This is a general guide. For other exact conversions, see the Metric Handbook, published by the U.S. Department of Commerce, Bureau of Standards, Washington, D.C. 20540.

PREFACE

This report describes an investigation into the traffic safety problems and training needs of older drivers. The investigation encompassed a review and assessment of (1) safe performance deficiencies associated with elderly drivers and (2) instructional programs geared to address these problems. Much of the project work was devoted to a controlled evaluation of "55-Alive"--an eight-hour safe driving program developed specifically for drivers aged 55 and up by the National Retired Teachers Association and American Association of Retired Persons (NRTA/AARP). The evaluation was designed to (1) obtain driver experience information that could be used to more precisely define the driving problems of the elderly and (2) determine the effectiveness of the NRTA/AARP curriculum as an accident countermeasure.

This report provides a brief review of traffic safety problems identified by prior research as being common among older drivers and summarizes a variety of driver improvement programs that have been offered to older drivers. The report also describes the methods used in, and results obtained from, the collection of driver experience and knowledge test data from drivers who had taken the 55-Alive program, as well as from a group of older drivers who had not taken the program. The development of a manual for older drivers, based upon the results of project review and evaluation activities is described as well. The report concludes with recommendations to guide future development of driver improvement/maintenance programs for the elderly.

The work was performed under contract to the National Highway Traffic Safety Administration (Contract No. DOT-HS-8-02033) by the National Public Services Research Institute (NPSRI) and the Texas Transportation Institute (TTI).

Dr. A. James McKnight served as principal investigator for the NPSRI effort. Ms. Gerry A. Simone served as project director through the collection of evaluation data and the survey of elder driver training programs. Mr. James R. Weidman succeeded Ms. Simone as project director and supervised the analysis of data as well as preparation of the Older Driver Manual. Others of the NPSRI staff contributing to the project were Mr. Michael Sadof, who supervised the processing of data, and Dr. Mark L. Edwards, who assisted in analysis of the data and was the liaison between NPSRI and TTI.

The TTI effort was initially directed by Dr. Mark L. Edwards. When Dr. Edwards left to join the NPSRI staff, he was succeeded by Dr. Roger Koppa. Mrs. June Housman was responsible for the collection and entry of data, while Mr. Kenneth Banning supervised the TTI data processing effort.

The manuscript for this report was prepared by Mrs. Ruth Freitas, Mr. C. Eugene Fasnacht and Ms. Anne Knipper.

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- o Mr. Ronald Coppin and Mr. Raymond C. Peck of the California Department of Motor Vehicles, who arranged for the processing and analysis of accident data from records of drivers residing in California.
- o The almost 5000 members of NRTA/AARP who participated in the project by completing questionnaires and knowledge tests prior to and following completion of the training program.

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INTRODUCTION

As people age, changes begin to occur in basic sensory and cognitive functions. These changes are usually so gradual that older adults are unaware of them, and make no attempt to compensate for ensuing limitations brought on by the changes. Research has shown that many age-related problems can significantly affect an individual's driving performance.

Age-related problems that are known to affect driver performance do not occur in all people at the same time or to the same degree. Physiological changes occur at different stages of life, with many changes beginning even before people reach licensing age. For instance, the eye's ability to focus peaks at about age 10. Hearing ability usually peaks at 10-15 years of age. Other gradual changes begin early in the driving career: visual acuity begins to decline in the mid- to late 20s, and the eye's field of vision starts to narrow in the late 30s. These and other physiological changes generally accelerate after age 55. Overall, age-related problems--both physiological and psychological--usually become profound enough to affect driving performance around age 60.

For the purposes of this project, the "elderly" or "older" driver group was defined as including drivers aged 55 years and above. These drivers comprise about 22% of the total driving population. This proportion is expected to increase as the proportion of senior citizens increases.

ACCIDENT EXPERIENCE OF OLDER DRIVERS

As a group, elderly drivers have fewer accidents than their younger counterparts (Waller 1972). They also have fewer accidents on a per-driver basis (Harger 1964, Freeman 1972, Harrington 1973). However, weighted with these trends is the fact that annual mileage traveled by elderly drivers is much less. On a per-mile basis, elderly drivers have a higher accident rate than other drivers (National Safety Council, 1976). They often tend to be responsible for the accidents in which they are involved as well (Zwagg 1971, Harger 1964). Finally, their likelihood of being injured or killed in any accident is greater (Waller 1974).

The 1975 National Highway Safety Forecast and Assessment predicts that the proportion of people aged 65 and older who drive will increase to 64% by 1985, compared to only 50% driving in 1978. The Forecast also predicts a 33% increase in traffic deaths among these drivers compared to their 1972 fatality rate.

OLDER DRIVER PROBLEMS

The types of problems commonly associated with the aging process that are capable of affecting a driver's performance are:

- o Physical Problems
- o Behavioral Problems

Additional information on the problems encountered by older drivers comes from the reports of physicians, traffic safety specialists, and law enforcement officials. Those problems most frequently mentioned deal with the following behaviors:

Maintaining proper speed--matching of speed to traffic conditions; entering and exiting freeways at the proper speed; slowing down unexpectedly.

Observing behind--checking mirrors; making headchecks.

Reacting appropriately to traffic conditions--operating in unfamiliar areas; processing information quickly; making decisions and reacting quickly; having the energy and physical freedom to cope with and resolve conflicts.

Responding appropriately to traffic signs and signals--recognizing newer traffic signs and signals; adjusting to altered traffic patterns and roadway design.

RETRAINING EFFORTS

There exists a real need for specific training programs to reeducate older adults in safe driving rules, principles, and practices. The ability of the elderly to learn has been widely questioned. However, research has rather consistently shown that age does not diminish the ability to learn so long as there is interest and the physical ability to carry out the learned act (Belbin and Downs, 1964).

Until recently, there weren't any retraining programs designed specifically for elderly drivers. What existed was primarily general driver improvement courses that were taught to elderly drivers. The programs did not provide extensive treatment of the types of information older drivers need to know over and above the basics. Even now, the programs purported to be for older drivers contain nothing that isn't in a regular driver improvement program. A catalog of available materials for older drivers (Katz and Simone, 1978) discusses the few programs that are offered to the elderly driver group.

The effectiveness of older driver retraining programs in reducing the incidence and severity of accidents to the target population is unknown. The effectiveness of improvement courses for the adult population in general has not, as yet, been evaluated either. The only evidence we have as to the

effectiveness of retraining programs comes from research involving traffic violators. Results obtained by Coppin, et al., (1965), Ellis and Edwards (1976), and Marsh (1978) show that it is possible to reduce the accident rate of licensed drivers through classroom retraining programs.

AARP/NRTA PROGRAM

In 1978, the National Retired Teachers Association and the American Association of Retired Persons (NRTA/AARP) developed a traffic safety program intended expressly for older drivers. In addition to the content that makes up most driver improvement programs, it dealt with such topics as:

- o The characteristics and accident experience of older drivers.
- o Physical changes that relate to driving performance.
- o Hazards to older drivers found in the driving environment.
- o Dealing with local driving problems.
- o License renewal.

A cooperative program of research was undertaken jointly by NRTA/AARP and the National Highway Traffic Safety Administration (NHTSA). Under this program, the NRTA/AARP program, entitled "55-Alive" was introduced in four States: California, Florida, Illinois, and Virginia. Measures of driving experience were administered to drivers prior to and following the course. Similar measures were administered to a control group which had sought to enter the course but whose enrollment was delayed long enough to permit comparison to be made with the group receiving instruction.

The joint effort was intended both to furnish new data concerning the problems and characteristics of older drivers and to provide an evaluation of the 55-Alive course.

PROJECT OBJECTIVES AND ACTIVITIES

The preeminent goal of the project was to determine program design and development guidelines that should be followed in creating optimum training programs for older drivers--programs that would help drivers aged 55 years or more to maintain satisfactory driving performance despite the physiological and other deficiencies associated with aging. As part of the activities undertaken to achieve this goal, the National Public Services Research Institute (NPSRI) provided technical assistance to the ongoing cooperative effort of NHTSA and NRTA/AARP to evaluate the 55-Alive program.

Project staff conducted five major activities within this project:

Review of the Driving Problems of the Elderly--Project staff reviewed prior research into driving problems of the elderly to determine what was known about the accident experience of older drivers, the factors contributing thereto, and the general driving exposure characteristics of elderly motorists. The review was conducted to enable project staff to determine the sufficiency of the assessment instruments to be used in connection with the 55-Alive program to collect necessary information on exposure, accident experience, and personal history.

Review of Older Driver Training Programs--The content of previously developed programs designed to improve the safety of older drivers was reviewed. Preliminary results of this review were used to perform a pre-experiment critique of the 55-Alive program. Final review results served as a basis for general recommendations for the design and development of older driver improvement programs.

Assess the NRTA/AARP Older Driver Retraining Program--Project staff provided technical assistance in the formal evaluation of "55-Alive" and analyzed data collected during the experiment to (1) describe the characteristics of older drivers and (2) determine--to the extent available data would permit--the effect of the 55-Alive program upon those receiving instruction.

Develop a Manual for Elderly Drivers--On the basis of information gained through the preceding three activities, project staff developed a manual expressly for the older driver population that could be widely distributed by a variety of agencies and organizations serving the older community.

Provide Recommendations for an Elderly Driver Retraining Program--Based upon the review of older driver problems and programs, a review of the results of tests administered to older drivers, and new data generated during the project itself, project staff prepared a set of recommendations to guide the development, content, and approach of future programs for retaining older drivers.

Each of these activities is described separately in the remainder of this report.

REVIEW OF DRIVING PROBLEMS OF THE ELDERLY

A literature review was conducted to determine what types of problems impede the safe performance of older drivers. Three types of literature were reviewed:

Analyses of Accidents Involving Older Drivers--These studies (e.g., Planek, et al., 1968; Planek and Fowler, 1969; Case, et al., 1970; State of California, 1975; AMA and AAMVA, 1974; McFarland, et al., 1964; Waller, 1967) were reviewed to determine the types of traffic situations with which older drivers have the most trouble coping and the specific performance errors attributed to older drivers as causal factors in these accidents.

Medical/Traffic Safety Research Reports--These papers (e.g., Allen, 1970; DHEW, 1975; Henderson and Burg, 1974) were reviewed to determine the factors related to the aging process that make driving more problematic for older drivers. Methods of compensating for physical and other limitations associated with aging were also sought in the literature.

Knowledge Test Results--Staff reviewed results of the National Item Bank testing program (Pollack and McDole, 1974), development of tailored license manuals and tests (McKnight and Green, 1976) and a safe driving information distribution system (McKnight and Simone, 1976) to identify the specific information needs of experienced drivers. Emphasis was placed on identifying information deficiencies which, if overcome, could help older drivers cope with their physical limitations and avoid the most critical performance errors and dangerous driving situations.

The results of the literature review, and the uses to which they were put, are described briefly in the following paragraphs.

ELDERLY DRIVER ACCIDENT PROFILE

In many ways, the "typical" accident involving older drivers is not atypical of accidents in general. The majority occur under "ideal" driving conditions--on clear days, on straight, dry pavement. Also fitting into the accident norm for the general driving population is the fact that most older driver accidents occur at intersections, within 15 miles of home.

The older driver accident departs from the norm in several ways, however. Proportionately more (nine out of ten) of the accidents involving older drivers are multiple vehicle accidents. These accidents involve above-average speeds less frequently than similar accidents among younger drivers, with the result that the crashes are less serious in terms of vehicle damage. However, the injury rate of older driver-involved accidents is higher than would be expected, with injuries being more severe than might be anticipated. The greater frequency and severity of injury may be attributed to older person's reduced ability to withstand and recuperate from crash-induced trauma.

Crash-involved older drivers also differ from their younger counterparts in that they are more likely to be held at fault. The most commonly cited performance error among older drivers is "failure to yield." Similar charges common among older, accident-involved drivers are failure to obey traffic signs and signals and careless intersection crossing. Changing direction unsafely represents a second major error for older drivers. Common charges in this area are improper turn, inaccurate turning (especially on left turns), and careless or improper lane changing. A final category of accident-type--careless backing--is very strongly associated with older drivers.

Anecdotal evidence indicates a common performance error to be failure to maintain an adequate rate of speed (i.e., failure to keep pace with traffic). "Common knowledge" also holds that older drivers frequently create accidents by suddenly stopping in the stream of traffic to "get their bearings" or "sort things out" when they realize they have missed a turn. No hard evidence of these specific problems was found in the research reviewed. However, there is some indirect evidence that these popular charges have some foundation in fact. One study cited rear-end collisions as being the second most common type of accident experience among older drivers. While no specific performance error was designated as leading to this type of crash, it seems to be a fair inference that at least some of these crashes occurred from failure to keep pace or from a sudden, unannounced stop or slow down in traffic. Other performance deficiencies--such as tendencies to not look behind frequently, to drive at more hesitant and variable speeds, to accelerate insufficiently to merge with highway traffic, and to pull from the roadside or an intersection stop improperly--have been established as well.

Conspicuously absent from this list of performance errors are the major causal factors cited most frequently for accidents among younger drivers: driving too fast, following too closely and driving while intoxicated.

PHYSIOLOGIC AND OTHER CHANGES ASSOCIATED WITH AGING

Although older drivers are seldom cited for reckless behavior, careless actions--in turning, changing lanes, and crossing intersections--are cited frequently. Careless actions are commonly attributed to inattention. In the case of older drivers, this apparent inattention may actually result from changes associated with the aging process--particularly cognitive and visual limitations.

Cognitive Limitations

Alexander, et al., (1967) assert that driving places critical demands on both short term memory and the ability to integrate and collate information from several sources simultaneously. Both functions are affected by aging, with the result that many older people have trouble retrieving information normally recaptured quickly from short-term memory (Schonfield and Robertson, 1966). Thus, many older drivers may have difficulty processing and retrieving cues to hazardous situations quickly enough to have time to react safely.

Compounding the information processing and retrieval problems is an increased difficulty in filtering out unimportant visual information (Rabbit, 1968). Fixation on irrelevant objects and events can distract the driver; and failure to "screen out" trivia requires the driver to mentally sort through the irrelevant data, thereby complicating and lengthening the task of interpreting critical information.

Visual Limitations

Visual performance is perhaps the most critical sensory area of driving. Virtually all information used in driving is collected with the eyes. Henderson and Burg (1974) have found a correlation between poor visual performance and poor driving performance--as calculated on an accident per vehicle miles driven basis. This correlation was stronger among drivers aged 50 and over than for the two younger age groups examined.

Henderson and Burg established a significant relationship between poor driving performance and the following visual functions:

- o Field of view--ability to notice cues appearing in the peripheral field.
- o Eye movement and fixation--ability to detect objects in the peripheral field, shift gaze to those objects, and identify them.
- o Static acuity--ability to resolve detail in a stationary object.
- o Central angular movement--ability to detect movement approaching from a lateral direction.
- o Central movement-in-depth--ability to perceive rate-of-closure of an object on the basis of increase in image size.
- o Useful peripheral vision--ability to use information collected from the peripheral field of view (without benefit of foveal attention).

Decline in all of these functions has been associated with the aging process.

Also associated with aging are declines in various functions involved in seeing well at night (static acuity in low-light conditions, ability to handle spot and veiling glare). Henderson and Burg speculate that problems in these areas may well contribute to nighttime accidents. An earlier study by Henderson and Burg (1973) also found a correlation between poor dynamic visual acuity and increased accident involvement. Again, degradation of dynamic visual acuity is associated with aging.

Other visual limitations, such as defects in color perception and stereopsis, also may affect driving performance. It remains unknown to what extent, if any, such limitations impede safe driving. However, Nathan, et al. (1963), found that some color defectives take about twice as long to react to some red lights as do those with normal color vision. Allen (1969) suggests that this deficiency may make it difficult to react to tail and brake lights in a timely fashion. Schmidt (1966) suggests that stereopsis may contribute to parking accidents, particularly in low-light level conditions. The extent, if any, to which these limitations impede safe driving is unknown at this time. However, both conditions are definitely associated with aging.

Hearing Limitations

There is no conclusive evidence that hearing limitations in and of themselves, impede safe driving performance. Finesilver (1961), Fisher (1966), and Henderson and Burg (1974) suggest that deaf or hearing impaired drivers are as safe as--and possibly safer than--drivers with normal hearing. Coppin and Peck (1963, 1964), however, indicate that deaf males have more accidents than drivers with normal hearing. In sum, there is no preponderance of evidence to indicate whether or not hearing difficulties are linked to increased accident involvement.

Those who contend that hearing difficulties do not impede safe driving suggest that this is the case because what little bit of information is collected by the ears may be as easily picked up visually by drivers alerted to their auditory limitations. This may not be the case with older drivers, however. Fully two of every five persons over age 65 have hearing problems serious enough to warrant the designation "hearing impaired." The numerous visual problems associated with aging may render these drivers physically incapable of using visual functions to take up the sensory slack of impaired hearing.

Limitations of Movement

Rheumatism and arthritis are much more common in older people than in younger people. Such movement-limiting disabilities may contribute to a tendency to swing wide before turning--a practice which makes the turning movement less physically demanding but which also invites lane-sharing on the part of other drivers. Arthritic joints in the legs or arms may also make it difficult to react quickly to sudden changes in a traffic situation.

Both stiffness in the neck and a propensity toward obesity also have been found to be correlated with a tendency to not make head checks and to not turn the head to check behind when backing. Such physical movements are important to reducing the likelihood of colliding with a vehicle in the driver's blind spot (improper lane change accidents, for example) and backing accidents.

General Physical Condition

Other physical ailments associated with aging include high cholesterol, hypertension, and a variety of cardiovascular diseases. Higher cholesterol levels have been found to be related to lengthier reaction times. Hypertension and cardiovascular diseases frequently require "maintenance" medications that, in themselves, can affect the brain or the general metabolism in ways that may affect driving ability.

Many elderly persons suffer a chronic disease or a combination of several physical problems. As a result, many are continuously under medication or are taking a variety of medicines simultaneously. Many of these medications--separately, or in a synergistic combination--may inhibit the person's mental or physical ability to drive safely.

Compounding the basic danger of driving under the influence of drugs is the fact that older people frequently have unexpected reactions to drugs. For example, a barbiturate may render an older person excitable and irritable rather than calm. Prior experience with a drug provides no reliable basis for predicting effects obtained from future administrations, as elderly people appear to react differently to the same drug more frequently than do younger people.

Similarly, alcohol appears to affect the drivers differently as they age. Older people frequently report that they can't "hold their liquor" like they used to--that smaller quantities of alcohol are sufficient to produce sensations of light-headedness. There is evidence to suggest that older drivers become unsafe at lower levels of Blood Alcohol Concentration. While older drivers appear less likely to drink to excess than younger drivers, smaller amounts of alcohol appear to place them at substantially higher risk. Baker and Spitz (1970) found that among drivers killed in accidents in which they were held to be "at fault," drivers aged 60 or more were less likely than drivers in other age groups to have alcohol in their systems at the time of the crash. However, people in the older group were more likely to have alcohol in their systems at a level below .10% (the level recognized by most States as indicating intoxicated driving) than were other drivers. One of five drivers aged 60 or more were found to have alcohol in their systems, though below the legal limit. An additional 25% had BACs at or above .10%. Data from the Grand Rapids Study (Hyman, 1968) indicate that when drivers drink to excess (BAC .10%+), those aged 55 or more are more likely to be involved in an accident than drivers aged 20-54. Drivers 70+ were found to face a greater risk of accident at BACs of .01-.04% than drivers aged 20-69 faced in the "impairment" range (BACs of .05-.09%).

In sum, it appears that elderly drivers mix drinking and driving relatively infrequently and, when they do, they appear less likely to consume large amounts of alcohol. However, while these drinking habits place the older driver at comparatively small risk of driving while legally intoxicated, it appears that consuming alcohol in relatively modest amounts substantially increases accident risks among older drivers. Some of this may result from a greater opportunity for synergistic interactions among alcohol and medication taken by the drivers. It also may be partially attributable to the general physical degradation associated with aging (deterioration of sensory facilities, lessened resistance).

Finally, loss of stamina or physical strength may contribute to accident involvement among the elderly. Though driving in general does not demand great physical strength, certain maneuvers (e.g., parallel parking) do demand a measure of exertion which may task the capacities of enfeebled persons. Stamina is not commonly required of drivers either. However, on lengthy trips--such as vacation drives--an out-of-condition driver can become susceptible to fatigue and the attendant problems of inattention and delayed reaction.

KNOWLEDGE DEFICIENCIES ASSOCIATED WITH OLDER DRIVERS

On the whole, drivers aged 55 and more appear to be no more or less knowledgeable about safety-related facts than do other age groups. Though relatively few of the 55+ population have been exposed to any formal education program on safe driving (e.g., high school driver education courses, the Defensive Driver Course), most appear to have gained through driving experience as much traffic safety knowledge as is exhibited by younger drivers who have received formal instruction. This is not to say that older drivers have no significant knowledge deficiencies. Rather they are widely deficient in such knowledges. It's just that their deficiencies are not exceptional compared to other age groups.

In terms of knowledge deficiencies, the greatest differences between younger and older drivers arise in two areas:

- o New developments in traffic regulation.
- o New statements of safe driving principles.

Traffic Regulation

New developments in traffic regulation encompass new traffic laws (e.g., Right-Turn-on-Red laws) and infrequently encountered regulatory devices (signs, signals and pavement markings). In the latter category, it should be noted that "newness" relates not to the period of time that has elapsed since the regulatory device was introduced, but to the infrequency with which drivers come in contact with a certain type of device. For instance, directional signals regulating lane use and shared-left-turn lane markings have been around for years. Yet drivers may not encounter them on a daily basis. In consideration of the significantly lower amount and frequency of driving engaged in by older drivers, they have a below-average chance of encountering such devices on a regular basis. Thus, when encountered, these devices are "new" to them, or at least more "new" than they are to people who drive more frequently and extensively. In any event, knowledge testing indicates that older drivers are less familiar with the meaning of such traffic control devices and with relatively new traffic laws.

Safe Driving Principles

Older drivers appear to be as unfamiliar with basic safe driving principles as are novice drivers. They appear to be particularly unaware of "improved" statements of these principles. For example, older drivers are likely to be familiar with principles such as "use your lights from one-half hour before sundown to one-half hour after sunrise" and "follow the car ahead by a distance of one car length for every ten mph." They are more likely to select these responses than responses suggesting more useful, performance-based statements of principles such as "use your lights whenever you have difficulty seeing other cars" and "keep a two-second following distance."

APPLICATION OF REVIEW RESULTS

Results of the literature review were applied to the evaluation instruments--Driver Experience Questionnaire (DEQ) and knowledge test--to be used in the assessment of the 55-Alive program developed by NRTA/AARP.

A DEQ, querying drivers about exposure factors, accident and conviction history, and personal (demographic and medical) characteristics had been previously drafted by NRTA/AARP and NHTSA for use in demonstration presentations of the 55-Alive program. On the basis of its review findings, project staff examined the original DEQ to determine its potential for collecting information that would allow meaningful comparisons between experimental groups and between these groups and the older driver population at large. Due to the tight schedule governing project activities, whole-scale revision was impossible. However, the original DEQ was shortened, and the language simplified to increase the likelihood that the forms would be filled out completely and accurately by the subjects. Dropped from the original draft were items sampling driver experiences which did not appear to be related to critical accident or aging characteristics identified in the literature review.

The knowledge test, also prepared by NRTA/AARP and NHTSA was examined in light of the review of knowledge deficiency research. Items testing knowledges judged to be of low criticality to safe driving were replaced, to the extent possible, with items testing knowledges with a high criticality rating. Of course, as the knowledge test was to be given in conjunction with the 55-Alive program, replacement items were limited to those which sampled critical knowledges which also were covered in the curriculum.

Information gained from all three types of literature reviewed also formed the foundation upon which later project products were built. The review of literature enabled project staff to identify a body of informational content dealing specifically with age-related driving problems and ways of handling them. This body of content served as a basis of recommendations to NRTA/AARP for improvement of the 55-Alive program. Content of the Older Driver Manual and recommendations governing the content of older driver programs in general are drawn largely from the literature reviewed throughout the project.

REVIEW OF OLDER DRIVER TRAINING PROGRAMS

Several safe driving programs for older Americans have been offered during the past twenty years. The content and scope of these programs vary widely. Typically, they provide general advancement instruction, and in some cases, focus on information requirements specific to the older driver population.

REVIEWED PROGRAMS

Documented reports of the following programs were obtained and reviewed during the period March 1979 - March 1980.

<u>Name of Program</u>	<u>Sponsor</u>	<u>Length (Hours)</u>	<u>Year Developed</u>	<u>Still Taught?</u>
Denver Driver Improvement School	Denver Courts	14	1962	No
Older Driver Seminar	New Jersey	8	1963	No
Driving Competencies for the Elderly	State of New York	6	1970	?
"Drive to Survive"	VFW	3	1971	Yes
Defensive Driving Course	Natl. Safety Council	8	_____	Yes
Senior Citizens Traffic Safety Seminar	Automobile Club of So. California	6	late 60s	Yes
"Driving After 50"	Wisconsin St. Patrol	4	1973	Yes
Senior Citizen Driver Education	San Diego County	38	1973	No
Older Driver Refresher Course	Univ. of Michigan	10	1975	?
Senior Driver Improvement Program	Illinois Secretary of State	4	1975	?
Safe Driver Improvement Clinic	St. Petersburg AAA	3	1975	Yes
Licensing Procedures and Driver Improvement	Seaside, Calif. DMV	?	1976	No
Rule of the Road Review Course	Illinois Secretary of State	6	1977	Yes
Seniors Traffic Safety	Cal. Highway Patrol	10	1977	Yes
Senior Adults Traffic Safety and Alcohol	AAA Foundation	1	1978	Yes
The Mature Driver	Mich. St. Univ.	10-12	1978	Yes
"Getting There Safely"	Washington Dept. of Licensing	6-8	?	Yes
Maryland Older Driver Improvement Laboratory Training Program	Univ. of Md.	12	1979	Yes
	Univ. of Akron	12	1975	No
55-Alive/Mature Driving	NRTA/AARP	7-8	1978	Yes

Each of these programs is reviewed in this section of the report. It is important to note that changes in programs still being taught may have occurred since the conclusion of the project review. It also is important to emphasize that comments made relative to the programs are not meant to be evaluative in any way. The purpose of these comments is to provide a review, not to evaluate the characteristics associated with all the various programs.

GENERAL OBSERVATIONS

The majority of safe driving programs for senior citizens provide classroom, rather than behind-the-wheel, instruction. In almost every case, the programs reviewed are (or were) offered to volunteer audiences in the over 50 age range.

The single biggest limitation of the programs developed up to the present time is their lack of guidance to older drivers on how to handle the problems that accompany increasing age. Many of the programs, as mentioned earlier, are simply basic driver improvement courses taught to older drivers. Those that do provide content specific to the needs of older drivers generally limit their coverage to the physical and psychological problems of age. Little attempt is made to (1) translate physical and mental conditions into driving problems, or (2) help guide older drivers in what to do about the problems when they encounter them.

FORMAT AND ORGANIZATION OF REVIEW FINDINGS

The review is presented in the form of an "abstract" for each program. Each abstract contains information (if appropriate and available) on the following program elements:

Introductory Information--When the program was developed, how long it was offered, and the volume of people it reached.

Program Sponsor(s)--Who sponsors the delivery of the program and where it is usually delivered.

Objectives and Program Content--A brief content outline for the program and mention of whether or not the program is based upon development of specific instructional objectives.

Program Structure--Program length, number and length of sessions, and the extent to which the program length and information coverage can be varied.

Methods--Teaching methods employed to communicate program information to students.

Materials--The materials specified for use with the program--instructor, student, audiovisual, and support materials.

Instructors--Those responsible for teaching the program and whether any instructor preparation program is offered.

Incentives--Any special incentives provided for student participation in the program. The primary incentive for attendance in most programs usually involves preparing for successful completion of examination to renew a license. (This section is included only where incentives--e.g., insurance discounts--are provided.)

Costs--This section is included only for programs where students must pay a fee to attend the program.

Assessment Techniques/Tests--Any instruments administered to students before or after the course to determine how much they gained by being exposed to the program.

Effectiveness Evaluation--This section is included if there was an attempt to evaluate the effect of the program on accident/violation rates for those persons exposed to the program.

The review covers the early programs first and progresses to the most recently developed ones. The level of detail provided in describing each of the programs is based upon two basic guidelines: (1) more detail is provided for new programs than for those developed in the early '60s since most of the earlier programs were short-lived; and (2) more detail is provided for those programs that were once offered for a substantial period of time (five or six years).

DENVER DRIVER IMPROVEMENT SCHOOL

One of the first driver safety programs for senior drivers was developed under the direction of Judge Sherman Finesilver of the University of Denver, College of Law. The first class of the Denver Driver Improvement School was held in 1962. Although the program was no longer in operation a few years after that, it is estimated that more than 15,000 people attended the program. This program received national attention as one of the first significant efforts to update the safe driving knowledges of older drivers.

Sponsor

At the time the program was being offered, the Denver Driver Improvement School was part of the City/County government in Denver. It has been said that the program had "no real budget" and was delivered in the evening at vocational school facilities.

Objectives and Program Content

As far as we can tell, there were not any specific instructional objectives outlined for the program content which was based upon accident data produced during those years.

A brief summary of subject areas covered:

- o Pedestrian safety.
- o Winter and mountain driving techniques.
- o State/local traffic law review.

- o Safety belts.
- o Safe driving techniques brought about by new roadways, increased traffic density and higher speeds.
- o Age-related physiological changes affecting driver performance.
- o Testing on driving simulator and reactometer.

Program Structure

The program comprised 14 hours of instruction. The only specification was that those 14 hours be delivered within a period of four weeks.

Methods

The program consisted largely of presentations by various individuals. During each session a question period was held.

Materials

The only description of the Denver program includes mention of "visual aids" and "other materials." Also used was a traffic safety manual--"Safety Tips for Senior Drivers"--designed specifically for the course by Finesilver.

Instructors

The following professionals were responsible for delivering the program:

- o Traffic engineers.
- o Traffic safety professionals.
- o License officials.
- o Doctors (geriatrics, otology, ophthalmology, orthopedic surgery)

Assessment Techniques

A final examination was given at the end of the program. The test covered traffic law. Few failures were reported.

OLDER DRIVER SEMINAR--A NEW JERSEY DRIVER EDUCATION DEMONSTRATION

In November 1963, New Jersey launched an experimental course in driver safety for senior citizens. The course was an outgrowth of the New Jersey Division of Aging's pedestrian safety program for seniors. It was delivered twice on a pilot basis. Although the participating agencies felt the classes were worthwhile, lack of funding prevented the program from continuing.

Sponsors

Sponsors of the program included the following:

- o Division of Motor Vehicles (supplied group leaders)
- o Division on Aging (provided "general administration")
- o Driver Safety Service, Inc. (responsible for development of curriculum and training leaders).

Objectives and Program Content

There is no indication that specific objectives were developed for the program. Content areas included:

- o Updating information on signs, roads, etc.
- o Changes in abilities (eyes, hearing, reaction time).
- o Non-safety attitudes resulting from lack of driver education, changes in cars, etc.
- o Rules of the road and other state traffic regulations.
- o The "Strategic Driving" concept emphasizing:
 - pre-trip planning
 - responding to changes in traffic patterns, new road design, physical abilities
 - necessary compensations
 - safe driving attitudes

Program Structure

The eight-hour seminar consisted of four two-hour sessions.

Methods

The group discussion method was used heavily to examine driver frustrations, limitations, and ways to compensate for them.

Materials

The New Jersey State Driver Manual was used along with vision, auditory, and reaction time testing equipment. The following remarks, taken from the course description, explain why there were no detailed materials for group leaders to follow.

"Since none of the agencies could predict in advance what specific responses and reactions from participants would be, course content was formulated and modified on a week to week basis... . Plans for the general content and structure were outlined in advance, but each session was laid out with alternatives to be used depending on specific reactions and actual group discussion needs."

Selected films from the library of the Bureau of Traffic Safety were used as departure points for group discussion.

Instructors

Older motor vehicle inspectors were selected to teach seminars. They were already trained to deliver a traffic safety seminar for traffic violators. For the majority of the senior seminars, inspectors wore civilian clothing to eliminate the symbol of authority.

Effectiveness Evaluation

A very subjective evaluation of the course was made by examining questionnaires completed by each student at the end of the class.

DRIVING COMPETENCIES FOR THE ELDERLY

Developed by the State of New York in 1970, this particular program has been used on only a limited basis since the early '70s.

Sponsor(s)

The course was developed by the New York State Education Department and distributed to state school districts. The school districts were requested to fund and implement the program in their respective communities.

Objectives and Program Content

No specific instructional objectives are included. The course materials outline eleven topics for presentation. They are:

- o Orientation and survey of driver concerns
- o Self-assessment--psycho-physical testing of students
- o Attitudes and abilities influencing safe driving
- o Ways of compensating for limitations imposed by advancing age
- o Operating on expressways, in congested traffic, in shopping centers, and in rural areas; handling emergencies
- o Advance trip planning
- o Motor vehicle regulations
- o Auto insurance
- o Car maintenance
- o Natural laws and the driver (e.g., road surface, speed selection, inertia, centrifugal force, brake application, stopping distance)
- o Cooperating with highway safety agencies.

Program Structure

The program was designed to cover the eleven topic areas (the last four of which are optional) in six hours of instruction. Aside from this suggestion, length of sessions is left up to those who deliver the program.

Methods

The methods to be used in covering the topic areas are left up to those delivering the program. The instructors may conduct highly presentational or highly interactive sessions. The materials themselves do not provide support for using any one teaching technique.

Materials

A "Guide" was prepared to support delivery of this program. This publication is intended to provide guidelines for the program and is designed for use by:

- o Senior citizens groups
- o Directors of continuing education
- o Driver education instructors

The Guide offers suggestions on how the course can be set-up, a list of resource materials, and an outline of information to be covered under each topic area. It also includes directions for publicizing the course.

Instructors

Since there are no specific lesson plans, this particular course would probably best be delivered by someone with traffic safety and education experience. The guide could be modified or restructured to support delivery by volunteer instructors with no specialized experience.

Assessment Techniques/Instruments

Included in the guide are several instruments designed to assess attitudes, habits, and knowledge. Their use is suggested. No suggestion is made to use the results of these instruments for determining "successful" completion of the course.

DRIVE TO SURVIVE

The Veterans of Foreign Wars developed this course in 1971. It is still being offered by some 1,000 instructors at various VFW posts across the country.

Sponsor(s)

"Drive to Survive" is offered through the VFW Community Service Program. Although the program is open to all citizens, the course is typically delivered to Vets and the membership of organizations like the Ladies Auxiliary.

Objectives

The following content areas make up the course:

- o Local traffic safety statistics
- o National accident statistics
- o Driver factors

--vision

- o Vehicle factors
- o Backing
- o Following distance and tailgating
- o Intersections
 - right and left turns
 - observations and speed adjustment
 - turning into one-way streets
- o Speed adjustments
 - Congested traffic
 - Hills and curves
- o Entering expressways
- o Passing (9 steps)
- o Six conditions affecting safety
 - light
 - weather
 - traffic
 - road
 - driver
- o Accident prevention formula (seeing, understanding, and reacting to hazards)

Program Structure

Total program length is three hours. Taught over a one or two day period, each of the two sessions is approximately 1-1/2 hours long.

Methods

The program is based upon a lecture format, accompanied by a film presentation.

Materials

The "Instructor Kit" provided by VFW headquarters includes the following materials:

- o Instructor Manual (provides a script for instruction to follow for each session)
- o Flip chart and some visual aids
- o Film--"The Smith System"

In addition, the instructor is responsible for obtaining a State driver manual for each student.

Instructors

No specific training program is offered for instructors. It is suggested that qualified DDC instructors, or others with teaching experience, can deliver this program.

THE DEFENSIVE DRIVING COURSE (DDC)

This particular driver safety program has probably reached more senior drivers than any other program developed to date. The National Safety Council's DDC, one of the most standardized safe driving courses, was developed for volunteer audiences in general. It is not specific to any one age group. Nevertheless, many agencies and organizations find it to be a worthwhile program to deliver to interested senior groups.

The National Safety Council has indicated that it plans to provide a modified version of the DDC especially suited to the characteristics of the older driver group.

Program Sponsor(s)

The National Safety Council coordinates with many cooperating agencies/organizations to deliver the DDC across the country. Examples are: State departments of motor vehicles, safety clubs, civic organizations, national/local retired persons organizations.

Objectives and Program Content

Specific objectives are applied to the following content areas:

- o Accident preventability
- o Six conditions of accidents
 - light
 - weather
 - road
 - traffic
 - vehicle
 - driver
- o Review of types of fatal accidents
- o Total stopping distance
- o Two-second following distance rule

- o Elements of defensive driving
 - knowledge
 - alertness
 - foresight
 - judgment
 - skill
- o Accident prevention formula (recognize, understand, act)
- o Strategy of total traffic safety (pre-crash, crash, and post-crash phases)
- o How to avoid a collision with an oncoming vehicle
 - read road ahead
 - ride to the right
 - reduce speed
 - ride to the right off the road
- o Collisions at intersections
 - right of way
 - right and left turns
 - new road signs
- o Steps for safe driving
- o Drinking, drugs and driving
- o Pedestrian accidents
- o Backing accidents
- o Train accidents
- o Bicycle accidents
- o Motorcyclist accidents
- o Animal accidents

Program Structure

The course consists of eight one-hour sessions. Three are some out-of-class assignments completed by the class. There is no flexibility built into the program where length and content coverage are concerned. The NSC requires all instructors to cover specific information according to the outline in the instructor materials.

Methods

The majority of DDC delivery is accomplished through instructor lecture and presentation of information through various films.

Class interaction is limited to specific question/answer periods outlined in instructor materials.

The case study method is also employed to analyze a variety of accident situations.

Materials

Materials for the DDC include:

- o Highly structured Instructor Manual containing:
 - notes and guidelines for delivery of each session
 - specific directions on when to use aids, what questions to ask
- o Student Workbook which is used as integral part of course in class. This manual contains:
 - overview of information taught in class
 - additional information, activities, and tests which parallel each course session
 - supplementary information on subjects not covered by instructor
- o Flipchart
- o Flannel Board (for illustration of traffic situations)
- o Magnetic Chalk Board
- o State Driver Manual
- o Films
 - "Who's to Blame"
 - "The Car Ahead"
 - "The Car Behind"
 - "The Head-On Crash"
 - "The Crossroads Crash"
 - "Passing and Being Passed"
 - "The Mystery Crash"
 - "The Responsible Driver"

Instructors

Volunteer instructors are usually recruited from among the members of cooperating organizations. For this reason the DDC is often delivered to seniors by members of their own peer group.

Each instructor must complete the DDC instructor training program and must be recognized as a certified instructor by the NSC.

Incentives

Various state insurance boards require companies to allow a ten percent insurance premium reduction for those successfully completing the DDC (e.g., Texas, Florida).

Costs

Students are usually required to pay an attendance fee of \$15.00.

Assessment Techniques/Tests

Completion of the quiz and final examination contained in the student workbook are optional. No time is allotted in the course for administration of these tests to students.

Effectiveness Evaluation

A few studies have been undertaken to evaluate the effectiveness of DDC in reducing accident and violation rates of volunteer audiences attending the course. The most commonly-cited study (Planek, Schupack and Fowler, 1972), associated exposure to the DDC with a reduction in self-reported and State-recorded accidents. However, the reductions in State-recorded accidents and violations were not significantly different from those of the control group. There has been substantial criticism of this study. The criticism typically raised questions about the sampling adequacy, research method employed, and interpretations of results.

To date, no large-scale study has been conducted to evaluate the effect of this program on the accident/violation rate of the older driver group.

SENIOR CITIZENS TRAFFIC SAFETY SEMINAR

In the late '60s, the Automobile Club of Southern California was responsible for offering various driver improvement programs to senior citizens in Southern California, and specifically, the County of Los Angeles. Their early program was six hours in length. More recently, together with the LA County Committee on Affairs of the Aging, the Auto Club sponsors a two-hour program. Both programs are described here. The Auto Club has also contributed to efforts by the LA Division of Adult Education to design programs in driver and pedestrian safety for seniors.

Program Sponsors

The Auto Club's program is often co-sponsored through organizations for retired persons and senior citizens groups. Other typical co-sponsors are:

- o Senior citizen recreational centers
- o Retirement centers
- o Women's clubs.

Program Structure

The six hour course was designed to be delivered in three two-hour sessions on three consecutive days. The two-hour seminar is delivered within one meeting.

The Auto Club, upon request, will also offer programs of varying length drawing from content in the six-hour course and recently developed defensive driving materials.

Methods

The majority of the content for the six-hour seminar is presented by one individual. There are, however, discussion periods based upon information covered in the films.

The two-hour seminar involves presentations by a panel of professionals in the field, with discussion encouraged throughout.

Materials

Materials used with the six-hour seminar include the following:

- o Brief Instructor Content Outline, accompanied by administrative information for setting up the seminars.
- o Senior Citizen's Seminar Kits which include pamphlets covering:
 - pedestrian safety
 - defensive driving techniques
 - tailgating
 - seeing and vision
 - first aid
- o Transparencies to support instruction

o Films

- "Dead Right"
- "I'm No Fool as a Pedestrian"
- "City Driving Factors"
- "E V O C"
- "Smith System"

Materials supporting the two-hour seminar are:

- o Brief content outline and information on goals, equipment and facilities.
- o Testing devices to measure reaction time, muscular coordination, depth perception, and glare recovery.

Instructors

The six-hour seminar is delivered by a traffic safety professional--usually a representative of the Auto Club--and a guest speaker from the State Department of Motor Vehicles.

The two-hour program assumes a panel format composed of the following individuals:

- o Law Enforcement Officer,
- o Department of Motor Vehicle Representative,
- o Traffic safety educator,
- o Representative of the insurance industry,
- o Representative of the Auto Club.

Assessment Instruments/Effectiveness Evaluation

There are no formal instruments used to measure level of knowledge gain or attitude change. No effectiveness evaluation has ever been conducted for either program.

DRIVING AFTER 50

At the request of senior citizens, in 1973, the Wisconsin State Patrol began offering this program. Still delivered to meet expressed needs, it is estimated that the course has reached 10,000 older drivers.

Sponsor(s)

The course is sponsored solely by various community and state facilities.

Objectives and Program Content

The major objective of the program is to establish a positive relationship between enforcement and senior citizens. Content includes:

- o Problems facing older drivers
- o Review of signs and pavement markings
- o Turning
- o Signalling
- o Vehicle factors
- o License restriction for physical defects
- o Vision testing
- o Driver factors (medication, inattention)
- o Auto insurance
- o License examination procedures

Program Structure

The only specification provided in materials is a total program length of four hours.

Methods

Program delivery consists of lecture and some question/answer periods.

Materials

Program materials include:

- o General Content Outline
- o Slide presentation on signs and pavement markings
- o State Driver Manual

Instructors

The majority of content is covered by a State patrolman, along with short presentations made by an insurance agent and driver license examiner.

SENIOR CITIZEN DRIVER EDUCATION

In 1975, San Diego County (California) began offering this course. There was no record of the course being offered after 1977.

Program Sponsor(s)

The course was sponsored by the LaMesa Recreation Department and the Adult Education Department of the Grossmont Unified School District. It was taught at a nearby recreation center.

Objectives and Program Content

Program materials included broad program objectives and specific objectives for each lesson. A brief outline of content is as follows:

- o The driving privilege
- o Keeping physically fit
- o Effects of alcohol and drugs on driving
- o Car maintenance
- o Natural forces affecting safety
- o California vehicle code
- o Enforcement and the courts
- o IPDE process
- o City driving
- o Expressway driving
- o Adverse driving conditions
- o Traffic engineering

Program Structure

Total course length was 38 hours. Students attended a 2-1/2 hour session once a week.

Methods

Although the program was lecture-based, there were provisions for group discussion periods and several demonstrations.

Materials

In information provided on the course mention was made of the following materials:

- o Charts
- o Motion pictures
- o Slide presentations
- o Magnetic boards
- o Driver education textbook
- o California driver's handbook

Instructors

This course was delivered by trained driver education instructors and guest speakers.

OLDER DRIVER REFRESHER COURSE

This program was developed and field tested in 1975 by the University of Michigan Institute for Gerontology. It was designed for use by all States.

Sponsor(s)

Developers of this course recommended that the course be delivered through community service organizations or departments of motor vehicles.

Objectives and Program Content

There are no specific instructional objectives for each program lesson. Content includes:

- o Self assessment of driving problems
- o Road signs, signals, markings
- o Other road users
 - bicyclist and motorcyclist
 - pedestrian
 - school bus
 - animals
 - emergency vehicles
- o Intersections
 - right of way
 - turns
 - blind spots

- o Rural and freeway driving
- o Two-Second following distance
- o Hazard perception
- o Night driving
- o Adverse weather conditions
- o Car failure
- o Safety belts
- o Local problem areas
- o License renewal process

Program Structure

Total program length is 10 hours. It is suggested that the program be delivered in five two-hour sessions. The program is designed in one-hour instructional blocks to allow for varied delivery formats.

Methods

The lessons are delivered through a combination of lecture, discussion, and demonstration.

Materials

Materials used in support of the program include:

- o Instructor Handbook including:
 - background information on older drivers
 - preparatory information for instructors
 - detailed lesson plan
- o Slide/tape presentation on the older driver
- o Perceptual skill slides
- o Slides depicting local traffic problem areas
- o State driver manual
- o List of suggested handouts
- o Five self-assessments to be completed by students

Instructors

Materials specify that the program be delivered by a professional driver training instructor.

SENIOR DRIVER IMPROVEMENT PROGRAM

The first of two programs developed by the Illinois Secretary of State's office, this program was offered in 1975.

Program Sponsor(s)

The program was developed under the administration of Secretary Howlett and delivered through a group of county senior volunteer programs.

Objectives and Program Content

There were specific instructional objectives for each lesson. Content for lessons assumed the following organization.

- o Orientation and review of older driver problems and characteristics
- o Driver responsibility
- o Expressway driving
- o Pedestrian safety
- o How the driving task has changed
- o State driving rules and regulations
- o Driving attitudes
- o Identifying and compensating for physical, mental and emotional limitations

Program Structure

Total program length was four hours, and it was recommended that the lessons be delivered in two or four sessions.

Methods

The majority of the course involved small group interaction activities moderated by the instructor. The lecture method was specifically not recommended.

Students were exposed to information through the study guide, instructor, films, etc. Then students would apply/discuss this information in small "buzz" groups triggered by questions from the instructor. Students also created traffic case histories and engaged in role-playing exercises.

Materials

Delivery of the course was supported by these materials:

- o Films
 - "We Drivers"
 - "Signs and Lines"
 - "Freeway Phobia"
- o Chalkboard
- o Transparencies and overlays
- o Flash cards
- o Charts
- o Student Study Guide, which is used as an integral part of classroom instruction, and for reading/study assignments. The Guide consisted of:
 - background information on problems of older drivers
 - information paralleling each of the classroom lessons
 - study questions
 - supplementary information not covered in class
- o Coordinator Lesson Plans, which contained:
 - detailed activity outline, instructional aids and objectives for each lesson
 - support information for conducting lesson activities
 - scripts for all audiovisual presentations

Instructors

There was no specific instructor training program. A good amount of information in the coordinators' book constitutes instructor preparatory information. For this reason, it would be possible for an interested individual with teaching experience to successfully conduct the program.

Assessment Technique/Test

Pre and final evaluation instruments were completed by each student. An exit interview was also conducted to determine student reactions to the course.

SAFE DRIVER IMPROVEMENT CLINIC

In 1975 the St. Petersburg Chapter of the Florida AAA begin offering this clinic to senior citizens in surrounding communities.

Sponsor

The Auto Club directly sponsors the program, and delivers it at a variety of community facilities and recreational centers.

Objectives and Program Content

The clinic covers information on the following content areas:

- o New road signs
- o School bus stopping requirements
- o Drinking and driving (BAC and DWI)
- o Local changes and needed improvements to roadways
- o Freeway driving
- o Hydroplaning
- o Avoiding collisions
- o Two-second following distance rule
- o Negotiating curves safety
- o Passing procedures
- o Safety belts
- o Intersections (observation patterns, right turn on red, making safe turns)

Program Structure

Total clinic length is three hours.

Methods

The clinic is based on a lecture format with opportunity for short discussion breaks.

Materials

Clinic materials include:

- o Safety Fact Sneets
- o Information on Florida point system and license re-examination
- o Student Workbook provided for the purpose of note taking
- o Instructor Booklet providing a brief outline of content
- o Florida State Driver Manual
- o Films
 - "Drink, Drive, Rationalize"
 - "Drunk Drivers"
 - "Emergencies In The Making"
- o Pamphlets on
 - Freeway driving
 - Hydroplaning
 - Managing time and space
 - Safety belts

Instructors

The clinic is delivered through a rotating staff of 12 volunteer instructors. It is taught on a team-teaching basis.

LICENSING PROCEDURES AND DRIVER IMPROVEMENT

This program was developed in 1976, by the Seaside California Department of Motor Vehicles. There is no evidence of this program still being offered.

Program Sponsor(s)

The program was jointly sponsored by the DMV and the Seaside Alliance On Aging. It was delivered through nearby college older adult education programs.

Objectives and Program Content

The purpose of the program was to prepare drivers for renewal testing. The program included a tour of the DMV facility and an explanation of license renewal procedures. A discussion then followed on basic rules of the road.

Program Structure

No length of time was specified for the program.

Materials

The primary classroom aid that was utilized in the program was the State Driver Manual.

Instructor

The course was taught by a trained driver education instructor.

RULES OF THE ROAD COURSE REVIEW

In 1977, the Illinois Secretary of State's office began offering this program to older drivers. The program is designed to provide an update for older drivers about to come up for renewal testing. This program has reached approximately 50,000 persons and is still offered widely in Illinois.

Program Sponsor(s)

Secretary Dixon's office provides the materials and coordination for this program which is delivered through senior citizens clubs and retired persons organizations.

Objectives and Program Content

The first part of this program is based upon a review of the State Driver Manual. Then a practice test is given and the test is corrected and discussed in class. Major content areas covered are briefly summarized as follows:

- o Physical/mental changes that come with age
- o Review of license testing procedures
- o Review of traffic signs and markings
- o Right and left turns
- o Passing
- o Speed limits
- o Implied consent

Program Structure

Total course length is six hours--taught in three sessions.

Methods

A large portion of the program is made up of presentations of information to the class. Interspersed are question/answer periods where students are provided an opportunity to discuss information.

Materials

Course materials include:

- o Discussion Leader's Guide containing:
 - course policies
 - instructor script
- o State Driver Manual
- o "Other" charts (unspecified)
- o Assorted safety driving pamphlets

Instructors

Instructors are recruited from the various service groups through which the program is delivered. The Secretary's office conducts a training program for instructors.

SENIORS' TRAFFIC SAFETY

Established in 1977, by the California Highway Patrol, this program was first delivered in the Hemet-San Jacinto Valley. In 1978, the CHP began offering the program to surrounding communities.

Program Sponsor(s)

This program has been delivered within mobile home parks and retirement communities, using available facilities. It may often be part a physical education class for seniors.

Objectives and Program Content

Overall course objectives are listed in the introduction to the material. Program content includes:

- o Overview of older driver accident involvement
- o Driving emergencies
- o Collision prevention measures
- o Common problems shared by older drivers
- o Rules of the road
- o Stopping distance
- o Local parking lots
- o Turning across local highways

Program Structure

The maximum course length is 10 hours. It is usually taught in four sessions.

Methods

The program is largely presentational in nature, including some demonstrations. Discussion periods are conducted on the basis of information covered in audiovisual presentations.

Materials

Program materials include:

- o A brief instructor content outline
- o Charts on accident statistics
- o Assorted pamphlets
- o California Vehicle Code
- o Reactometer
- o Films
 - "Things Aren't What They Used to Be"
 - "Smith System"
 - "Final Chapter"

Instructors

The program is delivered by a representative of the California Highway Patrol, who is often assisted by an AAA representative.

Effectiveness Evaluation

Although no formal evaluation has ever been conducted, information from the CHP indicates that for this area the "at fault" involvement of seniors began to decrease substantially in 1977. They attribute this trend to media coverage on safe driving for seniors, as well as delivery of the course for this driver group.

SENIOR ADULTS, TRAFFIC SAFETY AND ALCOHOL

In 1978, the American Automobile (AAA) Association Foundation developed this special traffic safety alcohol program with technical assistance from the Teachers College at Columbia University. The program focuses on alcohol consumption, and its interface with safe driving and pedestrian safety. The program is currently offered across the country. A full account of the program and the research leading to its development is available through the AAA Foundation.

Sponsor(s)

The program materials are distributed through the AAA Foundation. The program is delivered by local AAA Clubs within retirement communities, adult centers, etc. As with most senior programs, the AAA program is especially popular in the "sun belt" states.

Objectives and Program Content

There are specific behavioral and attitudinal objectives for the program based upon pre-development research. Content covered in the program includes:

- o Alcohol and its effect on the body
- o Effect of alcohol on walking and driving
- o Consequences of DWI
- o Dangers of mixing alcohol and drugs
- o Blood Alcohol Level
- o How to/how not to sober up

Program Structure

The program takes one hour to deliver. Program materials can be used exclusive of each other to supplement other programs for this group.

Methods

The majority of the program is made up of student-instructor interaction and a film presentation.

Materials

Materials include:

- o Detailed Program Leader's Guide containing:
 - outline for instruction
 - script for film
 - text for student written material
 - questions/answers for discussion periods
 - guideline for conduct of group discussion
 - planning information
 - hard copy for charts
- o Animated film on older adults and alcohol
- o Student pamphlet designed to serve as a supplement to the film

Instructors

Even though extensive background information is provided in the Program Leader's Guide, it is suggested that someone with traffic safety/alcohol education background be involved in teaching the program. This person could be combined with a senior representative from the sponsoring organization (team teaching).

Effectiveness Evaluation

The program was widely field tested, and controlled administration of pre/post test batteries showed significant positive changes in knowledge, attitudes, and behaviors for those exposed to the program.

THE MATURE DRIVER

This course was developed in 1978 by the Michigan State University Highway Traffic Safety Center. Still offered, it is dedicated to preparing older drivers for licensing renewal exams.

Sponsor(s)

The course is sponsored and coordinated through the Highway Traffic Safety Center and is delivered through retired persons' and civic organizations.

Objectives and Program Content

Activities and lessons are based strictly upon the state driver manual. A brief summary of information included in the program is as follows:

- o Obtaining a drivers license
- o The driving privilege
- o Insurance and registration
- o Rules of the road
- o Freeway driving
- o Emergencies
- o Sharing the road with other vehicles

Program Structure

Total course length can range from 10-12 hours. A common practice has been to offer the program in two-hour sessions, twice a week, for three weeks.

Methods

Instruction is handled through reading assignments and testing. The class takes a pre-test on a specific subject covered in the driver manual, then they are assigned to read the information. A post-test on the information follows. Each content area is taught this way--a total of 10 units. The instructors' responsibility centers on clarifying information in the manual, and providing background information on correct test answers.

Materials

Course materials include:

- o State Driver Manual
- o Instructor Book containing all tests and scoring sheets, and an explanation of each question

Instructors

This course is delivered by older adults (e.g., retired teachers). There is no formal training program.

GETTING THERE SAFELY

This program was developed by the Department of Driver Licensing in the State of Washington. The program was initially administered on a pilot basis in one county. It is currently offered throughout the state.

Sponsor(s)

The program is co-sponsored through the Department of Licensing and community service organizations in each county.

Objectives and Content

Program materials contain broad instructional goals. The specific content for the program is as follows:

- o Identification of common driving problems and tips for handling them
 - intersections
 - night driving
 - heavy traffic
 - mountain trips
 - passing
 - parking lots
 - freeways
 - adverse weather conditions
- o The Smith System
- o Narrative Driving Technique (students narrate film footage of traffic situations)
- o Common physical/psychological problems
- o Hazard perception
- o Accident experience of older drivers

Program Structure

Total program length is 6-8 hours. The program is typically delivered over a two-day period time with morning and afternoon sessions.

Methods

"Getting There Safely" relies heavily on the small group discussion method. Problem-solving situations are also analyzed using chalkboard diagrams.

Materials

The following program materials are used:

- o Instructor Manual containing:
 - some guidelines on managing group discussions
 - discussion questions
 - unit-by-unit description of activities
- o State Driver Manual
- o Films
 - "The Smith System"
 - "Narrative Driving Technique"
- o Shell's "Perception of Driving Hazards" filmstrip
- o Charts on accident statistics

Instructors

Volunteer instructors are recruited through the Department of Licensing. The Department also offers a training program specific to this course.

A local pharmacist also serves as a guest speaker to cover content on drugs and driving.

Effectiveness Evaluation

The Department of Licensing is conducting a 12-month follow-up study by taking a look at official driver records for those exposed to the program.

MARYLAND OLDER DRIVER IMPROVEMENT

The University of Maryland Safety Center--under contract to the Maryland Department of Transportation--began developing this program in 1979. The curriculum was created around existing materials, many of which have been field tested in driver improvement settings. The program was initially delivered to volunteers recruited by the University of Maryland.

Sponsor(s)

The University of Maryland assumed responsibility for delivering the program in its early stage. The Safety Center will work through the Maryland Department of Education, the Motor Vehicle Administration and the Maryland Center on Aging to eventually extend the program to the community level around the state.

Objectives and Program Content

Specific objectives are provided for each lesson. The program covers the following information:

- o Characteristics of older drivers
- o Defensive driving concepts
- o Traffic law review and license renewal information
- o Pedestrian safety
- o Observation techniques (also vision and hazard perceptions)
- o Night driving
- o Communication principles
- o Adjusting speed
- o Keeping a space cushion around the car
- o Driving emergencies and safety belts
- o Car maintenance
- o Alcohol, drugs and driving

Optional instruction includes:

- o Driving simulator lessons
- o On-street and off-street driving range activities (skill exercises, parking, collision avoidance, etc.)

Structure

Total program length is 12 hours, consisting of six two-hour sessions. It is recommended that the full program be delivered, but the lessons are modularized such that only portions of the program may be delivered.

The optional behind-the-wheel sessions involve an additional two hours of training.

Methods

Techniques for delivery of information are:

- o Presentation of information through instructor and audiovisuals
- o Problem-solving activities
- o Short question/answer instructor-moderated discussion
- o Student reading assignments for each class meeting

Materials

Program materials include:

- o Instructor Materials
 - detailed outline for each lesson
 - general guidelines for conduct of course and appropriate use of materials
 - instructional materials which have been prepared in the past to accompany the various audiovisual presentations
 - resource list for instructor
- o State Driver Manual
- o "How To Drive" Manual (AAA)
- o Films
 - "Final Factor"
 - "Things Aren't What They Used To Be"
 - "To Drive At Night"
 - "Senior Adults and Alcohol"
- o Slide presentations (from University of Michigan Program)
 - "The Older Driver"
 - "Hazard Perception"

- o Slide/Tape Presentations (from AAA Driver Improvement Program)
 - "Seeing"
 - "Communicating"
 - "Adjusting Speed"
 - "Keeping a Margin of Safety"
 - "Driving Emergencies"
 - "Your Car"
 - "You The Driver"
- o Pamphlets on
 - Safety belts
 - Consumer protection information on buying and maintaining automobiles
 - Freeway driving
 - Margin of safety
 - Alcohol and driving

Materials for optional behind-the-wheel sessions include:

- o Aetna-Allstate driving simulator films and equipment
- o Materials for setting up and conducting off-street and on-street driving range activities

Based upon the initial piloting of the program with approximately 100 students, the course will be revised. This will probably involve the elimination/addition of instructional material.

Instructors

In the beginning, the program will be delivered by traffic safety professionals and a few individuals from traffic safety clubs. Eventually the University of Maryland intends to recruit instructors from the student population and departments of driver education in the school systems. Plans call for 50-60 instructors to be trained in delivery of the program.

THE UNIVERSITY OF AKRON LABORATORY TRAINING PROGRAM

This particular training program represents a departure from the traditional classroom instructional programs reviewed in this report. For that reason, and due to the nature of the program itself, the review format--content, structure, materials, etc.--will not be used in discussing the characteristics of the program.

During 1975-1978 the National Retired Teachers Association and American Association of Retired Persons (Andrus Foundation) provided funds to the University of Akron to develop a training program demonstrated to be effective in improving the performance of older drivers.

The University developed a laboratory training program where skills were improved by subjecting individuals to various problem-solving situations and testing instruments. The program was designed to improve performance on aspects of selective attention, perceptual style, and perceptual motor reaction patterns--aspects which are predictors of automobile accidents. The course consisted of 12 hours of laboratory diagnostic testing and training procedures. The actual training program consisted of 13 modules delivered over a two-day period. The modules were directed at improving "information processing style." The skills needed for good information processing style were programmed into various exercises (sequenced from simple to complex) which each student completed.

The Akron program proved to be significantly effective in improving performance of older drivers. However, due to program requirements for a sophisticated laboratory setting and substantial administration time, to this date the program has not been instituted elsewhere.

55 ALIVE/MATURE DRIVING

This program was developed in 1978 by the National Retired Teachers Association and the American Association of Retired Persons(NTRA/AARP). "55 Alive" is based upon prior older driver research and programming initiatives.

Sponsor(s)

The program is delivered through NRTA/AARP Chapters in a variety of community facilities. Due to NRTA/AARP's widespread membership and network of chapter activities in other program areas, it is anticipated that "55 Alive" will eventually be offered nationwide.

Objectives and Program Content

There are no specific instructional objectives for lessons making up the curriculum. Program content includes:

- o Background of older driver characteristics and accident experience
- o Physical changes that relate to driving performance (vision, hearing, reaction time, medication)
- o Common hazards (encountered in the driving environment)
- o Rules of the road (right-of-way, turns, signs, markings, parking, passing)
- o Freeway driving
- o Driving emergency techniques
- o Adverse driving conditions (weather, night driving, rush hour driving)
- o Other road users (pedestrians, bicycles, motorcycles, trucks, etc.)
- o Local driving problems
- o License renewal

Program Structure

Total program length is 7-8 hours, which is broken down into six sessions. The suggested format for program delivery involves teaching three sessions per day for two days. It is suggested that the course be delivered on two consecutive days.

Methods

The program consists largely of instructor presentation from a script. There are, however, structured small group discussion periods throughout the program, and student-instructor interaction based upon slide presentations. Built into the program is an optional presentation by an ophthalmologist or optometrist.

Materials

Materials used in support of "55 Alive" are:

- o Program Leader's Guide which contains
 - course implementation packet (support materials, administrative aspects of program)
 - lesson plans for each session (detailed script with instructor guides for managing interaction and use of instructional aids)
- o Introductory slide presentation
- o Hazard perception slide series
- o State Driver Manual
- o Student workbook which parallels each of the sessions

Instructors

Volunteer instructors are recruited from NRTA/AARP membership. An extensive training program is provided by NRTA/AARP staff to review material, methods and administrative details associated with effective delivery of the program.

Incentives

One feature of the program involves offering students who participate in and complete the program a 10% automobile insurance discount. NRTA/AARP has sought the support of many insurance companies toward this end. At least one company now offers the discount to seniors completing the program.

Cost

Each student is charged \$3.00 to support the cost of materials.

Effectiveness Evaluation

A formal experimental evaluation of this program was conducted by project staff, as described in the next section of this report. It should be noted, however, that prior to the commencement of the formal evaluation, project staff conducted an in-depth review of all program materials and monitored instructor training sessions and pre-pilot administrations of the program among older drivers. NRTA/AARP was provided with a critique of program content, materials, and methods. Many of the alterations suggested have now been incorporated into the program, with the result that the edition of "55-Alive" now being offered--though substantially the same program--does differ to some degree from the program delivered during the formal evaluation period.

ASSESSMENT OF THE NRTA/AARP OLDER DRIVER RETRAINING PROGRAM

This section describes the methodology used to evaluate the "55-Alive" program developed by NRTA/AARP and the results of that evaluation. Conclusions drawn from this study also are presented.

A sample of drivers belonging to NRTA/AARP in the States of California, Florida, Illinois, and Virginia was solicited for participation in the 55-Alive program. The total sample was divided into Treatments and Controls. Treatments were enrolled immediately while Controls were told that they could not enroll for at least one year. Both groups completed a Driver Experience Questionnaire describing the nature of their driving practices, as well as a written knowledge test prior to the beginning of instruction. One year later, both instruments were administered again.

The following discussion focuses on the nature and adequacy of the driver sample, the administration of the 55-Alive program, administration of the Driver Experience Questionnaire and written examination, and the analysis of data obtained through administration of the measures.

STUDY SAMPLE

So far as the data collection effort is concerned, two samples can be identified:

Pre-Program--The sample of individuals from which data were collected prior to administration of the 55-Alive program.

Follow-up--The sample from which data were collected one year following administration of the 55-Alive program.

Pre-Program Sample

The initial study sample was the entire membership of NRTA/AARP in the four States in which this study was conducted. A solicitation was sent to each member as a part of the normal membership mailing. The solicitation apprised the membership of the nature of the 55-Alive program and the study that was to take place. All were informed that respondents would be randomly divided into Treatments and Controls and that those assigned to the Control group could not receive instruction during the first year. Applications for enrollment were received with that understanding.

Certain of the more remote geographical areas could not be serviced with instruction without requiring enrollees to travel long distances. To prevent drivers in these areas from bringing down the participation rate, applications from these areas were eliminated from the experimental sample.

All enrollment applications were randomly divided into Treatments and Controls. The sample was first stratified by geographical area (using ZIP code) to render the two samples similar with respect to factors related to geography. Within geographical data, the sample was further subdivided by sex.

Out of 10,257 Treatments invited to participate in the 55-Alive program, 3,933, or 38.3%, actually did. Since the data collection instruments were administered during the course, 3,983 represents the Treatment sample size so far as pre-program data collection is concerned. Of the 10,257 Controls who were sent data collection instruments, 5,624, or 54.8%, returned usable data. The pre-program sample for the Controls is, therefore, 5,624. The total sample was 9,557.

Because of the shrinkage that took place, the final samples cannot be considered random. Indeed, analysis of data obtained from the two groups, as described under "Program Effects," disclosed statistically significant differences on a number of variables.

Follow-up Sample

Before the follow-up data collection effort began, matched Treatment and Control samples of approximately equal size were created. This was done by selecting out Controls in such a way as to match the two groups on the basis of geographical area of residence and prior traffic accidents (as reported in the Driver Experience Questionnaire). All of the drivers in the Treatment group were sent a follow-up DEQ and knowledge test one year following completion of the training program. At the same time, a driver in the Control group from the same geographical area was also sent the same measures. The follow-up mailout yielded a response of 58% and 64% for Treatments and Controls respectively. A second mailout was made to all drivers not responding to the initial mailout. This brought the total response to 70.6% for the Treatments and 71.2% for the Controls.

The numbers of drivers solicited and responding in each of the samples, broken down by State, are presented in Table 1.

TABLE 1
SIZE OF SAMPLES BY STATE

SAMPLE	California		Florida		Illinois		Virginia		Total	
	T	C	T	C	T	C	T	C	T	C
<u>Pre-Program</u>										
Solicited	3400	3400	3108	3108	1075	1075	2674	2674	10,257	10,275
Responded	1163	1972	1737	1412	296	564	737	1676	3,933	5,624
Percent	34.2%	58%	55.8%	45.4%	27.5%	52.4%	27.6%	62.7%	38.3%	54.8%
<u>Follow-up</u>										
Solicited	982	961	1253	1170	237	243	711	783	3,183	3,107
Responded	711	773	835	921	161	202	543	316	2,250	2,212
Percent	72.4%	80.4%	66.6%	78.7%	67.9%	83.1%	76.4%	43.1%	70.6%	71.2%

Adequacy of Sample

The adequacy of the sample from whom pre-program and post-program data were collected can be examined in terms of size, representativeness, and group comparability.

Size

The adequacy of the sample from which both pre-program and post-program data were collected--2,250 Treatments and 2,212 Controls--must be assessed in terms of specific purposes. For pure description of the characteristics of older drivers, it is more than adequate. It is also adequate for assessing program-produced changes in most of the performance-related variables reported upon, including mileage, trip characteristics, and ease of driving in various environments.

Where the sample size falls short is in its ability to detect any program-produced changes in accidents or traffic violations. Because both are relatively infrequent events, particularly among older drivers, an extremely large sample of individuals is necessary to obtain an adequate sample of accidents and violations. The initial samples of over 10,000 drivers in each group would have been adequate to establish the significance of any reduction in accidents and violations that was great enough to cover the cost of the program. However, the loss of approximately 78% of the initial solicited sample left it far too small to be certain of detecting a true effect if one were produced.

Representativeness

It should be noted that the sample was selected for its accessibility rather than its representativeness. However desirable a truly representative sample of older drivers might be, it has not been possible as yet to secure from such a sample the information sought.

None of the samples are representative of any definable population of drivers. While drivers holding membership in NRTA/AARP may be representative of the older driver population, those within the membership who respond to a solicitation for a driver improvement program are doubtless a biased sample of the NRTA/AARP membership. Additionally, those who actually participate to the extent of attending a course and by returning a questionnaire and knowledge test are doubtless a biased sample of those responding to the solicitation. There would be no way to define the final population in any general terms.

The fact that the study sample is not representative of any definable population of older drivers is not a significant obstacle to the attainment of study objectives. While the amount and type of driving done by NRTA/AARP members may differ from that of older drivers in general, there's no reason to expect that the types of problems they encounter or the types of accidents in which they are involved are materially different. There is even less reason to believe that the effect of the 55-Alive program in producing changes in driving would differ from some other population.

Comparability

The Treatment and Control groups in the original solicitation, having been randomly assigned, were comparable within the laws of chance. However, the samples from which data were obtained were not. The low rate of response to the initial solicitation allowed substantial differences to arise between the two groups. The matching process that occurred prior to the followup solicitation restored comparability on the matching variables. However, it did not eliminate differences on other variables. The nature of the residual differences is described later in the "Program Effects" section. The high rate of response to the post-program solicitation (aided by a follow-up mailout) helped to maintain the degree of comparability achieved through the matching process.

The loss of randomness destroyed the comparability of the two groups. No matching process could totally restore comparability to the extent necessary to permit experimental comparisons to be made between the two groups. It became apparent that the only way in which some of the effects of the 55-Alive program could be determined was through a quasi-experimental pre-/post-comparison within the Treatment group. In such a comparison, the Control group, while no longer qualifying as a true experimental Control, helped by identifying changes brought about by factors outside of the experiment. A comparison of these changes with those achieved within the Treatment group would help to isolate the effects of the program. These comparisons are discussed more fully in the "Program Effects" section.

PROGRAM ADMINISTRATION

Instructors for the "55-Alive" program were selected on a volunteer basis from local NRTA/AARP chapters in each of the four States involved in the evaluation effort. These instructors were trained to deliver the program by members of the national staff of NRTA/AARP. Each instructor retained responsibility for all phases of the instructional effort including the procurement of training facilities, scheduling of training activities, recruitment of students, and administration of all data collection instruments. Where appropriate, assistance in carrying out these activities was provided by representatives of NRTA/AARP.

Training materials were provided by NRTA/AARP. NPSRI was responsible for distributing to the instructional staff the data collection instruments required to evaluate program effectiveness. These included:

- o Pre- and post-knowledge tests.
- o Driver Experience Questionnaires (DEQs).
- o Instructions for administering data collection instruments.
- o Self-addressed envelopes for returning completed instruments and class rosters to NRTA/AARP.

Instructors were initially supplied with materials sufficient to conduct three classes. Additional materials were supplied on an "as-needed" basis. As completed evaluation instruments were received by NRTA/AARP, they were cataloged and forwarded to NPSRI/TTI for processing. By June of 1979, instruction in the "55-Alive" program had been initiated in each of the four evaluation States. All instruction was completed by December of 1979.

DATA COLLECTION INSTRUMENTS

Two pencil and paper instruments were used to collect evaluation data from treatment and control group members:

- o Driver Experience Questionnaire--A general inventory of overall driving patterns.
- o Knowledge Test--A measure of general knowledge of safe driving practices.

Driver Experience Questionnaire

The DEQ was initially developed by NHTSA and NRTA/AARP prior to the evaluation effort. NPSRI project staff members subsequently pilot tested this version and initiated a number of changes in format designed to improve the accuracy of responses and the efficiency with which the questionnaire could be completed. Topic areas addressed in the 48 items comprising the final version of the DEQ included:

- o Driver Characteristics--such as age, sex, educational level, general health, etc.
- o Vehicle Use Patterns--including annual mileage, trip purpose, and other use characteristics.
- o Driving Problems--related to specific difficulties encountered when driving at night, in poor weather, congested areas, etc.
- o Accident and Conviction Involvement--during the previous three years, specific types, perceived contributory factors, etc.

A copy of the DEQ is included in Appendix A of this report.

Knowledge Test

This test consisted of 25 multiple-choice items addressing content contained in the "55-Alive" training program. Each item contained four alternative responses, which were pre-tested by the project staff and, where necessary, revised to improve readability and accuracy. General content areas addressed in this instrument included:

- o Safe Driving Practices--as in selecting proper speed for conditions, observing, and communicating intentions.
- o Traffic Rules and Regulations--regarding right of way, signs, signals, and markings.
- o Hazardous Driving Situations--their recognition and appropriate response.
- o Effects of Aging on Driving--including vision, audition, response time, etc.

Appendix A contains a copy of the knowledge test. The same form was used in all administrations; the item order was changed to minimize the effects of recall.

Administration of Data Collection Instruments

Data instruments were administered in pre-, post-, and followup versions as depicted in the following table:

<u>Instrument</u>	<u>TREATMENT</u>	<u>CONTROL</u>
Knowledge Test		
o Pre	X	X
o Post	X	
o Followup	X	X
DEQ		
o Pre	X	X
o Followup	X	X

Pre Administrations

Pre administrations of the DEQ and knowledge test for treatment group members were accomplished by members of the NRTA/AARP instructional staff. Both instruments were administered during the initial training session, prior to beginning instruction. The pre-administration of these instruments to members of the control group was coordinated through NRTA/AARP national headquarters staff, their preparation for mailing by NPSRI and TTI. Mailouts to control group members in each of the evaluation states were timed to coincide with the instructional effort to remove any possibility of temporal bias.

Post Administrations

Only the knowledge test was administered as a post test, and only to members of the treatment group. Members of the instructional staff administered the knowledge test as the last step in conducting the training program.

Follow-up Administrations

Follow-up administrations of the knowledge test and DEQ were initiated approximately 14 months subsequent to the date of training for treatment group members, and 14 months subsequent to the date of completion of the pre versions for control group members. All follow-up administrations were conducted via mail thru NRTA/AARP. Prior to this administration, a number of changes were instituted in the DEQ to improve the overall efficiency of the data collection effort. Principal among these were:

- o Deletion of Personal History Information-- including name, address, date of birth, etc. which had been collected in the pre-administration
- o Reporting Period--in the pre-program version of the DEQ, drivers were requested to record their driving experience for a period of three years. This reporting period was shortened in the followup administration to a minimum of 14 months in an attempt to expedite the collection of data.
- o Redundant Items--Some redundancy existed among items in the pre-version of the DEQ. They were deleted in the post version to minimize data extraction and processing requirements.

The revised DEQ used in follow-up administrations is contained in Appendix A. Follow-up administrations of all data collection instruments were completed by June of 1981.

Data Processing

Responses to both the DEQ and knowledge test were extracted by TTI manually and stored in a computerized data base. Individual responses were scored by subject name and identification number, although individual responses could be accessed by response number, subject name, State, or any other parameter.

To protect the privacy of those participating in the study, all analyses were performed using an assigned code number rather than names. It was necessary to maintain individual names, addresses, and driver license numbers in order to be able to secure official records of accidents and violations and to correlate them with information from the DEQ. However, that was the only use made of identifying information. All analyses were performed using automated processes and results were furnished in statistical form (e.g., frequency counts and means), rather than in the form of individual records. Whenever it was necessary to access an individual DEQ record, this was accomplished through the code number, and no identifying information was furnished. Further, since only the NPSRI Data Processing Manager knew the appropriate codes and procedures, there was no way for any unauthorized individual to gain access to individual records.

All processing of data was automated. Numbers of accidents, numbers of violations, and knowledge test scores were analyzed parametrically. Differences between means (Treatments vs. Controls, Pre-Program vs. Post-Program) were assessed for significance by two-tail t tests. The remaining data, being categorical, were subject to non-parametric analyses. Distributions were compared and differences between them assessed for significance through the use of chi-square analysis.

POPULATION DESCRIPTION

This section will describe the characteristics of older drivers as revealed by the analysis of the Driver Experience Questionnaires. This review of characteristics will be divided into the following categories:

- o Practices
- o Problems
- o Violations
- o Accidents

All of the data reported in this section have been taken from the pre-program questionnaire since it involves a larger sample and was not influenced by exposure to the 55-Alive course. The sample consisted of 9557 drivers, which may be taken as the N for the tables that appear in this section (Tables 2-16).¹

Practices

Driver practices reported included mileage, trips, riding, conditions of driving, use of safety belts, and trip purpose.

Annual Mileage

Annual mileage reported by drivers in the study is shown in Table 2 below.

TABLE 2
ANNUAL MILES TRAVELED

<u>Annual Mileage</u>	<u>Percent</u>
Less than 1,000 miles	4.6%
1000 - 2500	14.4%
2500 - 5000	19.8%
5000 - 7500	18.9%
7500 - 10000	18.4%
10000 - 15000	15.3%
15000 or more	8.6%

The average mileage reported was slightly over 7000 miles per year, about 85% of that reported by drivers in general.

¹ Due to missing data, the N in any one table might be slightly less than the total sample N. The discrepancy was never more than 1%, however.

Trip Frequency

The frequency with which drivers in the sample took trips appears in Table 3 below.

TABLE 3
FREQUENCY OF TRIPS

<u>Frequency</u>	<u>Percent</u>
Less than once a week	1.3%
One - two times a week	6.4%
Three - five times a week	39.9%
Once a day	24.6%
More than once a day	27.8%

Almost half of the drivers drove less frequently than daily.

Passenger Frequency

Table 4 below shows the frequency with which drivers in the sample rode with others.

TABLE 4
FREQUENCY WITH WHICH DRIVERS
IN THE SAMPLE RODE WITH OTHERS

<u>Portion of Time Riding with Others</u>	<u>Percent</u>
All the time	0.8%
Most of the time	4.2%
Half of the time	4.7%
Some of the time	33.4%
Rarely	53.9%
Never	3.1%

Most of the time, the person who was driving was either a spouse (32.8%) or a friend (26.7%). The individuals in the sample were rarely driven by children or other relatives.

Night Driving

Table 5 below shows that the great majority of older drivers severely limited their night-time driving.

TABLE 5
PERCENT OF DRIVING
DONE AT NIGHT

<u>Percent of Driving</u>	<u>Percent of Drivers</u>
0%	8.2%
1 - 10%	62.4%
10 - 25%	23.1%
25 - 50%	5.7%
50 - 100%	0.6%

Driving Trends

Drivers were asked to indicate, for various driving situations, whether they drove more frequently, less frequently, or about the same amount as they used to. The results appear in Table 6 below.

TABLE 6
TRENDS IN DRIVING FREQUENCY

<u>Driving Situation</u>	<u>Relative Frequency</u>		
	<u>Less</u>	<u>Same</u>	<u>More</u>
Night	75.6%	22.5%	1.9%
Snow	73.2%	25.5%	1.3%
Rush hour	62.3%	34.9%	1.8%
Fog	57.5%	41.0%	1.6%
Heavy traffic	52.5%	44.7%	2.7%
After drinking	47.4%	51.9%	0.7%
When upset	45.2%	54.1%	0.7%
Winter	37.4%	60.3%	2.3%
Rain	35.1%	62.4%	2.5%
After medication	31.4%	67.2%	1.5%
Expressways	26.1%	60.8%	13.1%
City streets	15.5%	78.7%	5.8%

The major conditions under which driving has been curtailed included driving at night, in snow, during rush hour, in fog, and heavy traffic. These results parallel those to be reported shortly in connection with driving "problems." It is worth mentioning that only about a third of the drivers reported driving after drinking or taking medication.

Driving Purpose

Table 7 below shows the proportion of driving devoted to various activities.

TABLE 7
PROPORTION OF TRAVEL BY PURPOSE

<u>Purpose</u>	<u>Amount of Travel</u>		
	<u>Most</u>	<u>Some</u>	<u>Little</u>
Recreation	39.2%	46.3%	14.5%
Household business	51.2%	41.0%	7.8%
Work	66.6%	13.2%	20.3%

There is an obvious inconsistency in that many drivers are attributing "most" of their travel to more than one purpose. However, the fact that almost 40% report most of their driving devoted to recreation is indicative of the general nature of the population. The fact that 2/3rds report that most of their driving as being devoted to work is surprising.

Location of Travel

Table 8 below shows the relative amount of driving taking place on different kinds of roads.

TABLE 8
PROPORTION OF TRAVEL
BY TYPE OF ROAD

<u>Type of Roads</u>	<u>Proportion of Travel</u>		
	<u>Most</u>	<u>Some</u>	<u>Little</u>
Expressways	22.0%	57.3%	20.7%
Residential	43.1%	50.7%	6.2%
Business	34.5%	57.4%	8.2%
Rural	9.5%	37.3%	53.2%

The drivers in the sample seemed to do most of their driving in residential streets and very little of it in rural areas. The lack of rural driving probably reflects the elimination of Treatments in remote areas from the sample and therefore cannot be viewed as representative of older drivers in general.

Time of Driving

Table 9 indicates the relative amount of time spent driving during various daily time periods.

TABLE 9
PROPORTION OF DRIVING
BY TIME OF DAY

<u>Time of Day</u>	<u>Proportion of Driving</u>		
	<u>Most</u>	<u>Some</u>	<u>Little</u>
Before 8 AM	14.7%	43.3%	42.0%
8 AM - 12 PM	28.3%	57.3%	14.5%
12 - 2 PM	19.8%	59.7%	20.4%
2 - 4 PM	21.3%	60.8%	17.9%
4 - 6 PM	12.6%	65.9%	31.5%
After 6 PM	3.7%	38.5%	57.8%

A tendency to avoid rush hour and night-time traffic is apparent.

Frequency of Use of Safety Belts

The frequency of safety belt use reported by older drivers appears in Table 10.

TABLE 10
FREQUENCY OF SAFETY BELT USE

<u>Frequency</u>	<u>Percent</u>
Always	33.4%
Usually	18.3%
Sometimes	18.4%
Rarely	17.9%
Never	11.9%

The frequency of reported use among older drivers appears somewhat higher than that reported by drivers in general in other surveys (Phillips, 1980).

Older drivers most frequently identified discomfort and forgetfulness as reasons why they did not always use belts.

Problems

Drivers were called upon to report two types of problems:

- o Traffic situations
- o Medical problems

Traffic Situations

Drivers were asked to indicate, for a variety of traffic situations, whether they have gotten easier, harder, or remained the same. The results appear in Table 11 on the next page.

A majority of situations were found to be "the same" by most drivers, with a few drivers finding them easier and a few finding them harder. There were, however, a number of tasks that a sizeable percentage of the drivers found more difficult. These were, in decreasing order of difficulty, driving at night, when tired, when upset, in fog, during rush hour, in snow, in heavy traffic, and in rain. For the most part, these situations seemed to be ones that placed heavy perceptual demands upon drivers. Surprisingly, those that make strong motor demands such as parking, backing, and making right turns, were not found to be more difficult by most drivers.

TABLE 11
DRIVING SITUATIONS THAT HAVE BECOME EASIER,
HARDER, OR REMAINED THE SAME

<u>Situation</u>	<u>Degree of Difficulty</u>		
	<u>Easier</u>	<u>Same</u>	<u>Harder</u>
Night	1.8%	50.6%	47.6%
When tired	0.9%	54.6%	44.5%
when upset	1.3%	62.5%	36.1%
Fog	1.2%	65.1%	33.7%
Rush hour	2.9%	66.0%	31.1%
Snow	2.4%	67.7%	29.9%
heavy traffic	2.7%	69.4%	27.9%
Rain	1.8%	76.8%	21.4%
Backing up	3.7%	79.5%	16.8%
Expressways	13.3%	72.4%	14.3%
Entering expressways	6.0%	80.0%	14.0%
Changing lanes	4.4%	82.4%	13.2%
Passing	3.5%	85.5%	11.0%
City streets	4.9%	84.3%	10.7%
Pulling out of a parking space	2.8%	87.4%	9.8%
Parking	5.3%	85.1%	9.7%
Driving through intersections	2.9%	87.7%	9.4%
Turning left	4.4%	86.6%	9.0%
Highway speeds	8.8%	83.4%	7.8%
Keeping up w/traffic	5.3%	88.3%	6.4%
Being passed	2.8%	93.8%	3.4%
Non-rush hour	9.6%	88.2%	2.2%
Turning right	3.6%	89.5%	1.9%
After drinking*	1.8%	87.4%	10.8%
After medication*	1.0%	91.4%	7.7%

*Less than half reported driving after taking medication. less than a quarter reported driving after drinking.

The drivers were asked to identify from this list of driving situations the three that were hardest for them. In general, the situations rated as "most difficult" by the drivers were the same ones that the largest number of drivers found to be harder. Driving at night was considered the most difficult situation by over a third of the drivers, while driving in snow was second, with 13.5%

Medical Problems

The incidence of reported medical problems appears in Table 12 below.

TABLE 12
PERCENT OF DRIVERS
REPORTING VARIOUS HEALTH PROBLEMS

<u>Problem</u>	<u>Percent</u>
Arthritis	25.1%
High blood pressure	19.4%
Heart/artery	13.4%
Hearing	12.7%
Allergies	10.8%
Vision (uncorrected)	6.4%
Diabetes	6.2%
Lung	5.2%
Broken leg	1.6%
Stroke	1.5%
Broken arm	1.3%
Other broken bones	1.2%
Epilepsy	0.2%
Other	4.2%

The health problems reported by a sizeable proportion of the sample include arthritis (25.1%), high blood pressure (19.4%), heart problem (13.4%), and allergies (10.8%). It is a little bit difficult to reconcile the high incidence of arthritis with the low incidence of difficulty reported in dealing with situations that are demanding of motor response (parking, backing, etc.), which one would expect to be highly vulnerable to arthritis.

Violations

Table 13 below shows reported incidence of violations and violations with accidents for the previous three years among the sample.

TABLE 13
THREE-YEAR TOTALS OF VIOLATIONS AND
VIOLATIONS WITH ACCIDENTS

<u>Number</u>	<u>Percent Reporting Violations</u>	<u>Percent Reporting Violations w/Accidents</u>
0	86.3%	96.4%
1	11.6%	3.4%
2	1.8%	.2%
3+	.3%	.1%

Drivers reporting accidents were asked to indicate the nature of their most recent violation. The most frequently reported, in decreasing order of prevalence, were speeding, failure to yield right of way, improper turning, not stopping at a stop sign, disregarding a traffic light, turning from the wrong lane, improper passing, and following too closely.

Three percent of the drivers in the sample had had their licenses revoked sometime within the previous three years.

Accidents

Table 14 below shows the reported accident experience for the previous three years among the sample.

TABLE 14
THREE-YEAR ACCIDENT INVOLVEMENT

<u>Number of Accidents</u>	<u>Percent Reporting</u>
0	83.3%
1	14.8%
2	1.7%
3 or more	.2%

From the drivers reporting an accident, approximately 50% reported they were hit by the other vehicle, 37% reported they were responsible for the accident, and 10% considered it a draw. The remainder (3%) couldn't decide.

Collision Object

As would be expected, the overwhelming majority of accidents (74%) involved another car. Other collisions involved, in descending order, trucks, fixed objects, and motorcycles.

Accident Severity

Of the accidents reported in the sample, 10.9% involved minor injury, 4.2% a serious injury, and .8% were fatal accidents.

As far as vehicle damage is concerned, the drivers' vehicles sustained minor damage in 80% of the accidents, major damage in 10.9% of the accidents, and were totaled in 4.3% of the accidents.

Accident Location

Table 15 shows the highway configuration most frequently involved in the accidents reported by the drivers.

TABLE 15
ACCIDENTS BY HIGHWAY CONFIGURATION

<u>Configuration</u>	<u>Percent</u>
Controlled intersection	26.1%
Straight road	14.4%
Railroad crossing	13.3%
Parking lot	12.2%
Uncontrolled intersection	9.2%
Driveway	5.0%
Curve	3.1%
Other	16.7%

Most of the accidents occurred on two-way undivided roads (32.8%), and divided roads (26.0%). Three-quarters of the accidents occurred on roads that were posted at 35 mph or under.

The majority of accidents occurred in urban or suburban business areas (53.1%). The second most common accident sites were urban or suburban residential areas (28.5%). Rural and expressway accidents accounted for less than 15% of the total.

Seventy-six percent of the accidents were reported as having occurred on dry pavement and 13.3% on wet pavement. Accidents on gravel surfaces (5.5%) exceeded those on snow-packed and icy surfaces combined, probably a reflection of the fact that the drivers came primarily from southern States.

Time of Accident

Approximately 85% of the accidents occurred during the week. The relatively small involvement in weekend accidents, about half that of

drivers in general (Accident Facts), probably reflects the reduced weekend travel of older drivers.

Eighty-five percent of the accidents also happened in daylight. The remaining 15% is about half the percent of nighttime accidents occurring generally, indicating reduced nighttime travel on the part of older drivers.

Driver Actions

The driver maneuvers that accompanied the accidents were going straight (36.5%), turning left (13.7%), backing (13.5%), stopped (11.9%), slowing down (9%), and negotiating a curve (6%). The same maneuvers, in approximately the same order, also characterized the other driver involved in the accident.

The major actions employed by drivers who attempted to avoid the action were applying the brakes (41.1%), steering around the other vehicle (11.2%), and changing lanes (6.7%). In 38% of the reported cases, drivers felt that they "could not do anything," while in 8.7% of the cases, they did not attempt to do anything.

When another driver was involved in the accident, the mistakes attributed to the other driver included driving too fast (25.5%), misjudging distance (21.1%), failure to see the informant's vehicle (18.8%), failure to yield the right of way (12.1%), and failure to stop for a sign or signal (10.8%). In 13.2% of the cases, the other driver was not believed to have made a mistake.

In reporting their own mistakes, 31.7% of the drivers believed they did not make a mistake. Where the drivers did admit a mistake, it was primarily failure to see the other car (23.7%), misjudging distance (16.5%), and failure to yield the right of way (5.8%).

Prevailing Conditions

Conditions prevailing at the time of the accident and capable of having a bearing upon the accident are summarized in Table 16 below.

TABLE 16
CONDITIONS PREVAILING AT
THE TIME OF THE ACCIDENT

<u>Condition</u>	<u>Percent</u>
Wearing seat belt	52.9%
Had been drinking	10.0%
Had taken medication	15.2%

The use of medicines was pretty evenly distributed across sedatives, analgesics, antihistamines, antihyperactives, and stimulants. Of the accident-involved drivers, 35% had been seeing a physician for a medical condition during the period that the accident occurred. Medical conditions

involved were primarily heart disease (9%), arthritis (6%), and high blood pressure (5%).

PROGRAM EFFECTS

This section of the report will discuss the effects that the 55-Alive program appears to have had upon the drivers who received it. Examined will be the effects of the instructional program upon driver mileage, accidents, violations, and driving practices.

Sample Size

As shown in Table 1, a total of 2,250 Treatments and 2,212 Controls returned post-program DEQs. However, it was discovered that some of those returning post-program DEQs had never returned a pre-program DEQ. The numbers of drivers returning both a pre-program DEQ and a post-program DEQ were as follows:

Treatments	-	2140
Controls	-	2164
Total	-	4304

This total represents only 21% of the total sample of 20,514 drivers originally solicited.

Comparability of Groups

As pointed out previously, Treatment and Control groups were matched for prior accidents before mailing the followup questionnaire. However, Table 1 shows the loss of 29% of the total sample during the followup. This loss could easily have destroyed the comparability of sample. Before examining results obtained within the Treatment and Control groups, it is necessary to determine the comparability of the two experimental groups in the final sample.

Prior Accidents

The variable of most concern in determining comparability of groups is accidents, both because it is the primary criterion of program effectiveness and because it served as the basis of a matching. The self-reported annual accident rate for Treatment and Controls was .058 and .061 respectively. This difference is extremely small and attributable to chance. Nor were there significant differences in the characteristics of accidents experienced by that group.

Evidently, neither the overall sample loss, nor the differences in response rate between the two groups had a practical or statistically significant effect upon the sample with regard to prior self-reported accidents.

Prior Violations

Annual violation rate for Treatments was .044 violations per driver as opposed to .054 for Controls. The difference is statistically significant

($P < .05$), and creates a definite bias in favor of the Treatment group.

Matching on the basis of accidents did not render the two groups equal on violations. There were no significant differences between the two groups in the nature of the violations reported.

Other Factors

A number of variables showed significant differences between Treatments and Controls prior to administration of the training program. These include the following:

Age--Treatments were older than Controls. ($P < .001$)

Sex--A greater proportion of Controls was male. ($P < .001$)

Employment--More of the Controls were employed in a full-time or part-time basis. ($P < .001$)

Driving Experience--The Controls tended to have driven for more years than the Treatments. ($P < .001$)

Annual Mileage--The Controls reported a higher annual mileage. ($P < .001$)

Trips--The Controls reported more trips per week than the Treatments. ($P < .001$)

Riding--The Treatments did more riding with others than did the Controls. ($P < .001$)

Night Driving--Controls reported more driving at night, and fewer of them were finding it more difficult to do. ($P < .001$)

Adverse Conditions--Generally speaking, the Treatments had more trouble handling difficult weather conditions, traffic conditions, and maneuvers than did Controls. They also generally reported driving less often under such conditions. ($P < .05$)

Driving Purpose--Controls spent less of their driving on household business and more of it on work than the Treatments. ($P < .001$)

Location--Controls did relatively more of their driving on expressways and relatively less on residential streets. ($P < .05$)

Type of Vehicle--The Controls were more likely to drive vans, pick-ups, and compacts, while Treatments were more likely to drive medium-sized cars. ($P < .05$)

Restraint Usage--Treatments were more likely to use restraints than Controls. ($P < .01$) Controls were more likely to feel that restraints were unsafe and unnecessary. ($P < .01$)

Health--Though a wide variety of health problems was reported, there were no significant differences between groups except for a higher incidence of arthritis among Treatments. ($P < .001$)

Time--Treatments drove more during mid-day ($P < .001$), while Controls drove more in rush hour and in the evening. ($P < .05$)

Driver Training--The Treatment group had a greater number of drivers who had taken a driver training course within the previous five years than did the Controls.

The Controls also scored higher on the pre-program knowledge test. However, the results cannot be directly compared since it was a "closed book" exam for the Treatments and an "open book" exam for the Controls.

Summary

The differences between the Treatments and Controls seemed to stem from two basic sources. First, more of the Controls are engaged in some form of paid or voluntary employment. It is not hard to see how this difference could have occurred. Participating in a training program, as did the Treatments, takes more time than simply filling out a questionnaire--all that was required of the Controls. Therefore, of the drivers originally assigned to the two groups, a somewhat larger share of those employed would not have had the time to attend the training program, resulting in under-representation of such people in the Treatment group. This under-representation of the employed probably accounts for the Treatment group's greater age, reduced driving, less frequent driving under adverse conditions, and hours of driving. Additionally, the Controls who were still employed were probably among those less affected physically by age. This would explain the tendency of Controls to have less difficulty handling the more strenuous aspects of driving.

The second basic difference between the two groups is probably that referred to as the "volunteer bias." Drivers who volunteer for improvement programs are generally more "safety conscious" than other drivers and have a somewhat better prior driving record. This volunteer bias probably accounts for the greater use of safety belts and the prior exposure to driver improvement programs.

The significantly higher prior violation rate of the Control group probably results from both of these factors. The Treatment group, being the more safety conscious, would be less likely to drive in a manner resulting in a citation. Even where they did not, their reduced mileage would lower their chances of being cited. The same factors would also be expected to produce a difference in accident likelihood. Such a difference did indeed exist before the matching process rendered them equal again.

Accidents

The accident experience of the two groups, based upon DEQ reports, appears in Table 17.

Table 17
SELF-REPORTED ACCIDENT AND VIOLATION RATES

<u>Period</u>	<u>ACCIDENTS PER DRIVER</u>		
	<u>Treatments</u> N = 2140	<u>Controls</u> N = 2164	<u>Difference</u>
Pre-Program	.058	.061	.003
Post-Program	.085	.086	.001

Since the pre-program accident experience of the Treatments and Controls was highly similar, because of the matching process, the post-program experience for the two groups can be directly compared. The mean annual accident rates for Treatments and Controls were .085 and .086, respectively. This difference was statistically non-significant. The data obtained do not establish the 55-Alive program as having a beneficial effect upon accidents.

The observation made during the earlier discussion of sample size bears repeating at this point. The numbers of drivers completing both pre-program and followup questionnaires--slightly over 2,100 in each group--are not sufficient to provide a fair test of program effects. The 55-Alive program could well have had a cost-beneficial effect that was not of sufficient magnitude to be detected within the small sample involved. The statement that the program was not shown to be effective certainly does not necessarily mean it is ineffective.

The mean accident rates reported in the year following administration of the program were substantially higher than the "prior" accident rate per driver of approximately .06 obtained from the pre-program DEQs. This difference does not necessarily mean that accident experience increased during the year following administration of the program. Rather, it is probably the result of forgetting. In the pre-program analysis, the annual accident rate was based upon a three year reported accident experience. It is likely that some of the minor accidents occurring in the early part of the three year period had been forgotten.

Traffic Violations

The violation experience of the two groups appears in Table 18.

TABLE 18
SELF-REPORTED VIOLATION RATES

<u>Period</u>	<u>VIOLATIONS PER DRIVER</u>		
	<u>Treatments</u> N = 2140	<u>Controls</u> N = 2164	<u>Difference</u>
Pre-Program	.044	.054	.010
Post-Program	.064	.083	.019

For the one-year period following completion of the training program, the traffic violation rates for the Treatments and Controls were .064 and .083 violations per driver respectively. Although the difference is statistically significant ($P < .05$), over half of the difference between the two groups existed in the violation rates reported in the pre-program DEQ. If post-program differences are adjusted for differences present before the program, they become non-significant. Of the drivers reporting traffic violations, there were no significant differences in the proportion of violations resulting in accidents.

Conclusions as to the effect of the 55-Alive program upon traffic violations are the same as those governing accidents. No effect was demonstrated. However, because of the relatively small sample, an undetected effect could exist.

The fact that the violation rate in the year following the program appears higher than the annual rate before the program is probably due to a higher rate of forgetting during the 3-year pre-program period rather than an actual increase in traffic violations during the year following the program.

Officially Reported Accidents

The project did not call for the collection and analysis of accident or violation data from state records. Since self-reported accidents and violations are typically more complete than those from official records, an analysis of self-reports was considered sufficient. However, if these analyses had shown significant differences between Treatments and Controls on either accidents or violations, official records would have been requested in order to verify the differences. Since no significant differences were obtained from the self-reports, the cost of procuring State records was not considered justified.

The California Department of Motor Vehicles, because of its excellent traffic records and data processing system, was able and willing to provide official accident and violation records on all Treatments and Controls from the State of California. These records were analyzed for two purposes:

- o Verify self-reported records
- o Compare Treatments and Controls

Verification of Self-Reports

The three year accident and violation experience reported in the pre-program DEQ was compared with the accidents and violations reported in the California driving records for the same period. With respect to accidents, the DEQs contained all of the accidents reported on the official records. However, 10% of the accidents reported in the DEQs did not appear on the record. The majority of these are probably minor accidents having damage below the California reporting threshold. As stated previously, there were probably some minor accidents occurring early in the three year period that were not recalled by the drivers and therefore not even reported on the DEQ. In any case, with respect to accidents, the experience reported on the DEQ may be considered as encompassing all that appear in official records as well as some accidents that are not reported to the State.

In the case of violations, 2.5% of those appearing in DMV records did not appear in the DEQ. All of those in the DEQ did appear in the DMV records. This suggests that the reporting of violations is not as accurate and comprehensive as that of accidents. However, the underreporting is not great enough to be a significant factor in analyzing program effects.

Comparison of Treatment and Control

The mean accident rates for Treatments and Controls for the one year periods prior to and following initiation of the 55-Alive program, as obtained from official records, appear in Table 19 below.

TABLE 19
STATE-REPORTED ACCIDENT RATES

<u>Period</u>	GROUP		<u>Diff.</u>
	<u>Treatments</u> N=474	<u>Controls</u> N=538	
Pre-program	.0443	.0725	.028
Post-program	.0380	.0610	.023

As with self-reported accidents, the Controls evidenced a significantly higher accident rate than did the Treatments on pre-program DEQs ($P < .05$) but not on post-program DEQs. The small size of the sample is certainly a factor in the level of a significant post-program difference. In any case, whatever difference there is between the two groups is probably due to some combination of (1) the higher mileage of the Control group and/or (2) the volunteer bias represented by the Treatment group (i.e. people who volunteer to take safety programs generally have a lower accident rate than the general population).

The slight drop in accident rate following the program is probably due to a decrease in mileage as the entire experimental sample became a year older.

Amount of Driving

The pre-program differences in the mileage of Treatments and Controls prevents any post-program comparisons from being made. In a pre-post comparison, the Treatments showed a marked drop in annual mileage following completion of the 55-Alive program. However, so did the Controls. Similar parallel reductions occurred in the frequency with which trips were made. To compensate for the reduction in driving, both groups reported an increase in their frequency of riding as a passenger.

While the Treatments seemed to show a somewhat larger decrement in amount of driving than the Controls, the difference was not large enough to be of practical or statistical significance and certainly cannot be attributed to the effects of the 55-Alive program.

Driving Conditions

The 55-Alive program does not seem to have materially affected the amount of nighttime driving. The percent of people doing no nighttime driving went up somewhat in both Treatment and Control groups. Among those who do drive at night, however, the amount of night driving remained the same for both groups.

In the pre-program DEQ, the majority of drivers in both groups reported doing less driving under such adverse conditions as nighttime, snow, when upset, during rush hour and during heavy traffic, and holding steady on driving under such conditions as winter driving, driving in the rain, driving on expressways and city streets. Most of the significant changes occurring in the post-program were increasing numbers of drivers reporting no change in their frequency of driving under adverse conditions. This suggests a slight "leveling off" in changes of behavior resulting from increasing age. This tendency was more pronounced among the Treatments than Controls. The difference between the two groups is more likely attributable to the fact that the Treatments had already shown greater pre-program changes than it is to the effect of the 55-Alive program. The only exception to the general trend was the "driving while upset" category, in which an even greater number of Treatments and Controls indicated they were driving less often.

Driving Difficulty

On the pre-program DEQ, the majority of Treatments and Controls testified to finding it "harder" to drive under adverse conditions. Only a few conditions showed any change during the post-program period. Among the Treatments, a significantly larger portion indicated that driving while tired or upset had not changed in difficulty--indicative of a levelling off. Among the Controls, a significantly larger number found driving in fog or while upset to be "harder." The differences between the two groups could result from the fact the Treatments tended to find driving in adverse conditions harder than did the Controls to begin with and were levelling off while the Controls tended to experience increasing difficulty. However, the differences could be totally due to chance.

Use of Safety Restraints

Substantial and significant pre-program differences between Treatments and Controls in the use of safety restraints prevented a direct post-program comparison between the two groups. Any effect of the program itself upon restraint use had to be found in a comparison between the pre-program and post-program reports of the Treatments. These reports showed no significant gain in use.

In contrast, the Controls showed significant increases in use ($P < .05$). The primary changes were an increase in the percent using safety belts "sometimes" from 17% to 20%, and a decrease in the percent using them "rarely" from 20% to 17%. Despite their increased use, however, the Controls still reported significantly less use of safety belts during the post-program period than did the Treatments.

There is no way of knowing what factors caused the increase in safety belt usage among the Controls during the year between the two reports. It may be simply a case of being one year older and one year wiser. Whatever the cause, it narrowed, but did not close the gap between Controls and Treatments.

Knowledge Test

Both the Treatments and Controls were administered a written knowledge test. The Treatments received a pre-test immediately prior to the training program, a post-test immediately afterward, and a follow-up test one year later. The follow-up test was administered through the mail. The Control group received a pre-test and a follow-up test through the mail. The results obtained from these test administrations appear in Table 20 below.

TABLE 20

MEAN SCORES ON THE WRITTEN KNOWLEDGE TEST

<u>Test</u>	<u>Treatments</u>	<u>Controls</u>
Pre-test	5.57	10.39
Post-test	20.48	N/A
Follow-up	18.44	15.97

The test results of primary interest are the pre-test and post-test scores obtained by the Treatments. These are the only test results that truly reflect knowledge. The other tests, being administered through the mail, are all "open-book" tests and therefore do not truly indicate the driver's state of knowledge.

A comparison of the pre-test and post-test scores shows a large and statistically significant information gain among the Treatments. The scores obtained by the Treatments in the post-test averaged over three-and-one-half times the pre-test score. The mean post-test score of 20.48 corresponds to 82% correct in the 25-item measure, indicating that the 55-Alive program was fairly successful in attaining its knowledge objectives.

The knowledge test was given to the Controls to measure of the effect of giving an open-book examination and to aid in interpreting the follow-up results obtained from the Treatments. Assuming that the Treatments and Controls were equally knowledgeable at the outset, the difference of approximately 5 raw score points between the pre-test scores obtained by the two groups provides a rough indication of the difference between an open-book and closed-book exam. The gain of 5 raw score points shown by the Control group from pre-test to follow-up test probably represents the results of some self-instructional effort relative to the information items covered on the test.

Based upon the results obtained by the Controls, we can infer that somewhere between 5 and 10 raw score points are attributable to the open-book exam and to self-instruction that would have occurred even in the absence of the 55-Alive program. This would mean that the retention of information from the 55-Alive program, while considerably less than that present in the post-test, or that reflected in the follow-up score of 18.44, is still appreciable.

ACCIDENT-RELATED FACTORS

The collection of data on both the characteristics and accident involvement of older drivers offered an opportunity to examine the relationships between the two, that is, to identify driver characteristics that appear to be related to accident involvement. To make this comparison, the entire experimental sample, including Treatments and Controls, was divided into two subsamples as follows:

Accident Involved--Drivers reporting one or more accidents.

Accident Free--Drivers reporting no accidents.

The three-year pre-program and one-year post-program period were combined. Any driver reporting an accident in either period was assigned to the Accident Involved group. This was done to obtain the largest subsample of accident-involved drivers. The sample consisted of 3352 accident-free drivers, and 839 drivers with one or more accidents.

The comparison between accident-involved and accident-free drivers was performed using pre-program questionnaire data in order to prevent the comparison from being influenced in any way by the exposure of one-half of the sample to the 55-Alive training program.

The following paragraphs describe comparisons for variables that yielded significant differences between accident-free and accident-involved drivers.

Employment

Drivers who held some form of volunteer or paid employment were significantly over represented in the accident-involved group ($P < .001$). This probably means only that drivers who are employed tend to drive more often and under a greater range of driving conditions than those who are unemployed.

and therefore have a higher accident exposure. Accident-involved drivers also reported a greater portion of their driving as being devoted to work purposes ($P < .05$)

Amount of Driving

The accident-involved drivers tend to drive more often and have higher annual mileage than accident-free drivers ($P < .01$). This is not unexpected since more frequent and higher annual mileage means greater accident exposure. Previous studies have shown that high mileage drivers, while having a greater absolute number of accidents per year, generally show a lower rate of accidents per mile. Unfortunately, the manner in which data were collected in the present study does not permit such a measure of accident rate.

Riding With Others

Since accident-free drivers tend to drive less often than accident-involved drivers, they might be expected to ride more often. Such is true ($P < .001$). When they do ride, the accident-free drivers are more likely to ride with a husband or wife, while the accident-involved drivers are more likely to drive with children, relatives, friends, or others ($P < .01$). Since a spouse is more generally available than other relatives and friends, this result suggests that the accident-free are more likely to be dependent upon others to do the driving.

Adverse Driving Conditions

The accident-free drivers reported driving less often under all of the adverse conditions noted in the questionnaire. Those showing significant differences ($P < .05$) included driving:

- o At night
- o In snow, sleet, and slush
- o In rain
- o In fog
- o In heavy traffic
- o After drinking

The relationship between driving in adverse conditions and accident involvement may be a direct one, that is, driving under adverse conditions raises the likelihood of having an accident. On the other hand, the relationship may be mediated by the amount of driving; those who drive the most have the greatest exposure to both accidents and adverse conditions.

Medical Conditions

The accident-involved drivers showed a higher incidence of every one of the medical conditions listed on the DEQ. The differences were significant ($P < .05$) for:

- o Heart and artery problems
- o Arthritis
- o Broken bones
- o Vision problems
- o Hearing problems
- o Diabetes

This result was quite surprising. One would have expected that older drivers with these handicaps would compile lower mileage than those not so afflicted and therefore be more likely to remain accident free.

Just what is responsible for the relationship between medical conditions and accident involvement is open to speculation. The most obvious explanation is, of course, that the medical condition exerts a direct causative effect. There is certainly ample research showing correlations between medical handicaps and accidents. A great many additional analyses, parceling out the effects of exposure, age, and other related variables, would be necessary before a direct causative relationship could be postulated from the data available. In the meantime, the results obtained can certainly be accepted as supporting other research showing the effect of medical factors upon accidents.

Traffic Violations

As might be expected, accident-involved drivers reported a greater number of traffic violations than accident free drivers, both total violations and violations with accidents ($P < .001$). Among the drivers reporting violations, the accident-involved drivers were over-represented in more serious violations, including speeding, failure to yield right of way, drinking and driving, following too closely, and disregarding traffic lights, and reckless driving. There were no significant differences in such offenses as driving too slowly, failing to signal, running stop signs, turning from the wrong lane, failure to dim headlights, and equipment violations.

The relationship between accident involvement may be mediated in any of the following ways:

Legal--A certain portion of the accidents may involve acts that are in violation of the law.

Benavorial--The unsafe behavior that leads to violations might also lead to accidents.

Exposure--Drivers who compile a lot of mileage are exposed to accidents and violations.

It is likely that all of these relationships prevail to some extent. The relative contribution of each cannot be determined without analyses that would be beyond the scope of the project.

Summary

The factor primarily responsible for accident involvement among older drivers appears to be exposure. Those who do the most driving and drive under the conditions that are most conducive to accidents have the highest accident involvement. Among older drivers, the variable most responsible for accident exposure is employment. It appears to be primarily paid and volunteer employment that induces older people to drive and to drive under conditions that expose them to accidents.

The nature of violations sustained by accident-involved drivers suggests that a second factor in their accident record is simply unsafe driving. The violations could also be due to exposure or accident-connected violations. However, the difference between accident-involved and accident-free in the nature of violations suggests that, as with other age groups, older drivers who operate in violation of the law tend to get into accidents.

The final causative factor appears to be medical conditions. The tendency for accident-involved drivers to report a higher incidence of almost any medical condition that could adversely affect driving is difficult to attribute to anything but the direct effect of the condition itself.

DEVELOPMENT OF AN OLDER DRIVER RETRAINING MANUAL

Although formal retraining programs for older drivers are eminently desirable, it is evident that programs alone cannot reach a significant proportion of the older driver population. The number of older drivers participating in mandatory programs (i.e., driver improvement courses for traffic violators) is negligible. And, because older drivers constitute such a low percentage of drivers eligible for these programs, it is economically impractical for most States to offer a separate driver improvement program for older drivers which can address their peculiar driving problems and informational needs. Voluntary programs, such as that developed by NRTA/AARP, can provide more focused instruction. However, voluntary programs are notoriously unable to attract the participation of a sizeable proportion of drivers. As age-related driving problems can affect all drivers, the need for instructional materials which can reach a significant proportion of this, the older driver population, is apparent.

Recognizing this need, NHTSA sponsored research to develop older driver manuals that could be distributed by State driver licensing agencies. (McKnight and Green, 1976; Brainin, et al., 1979). Licensing agencies form a promising distribution system as they can provide materials systematically to all licensed drivers. Unfortunately, tight budgets preclude many, if not most, licensing agencies from offering such a manual. What was needed, therefore, was an older driver retraining manual that could be distributed by a larger network. A pamphlet suitable for distribution by State and local safety, education, health, and transportation agencies, as well as senior citizen centers and associations would hold more promise for reaching a larger segment of the older driver population.

DESIGN CONSIDERATIONS

Design of the manual was driven by considerations concerning both the instructional content (what the manual must say) and the instructional approach (the way in which the manual must say it). Content criteria and approach guidelines were developed in response to the instructional needs of older drivers and the nature of the intended (omnibus) delivery system.

Content Criteria

The foremost criterion for content was that of accident criticality-- the information most needed by older drivers to help them avoid accidents in the first place or to lessen the consequences of accidents should they occur. Accident criticality was determined by review of various older driver accident analyses (e.g., Planek, et al., 1968; Planek and Fowler, 1969; Case, et al., 1970; State of California, 1975; AMA and AAMVA, 1974; McFarland, et al., 1964; Waller, 1967) which document the types of performance errors and traffic situations typically resulting in accidents among drivers. Another important source of information on the driving problems and concerns of older people was the analysis of the Driver Experience Questionnaire administered earlier within this project.

Information which would help older drivers to recognize and cope with these performance and situational factors became candidates for inclusion in the manual.

As older drivers are highly experienced drivers, they already possess many of the knowledges rated as critical to safe performance (McKnight and Adams, 1970). To identify the specific information needs of experienced drivers, project staff reviewed the results of the National Item Bank testing (Pollack and McDole, 1974), development of tailored license manuals and tests (McKnight and Green, 1976), and a system for distributing safe driving information to various categories of drivers (McKnight and Simone, 1979). Identification of the safe driving information requirements of experienced drivers was a major focus of the latter two studies, in which written tests were administered to experienced drivers. Project staff also reviewed the results of knowledge tests administered to older drivers within this project to identify knowledge deficiencies peculiar to older drivers.

The third criterion used in the content screening process was "age-specific" information--information related to the aging process that would help older drivers understand why driving becomes more problematical as the years begin to add up and what they can do to compensate for these age-related changes. This information was gleaned through review of conference proceedings (e.g., DHEW, 1975; AMA and AAVA, 1974) and medical/traffic safety research reports (e.g., Allen, 1970).

Age-specific information was given as much "weight" in the content selection process as was experienced driver information deficiencies. This was done as much in consideration of the intended delivery system as it was in consideration of audience needs. Relying strictly upon criteria of accident criticality and the needs of experienced drivers would have resulted in an older driver version of a basic driver improvement manual. While eminently suitable for distribution through licensing agencies, such a manual would not be seen as being essentially germane to the broader instructional mission of other agencies (e.g., State health and State education agencies).

Approach Guidelines

Project staff erected and abided by two sets of research-derived guidelines governing the instructional approach to be employed. One set of guidelines is general in nature, being applicable to all instructional materials regardless of the intended audience. The other set of guidelines--age-related guidelines--was established to address the learning traits peculiar to an older audience.

General Guidelines

The following general guidelines governing approach were established:

- o Information should be presented in a straight-forward, factual manner, rather than in a fashion calculated to appeal to emotions.

- o Information presented must emphasize traffic safety concepts, rather than traffic laws.
- o The manual must convince the audience that it contains information that is (1) new to them and (2) relevant to their personal needs (i.e., that it contains information they do not have but need to know).
- o Information should be presented at a 6th-grade reading level.
- o Technical terms (e.g., dark adaption, hypertension) should be avoided whenever possible and, where they are used, must be followed immediately by a layman's definition.
- o The manual should be informal and intimate--e.g., use "you" rather than "the older driver."

Age-Related Guidelines

The following "special" approach guidelines were established in recognition of the learning characteristics of adults in general and older drivers in particular:

- o Information must be presented in a way that will allow it to be perceived as being directly useful. Older people typically attend most closely to information which they view as providing immediate benefits.
- o Information must be presented in an "up-beat" fashion, emphasizing while aging creates definite problems for most drivers--these problems are not so great that they cannot be overcome.
- o To the extent possible, new information should be integrated into discussions of real-world experiences and attitudes commonly shared by older drivers.
- o Learning experiences (i.e., an interactive element) must be injected into the presentation of information.
- o The manual must present realistic situations which challenge readers to work out practical solutions.
- o Questions or tests (used to provide an interactive element) must be difficult enough to be perceived as posing a true challenge, yet easy enough to make success likely.
- o Information must be presented in a non-condescending manner.
- o The manual must do nothing to raise the spectre of loss of license (a real fear among many older persons and one which, if raised, might cause many to doubt the intent or helpfulness of the manual).

- o The manual must avoid treating older drivers as an homogenous group.
- o The manual must focus on driving problems which become more likely with advancing years. It should not focus on aging per se. Under no circumstances should age itself be presented as a problem.

It will be noted that the two sets of guidelines are mutually reinforcing. The age-related guideline that calls for introducing new information within the context of familiar situations or concerns is fully compatible with the general guideline that the audience perceive information as being both new and relevant to their real needs. Similarly, the age-related dictum to avoid employing the threat of loss of license as a motivational appeal jibes with the general guidelines urging that the approach be informative rather than emotional and emphasize safety rather than legal requirements or sanctions.

These last-mentioned approach guidelines also were deemed especially appropriate given the nature of the intended delivery system. While it would be entirely appropriate for a licensing agency to distribute a manual that plays up information concerning license revocation or voluntary surrender of license, this type of information is not germane to the responsibilities of other agencies and organizations. The responsibility shared by all components of the intended delivery system is that of fostering the safety and well-being of older people.

DEVELOPMENT OF MANUAL

The older driver manual developed under this project appears as Appendix B to this report. An overview of the manual may best be communicated through a brief discussion of manual theme, instructional technique, and content structure.

Theme

The theme of the manual can be described in terms of how the manual views older drivers and what the manual proposes to do for older drivers. Basically, the manual views older drivers as accomplished, successful drivers--people who possess a wealth of practical driving experience and mature judgment that makes continued safe driving not only possible but outright likely. The manual proposes to help older drivers make the most of these personal advantages by providing them with little-known information about:

- o physical and traffic-related problems that frequently crop up among experienced drivers
- o how to prevent some of these problems from arising, and
- o how to spot unavoidable problems as soon as they develop and cope with them safely and confidently.

The manual acknowledges that not every reader is, at this stage in his or her life, facing every problem discussed in the manual. It stresses, however, that every reader will find something immediately useful, and that the rest of the information will hold the reader in good stead over the long run. In a nutshell, the manual employs a supportive theme to convince older drivers that reading and acting upon the information contained in the manual can help them drive more confidently and safely than before and keep them driving safely for nowever much longer they may wish to operate a motor vehicle.

Instructional Technique

The need for an interactive instructional approach has been accommodated by the inclusion of various exercises and rhetorical devices designed to "engage" the reader in the presentation of information. Exercises presented include a "do-it-yourself reflex test" and "test-your-knowledge" questions. So that readers might be convinced that they can benefit from information in the manual, these exercises are relatively demanding. Few readers will "grade out" as deserving an A+ mark. However, to make sure that these exercises are not frustrating to readers (creating the undesirable feeling that success is impossible for them) the manual follows each exercise with an assurance that imperfect performance was to be expected and that the physical or knowledge deficiency revealed can be readily overcome.

An interactive learning atmosphere is provided by rhetorical questions which require readers to conjure up personal experiences similar to those being discussed. This device is used frequently in the chapter headings themselves--e.g., "Do cars suddenly come out of nowhere?"; "Do drivers stop in front of you suddenly?" These questions were chosen as ways of introducing problems. Most of the questions externalize the problem (e.g., "do other drivers...") to make them less threatening. The same device is used within the presentations proper--e.g., "Have you ever been surprised to find the lane you're driving in has ended?"

Questions also are used to introduce information not directly related to "problems." These introductory questions allow information to be presented in a fashion consistent with the overall approach of the manual. They are cast in the form of questions likely to be voiced by readers in response to new information. For example, the suggestion to scan 15 seconds ahead is followed by the question: "How far ahead is 15 seconds?" Such a question would be a "natural" among older persons who, if they have received any formal driving instruction at all, were taught distances in terms of length measures (e.g., feet, car lengths, city blocks) rather than temporal measures. Asking questions likely to be in the minds of the reader assures the reader that the manual is in tune with his or her personal thought processes and informational needs. Additionally, it allows the manual to avoid a lecture mode of presentation, by counterfeiting the give-and-take of classroom question-and-answer exchanges. In this fashion, the manual attempts to provide an interactive learning atmosphere vicariously.

Content Structure

Most driver training manuals are structured in terms of the type of content they employ. Those that deal primarily with traffic laws are organized in terms of the laws. Manuals focusing on safe driving information tend to be organized either in terms of various driver tasks (e.g., how to enter expressways safely, how to pass safely, how to drive safely on ice) or fundamental driving principles (e.g., principles of speed management, principles of space management).

Given the nature of the intended delivery system, adherence to any one of these traditional structures was deemed to be inappropriate. As all potential delivery components share the responsibility of responding to the information needs of older persons, project staff elected to adopt an organizational structure built around concerns frequently voiced by older drivers.

The manual presents these concerns in the form of questions. The relevant information (answers) is provided in the following sequence:

- o HOW DOES AGE AFFECT DRIVING?--introductory section establishing the theme of the manual.
- o HOW IMPORTANT ARE SHARP REFLEXES?--information concerning the importance of looking 15 seconds ahead in traffic.
- o DO DRIVERS STOP IN FRONT OF YOU SUDDENLY?--information concerning the importance of maintaining a 3-second following distance.
- o DO CARS SUDDENLY COME OUT OF NOWHERE?--information concerning the importance of looking to the sides and behind. Techniques for eliminating blindspots and backing safely are highlighted.
- o ARE OTHER DRIVERS IN TOO BIG A RUSH?--information concerning how to maintain a comfortable (slower than others') pace safely. Highlighted are the issues of proper lane selection, trip scheduling, and techniques for handling tailgaters.
- o DO YOU SOMETIMES MISS A SIGN?--techniques for spotting signs in time to react to them safely.
- o ARE ROADS GETTING TOO CONFUSING?--information for coping with infrequently encountered traffic control devices: arrow signals, reversible lanes, and shared left-turn lanes. Also included is information on avoiding or overcoming on-the-road disorientation (being lost or momentarily confused).
- o ARE GAPS IN TRAFFIC HARDER TO JUDGE?--information on how to select appropriate intersection gaps via patience, route selection, and trip scheduling.

- o IS IT TOUGH TO MAKE SHARP TURNS?--information on the dangers of turning wide and techniques for making sharp turns more easily and safely.
- o ARE EXPRESSWAYS GETTING TO BE MORE TROUBLE THAN THEY'RE WORTH?-- information on the advantages of riding on expressways and advice on how to get on and off expressways safely.
- o IS NIGHT DRIVING GETTING MORE DIFFICULT?--information on how to handle the problems of too much or too little light.
- o DO LONG TRIPS WEAR YOU OUT?--information on how to plan for and make lengthy trips without undue fatigue.
- o DO YOU TAKE MEDICINE?--information on how various types of medication may affect driving; guidelines for keeping the effects of medicine from spilling over into driving.
- o CAN YOU DRINK AS WELL AS YOU USED TO?--information on how alcohol affects older people and guidelines on limiting drinking or separating drinking from driving.
- o ARE SAFETY BELTS A BIG NUISANCE?--special needs of older people to wear safety belts; myths and facts about safety belt use; older people and child restraints.
- o ALL IN ALL, HOW DANGEROUS IS IT OUT THERE?--summary statement of the need to drive more safely than ever and the advantages of cutting back on driving, selecting safe routes, and scheduling trips for maximum safety.

RECOMMENDATIONS FOR OLDER DRIVER RETRAINING PROGRAMS

The recommendations presented in this section of the report are intended to serve as general guidelines for curriculum developers. These recommendations represent the findings and conclusions of project staff derived from the research activities already described.

As general guidelines, these recommendations do not purport to be deserving of slavish adherence. A cardinal rule of program development is to speak as closely as possible to the specific needs of the intended audience. It is obvious that older drivers are not an homogenous group. There exists a wide variance of interests, experience, knowledge, physical and mental capability, and skills within any group of drivers--young or old. Similarly, there are significant differences in driving conditions from town to town, state to state, and region to region. The effectiveness of any program can be increased by tailoring its instructional content, methods, and materials to address the specific needs of the student group. The efficiency of any program can be enhanced by weeding out content, methods, and materials that are inappropriate or unnecessary for the specific audience to be addressed. Because of these considerations, it is highly recommended that program developers solicit the active participation of older drivers in all program development activities.

The age-related guidelines for instructional approach used by project staff to develop the older driver pamphlet are fully applicable to development of an older driver retraining program. To avoid unnecessary repetition, those guidelines are not duplicated here. However, they should be viewed as recommendations for use in future development activities, complementing the recommendations for program content, methods, and materials presented in this section.

CONTENT RECOMMENDATIONS

Information requirements for older drivers are listed below. This list is by no means exhaustive. It does, however, represent core information needs identified through knowledge testing and research conducted with this driver group (e.g., McKnight & Green 1976; Planek et al., 1968), as well as through the accident literature and project activities.

In reviewing these content areas, it is important to keep in mind that simply identifying safe operating procedures and age-related problems is not enough. Content must explain the rationale behind procedures and practical ways of compensating for driver performance-related deficiencies that are often brought on by aging. In sum, in addition to explaining the "what" of a principle or problem, an older driver program must also provide information on the "why" and the "how."

RECENT SIGNS AND SIGNALS

- o Lighted arrows
- o Overhead lane signals
- o Wrong way
- o Do not enter
- o No left/right/U-turn
- o Yield sign
- o Divided highway ahead
- o Pedestrian crossing
- o Lane ends ahead
- o Slippery road
- o Slow moving vehicle
- o School crossing

PAVEMENT MARKINGS

- o Reversible lanes
- o 2-way left turn lanes
- o Special vehicle lanes

RIGHT-OF-WAY

- o Rules
- o "Last clear chance"
- o Driver responsibility for yielding the right-of-way

MAINTAINING SPEED

- o "Safe Speeds"
- o Maintain prevailing speed
- o Lane usage
- o Travel times
- o Route selection
- o Freeway entrances
- o Freeway exit
- o Leaving the roadway
- o Avoiding sudden stops
- o Avoiding sudden lane changes, turning, passing

OBSERVING

- o Rearview mirrors
- o Side mirrors
- o Over-the-shoulder checks
- o Backing up

SEEING/HEARING PROBLEMS

- o Importance of seeing/hearing well
- o Check-ups
- o Peripheral vision
- o Night vision

SEEING/HEARING (CONT.)

- o Dark glasses
- o Use of high beams
- o Glare

Hearing

- o Windows
- o Radio
- o Use of mirrors

COMMUNICATING

- o Signalling intentions
- o Communicating sudden/unexpected stops
- o Stopping on or near the highway

KEEPING A MARGIN OF SPACE AROUND THE CAR

- o Safe passing
- o Lane position
- o 3-second following distance
- o Situations requiring increase in following distance
- o Tailgaters
- o Making turns

EMERGENCIES

- o Safety belts

INFORMATION PROCESSING

- o Recognizing hazards
- o Heavy traffic, rush hours
- o Unfamiliar areas
- o Construction areas
- o Passenger assistance
- o Pre-trip planning

PHYSICAL

- o Reaction time
- o High blood pressure
- o Dizziness, blackouts
- o Arthritis
- o Heart trouble
- o Diabetes

FATIGUE

- o Cause of fatigue
- o Importance of rest before/during driving
- o Eating prior to traveling
- o Limiting daily mileage
- o Rest stops
- o Avoiding bad weather driving

ALCOHOL

- o Dangers
- o Relation to age
- o Limiting consumption

MEDICATION EFFECTS

- o Over-the-counter drugs
- o Prescription medication
- o Combining medications
- o Mixing medicine and alcohol
- o Precautionary measures

ALTERNATIVES TO DRIVING

- o Public transportation
- o Senior citizen groups
- o Social service agencies

METHODS AND MATERIALS RECOMMENDATIONS

The appropriate selection of instructional methods and materials is perhaps the strongest factor in successfully communicating information requirements to the older driver group.

Different age groups have different learning patterns. Older adults bring to the learning situation a greater level of life experiences to which they can relate information presented. The older age group also possesses a different motivation to learn certain types of information. Older persons are especially interested in the areas of health and safety, since they can directly relate this information to their particular life needs. Considerations like these should play a part in the selection of instructional methods and materials employed with this learner group.

Methods

- o Members of the peer group should be involved in actually delivering the course (i.e., older adults serve as instructors)
- o The program should incorporate a high level of student-instructor interaction rather than relying on mere presentation of information. New information is often more easily grasped when related to past experiences within a participating learning exercise.
- o Structure must be provided for group discussion and question/answer segments so that ample time is provided for student responses and interaction is directed toward specific goals.
- o The meaningfulness and applicability of information should be stressed.
- o Interrelationship among program content areas should be explained.
- o Information should not be presented at a rapid pace. Major points should be reviewed.
- o Factual information, rather than shock effects or scare tactics, should be relied upon to create receptiveness.
- o Program content should not be presented in a condescending manner, and should not be oversimplified.
- o Mere recitation of facts and information presented in instructional aids should be avoided.
- o If guest lecturers (e.g., physicians, police officers) are to be used, they should be given guidance beforehand to assure that their presentations will jibe with the guidelines presented here.
- o Visual and hearing problems should be taken into account where classroom set-up and design of group activities are concerned.

Materials

- o Written materials should incorporate an informal style (e.g., written in the first person.)
- o All materials should be geared to an acceptable readability level. The use of technical expressions should be avoided.
- o Visuals and written materials should provide high contrast (light and dark) for legibility and clarity.
- o Print should be sufficiently large and bold, and important detail should be exaggerated in illustrations.
- o Materials should not focus on age, but address information needs. The use of adjectives like "elderly" should be avoided, since few people identify with them.
- o Materials should be attractive and presented in a straightforward manner. Illustrations of the drivers should not exaggerate the age element.
- o Illustrations should be utilized whenever they can communicate principles more efficiently than the printed or spoken word (e.g., 3-second following distance rule, location of driver blind spots).
- o In films, the use of animated characterizations not obviously related to age has been suggested as a way of avoiding generalized physical stereotypes of older persons.
- o Narrative accompanying visual presentation should be moderately paced in order to provide adequate exposure time.

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DRIVING EXPERIENCE QUESTIONNAIRE

Name: Last _____ First _____

Address: _____

Telephone Number: _____

NRTA/AARP Membership Number (Leave blank if not a member)

Date of Birth: Month _____ Year _____

Sex: Male _____ Female _____

Driver License No.: _____ State _____

Today's Date: _____

This questionnaire was developed to find out about people's driving experience. Please answer each question very carefully. It is important that you provide an answer for every question, unless otherwise directed. All of the information which you provide will be kept strictly confidential.

If you have any questions, ask your instructor for clarification. Please return this questionnaire to your instructor when you are done. Thank you for your cooperation.

This part of the Driving Experience Questionnaire has to do with you and your general driving habits. For each of the questions please check the box that corresponds with the appropriate answer. Remember to CHECK ONLY ONE BOX, unless otherwise directed. Before you get started, review the example below.

EXAMPLE:

How many children do you have?

No children	<input type="checkbox"/>
One child	<input type="checkbox"/>
Two children	<input checked="" type="checkbox"/>
Three children	<input type="checkbox"/>
More than three children	<input type="checkbox"/>

The answer checked with the example above indicates that you have two children.

1. What is the highest grade in school you have completed?

1-6th grade	<input type="checkbox"/>
7-11th grade	<input type="checkbox"/>
graduated high school	<input type="checkbox"/>
some college	<input type="checkbox"/>
graduated college	<input type="checkbox"/>
any graduate studies	<input type="checkbox"/>

2. Are you now employed (full- or part-time)?

Full-time paid employment	<input type="checkbox"/>
Part-time paid employment	<input type="checkbox"/>
Full-time volunteer employment	<input type="checkbox"/>
Part-time volunteer employment	<input type="checkbox"/>
Both paid and volunteer employment ..	<input type="checkbox"/>
Not employed	<input type="checkbox"/>

3. How many years ago did you learn to drive?

1 or less	<input type="checkbox"/>
2-4	<input type="checkbox"/>
5-9	<input type="checkbox"/>
10-19	<input type="checkbox"/>
20-29	<input type="checkbox"/>
30-39	<input type="checkbox"/>
40 or more	<input type="checkbox"/>

4. How many miles have you driven in the last year?

Less than 1,000 miles (less than 20 per week).....	<input type="checkbox"/>
1,000-2,500 miles (20-50 miles per week).....	<input type="checkbox"/>
2,500-5,000 miles (50-100 miles per week).....	<input type="checkbox"/>
5,000-7,500 miles (100-150 miles per week).....	<input type="checkbox"/>
7,500-10,000 miles (150-200 miles per week).....	<input type="checkbox"/>
10,000-15,000 miles (200-300 miles per week)	<input type="checkbox"/>
15,000 miles or more	<input type="checkbox"/>

5. How often do you drive (on the average)?

Less than once a week	<input type="checkbox"/>
1-2 times a week	<input type="checkbox"/>
3-5 times a week	<input type="checkbox"/>
Once a day	<input type="checkbox"/>
More than once a day	<input type="checkbox"/>

6. How often do you ride while others drive?

All of the time	<input type="checkbox"/>
Most of the time	<input type="checkbox"/>
Half of the time	<input type="checkbox"/>
Some of the time	<input type="checkbox"/>
Rarely	<input type="checkbox"/>
Never	<input type="checkbox"/>

7. Who MOST OFTEN drives when you ride?

Your husband or wife	<input type="checkbox"/>
Your children	<input type="checkbox"/>
Other relatives	<input type="checkbox"/>
Friends	<input type="checkbox"/>
Others	<input type="checkbox"/>
You always drive	<input type="checkbox"/>

8. What percent of your driving is done at night (dark)?

0%	<input type="checkbox"/>
1-10%	<input type="checkbox"/>
10-25%	<input type="checkbox"/>
25-50%	<input type="checkbox"/>
50-100%	<input type="checkbox"/>

9. What year car or truck do you drive most? Year _____

10. What size vehicle is it?

Truck or van	<input type="checkbox"/>
Full sized car or station wagon	<input type="checkbox"/>
Intermediate sized car	<input type="checkbox"/>
Small or compact car	<input type="checkbox"/>

11. How often do you use safety belts?

Always	<input type="checkbox"/>
Usually	<input type="checkbox"/>
Sometimes	<input type="checkbox"/>
Rarely	<input type="checkbox"/>
Never	<input type="checkbox"/>

If you do not wear safety belts all of the time, why don't you?

I forget	<input type="checkbox"/>
They are uncomfortable	<input type="checkbox"/>
They are unsafe	<input type="checkbox"/>
I don't need them	<input type="checkbox"/>
Do not have	<input type="checkbox"/>
Other	<input type="checkbox"/>

12. For the following driving situations, indicate whether they have gotten easier, harder, or have remained the same:

	Easier	Harder	Same
a. At night			
b. In snow/sleet/slush			
c. In rain			
d. In fog			
e. On expressways (freeways, turnpikes, interstates, limited access highways) ..			
f. On city streets			
g. During rush hour			
h. During non-rush hour			
i. At highway speeds			
j. In heavy traffic			
k. While parking			
l. While backing-up			
m. When tired			
n. When upset			
o. When entering expressways ...			
p. When driving through intersections			
q. When turning left at an intersection			
r. When turning right at an intersection			
s. When keeping up with traffic flow			
t. When pulling out of a parking space			
u. When changing lanes on a highway			
v. When passing			
w. When being passed			
x. After drinking (if you drink)			
y. After taking medication (if you take medication) ..			

13. Of the driving situations listed in the previous question pick the three which are the hardest for you, and circle the letter next to that item.

14. For the following situations, indicate whether you drive more frequently, less frequently, or the same amount as you used to:

	More	Less	Same
At night			
During winter			
In snow/sleet/slush			
In rain			
In fog			
On expressways			
On city streets			
When upset			
During rush hour			
During non-rush hour			
In heavy traffic			
After drinking (if you drink) ..			
After taking medication (if you take medication)			

15. Do you have any of the following medical problems? (check as many answers as appropriate)

Heart or artery problem	
Lung problem	
Arthritis	
Stroke	
Epilepsy	
Broken bone in arm	
Broken bone in leg or hip	
Other broken bone	
Vision problem NOT corrected completely by glasses or contacts ..	
Hearing difficulty	
Diabetes	
High blood pressure	
Other	

16. For what purpose do you normally drive?

Recreational/Pleasure .
Household business
Work

17. On what type of road do you normally drive?

Expressways
Residential streets
Business streets
Rural

18. At what time of day do you normally travel?

8-10 a.m.
10 a.m. - 12 p.m.
12-2 p.m.
2-4 p.m.
4-6 p.m.
After 6 p.m.

19. What driver training courses have you taken in the last 5 years?

None
Defensive Driving Course (DDC)
Traffic School (for a violation)
Other

This part of the questionnaire relates to traffic violations which you may have had in the past 3 years. Please do not include parking tickets.

20. How many tickets have you had in the past 3 years?

0	<input type="checkbox"/>
1	<input type="checkbox"/>
2	<input type="checkbox"/>
3	<input type="checkbox"/>
4	<input type="checkbox"/>
5	<input type="checkbox"/>
6 or more ..	<input type="checkbox"/>

IF YOU HAVE NOT HAD A TICKET IN THE PAST 3 YEARS, GO TO QUESTION 24.

21. How many of the violations involved an accident?

0	<input type="checkbox"/>
1	<input type="checkbox"/>
2	<input type="checkbox"/>
3	<input type="checkbox"/>
4	<input type="checkbox"/>
5	<input type="checkbox"/>
6 or more ..	<input type="checkbox"/>

22. What was your last violation for?

Speeding	<input type="checkbox"/>
Failure to yield right of way	<input type="checkbox"/>
Drinking and driving (driving under the influence).....	<input type="checkbox"/>
Following too closely	<input type="checkbox"/>
Driving too slowly	<input type="checkbox"/>
Driving left of center	<input type="checkbox"/>
Improper passing	<input type="checkbox"/>
Failure to signal	<input type="checkbox"/>
Not stopping at stop sign	<input type="checkbox"/>
Disregarding traffic light	<input type="checkbox"/>
Turned from wrong lane	<input type="checkbox"/>
Other improper turning	<input type="checkbox"/>
Improper starting	<input type="checkbox"/>
Failure to dim headlights	<input type="checkbox"/>
Poor vehicle condition	<input type="checkbox"/>
Reckless driving	<input type="checkbox"/>
Other	<input type="checkbox"/>

23. Has your license been suspended or revoked in the past 3 years?

Yes ...
No

24. How many accidents have you had in the past 3 years? (Do not count accidents when your car was hit after it was parked)

0
1
2
3
4
5
6 or more .

IF YOU HAVE HAD NO ACCIDENTS IN THE PAST 3 YEARS YOU HAVE COMPLETED THE QUESTIONNAIRE. THANK YOU VERY MUCH.

IF YOU HAVE HAD ANY ACCIDENTS IN THE PAST 3 YEARS, PLEASE CONTINUE.

25. In the chart provided below, please indicate the month, year, and State in which each of your accidents occurred. Remember to give this information for each of your accidents, beginning with the first one.

	Month	Year	State
First Accident ...			
Second Accident ..			
Third Accident ...			
Fourth Accident ..			

Please answer the following questions about your last accident:

26. Did you hit another car or object or did the car hit you?

You both hit each other	<input type="checkbox"/>
You hit another car or object ...	<input type="checkbox"/>
Another vehicle hit you	<input type="checkbox"/>
Other	<input type="checkbox"/>

27. What other object was involved?

Car	<input type="checkbox"/>
Truck	<input type="checkbox"/>
Bus	<input type="checkbox"/>
Motorcycle	<input type="checkbox"/>
Train	<input type="checkbox"/>
Pedestrian	<input type="checkbox"/>
Bicycle	<input type="checkbox"/>
Fixed object (post, tree, etc.)...	<input type="checkbox"/>
Other	<input type="checkbox"/>

28. Was that object moving?

Yes	<input type="checkbox"/>
No	<input type="checkbox"/>

29. What part of your vehicle was hit first?

Front center	<input type="checkbox"/>
Front end-driver's side	<input type="checkbox"/>
Front end-passenger's side	<input type="checkbox"/>
Driver's door	<input type="checkbox"/>
Passenger's door	<input type="checkbox"/>
Rear-center	<input type="checkbox"/>
Rear-passenger's side	<input type="checkbox"/>
Rear-driver's side	<input type="checkbox"/>

30. What was the damage done to your vehicle in the accident?

Minor (less than \$200)	<input type="checkbox"/>
Major (more than \$200)	<input type="checkbox"/>

31. Was anyone injured?

No	<input type="checkbox"/>
Minor injuries (cuts, bruises)	<input type="checkbox"/>
Serious injuries (ambulance needed)	<input type="checkbox"/>
Death associated with accident	<input type="checkbox"/>

32. Where did the accident happen?

At controlled intersection (with traffic light or stop sign) ...	<input type="checkbox"/>
At uncontrolled intersection (no traffic light or stop sign)	<input type="checkbox"/>
On straight road	<input type="checkbox"/>
On a curve	<input type="checkbox"/>
Exit ramp	<input type="checkbox"/>
Entrance ramp	<input type="checkbox"/>
Driveway	<input type="checkbox"/>
Parking lot	<input type="checkbox"/>
Underpass	<input type="checkbox"/>
Railroad crossing	<input type="checkbox"/>
Traffic circle	<input type="checkbox"/>
Bridge	<input type="checkbox"/>
Other	<input type="checkbox"/>

33. What type of roadway?

Dirt or gravel road (one-or two-way) .	<input type="checkbox"/>
One-way road or street	<input type="checkbox"/>
Two-way undivided road	<input type="checkbox"/>
Two-way divided road	<input type="checkbox"/>
Expressway	<input type="checkbox"/>
Parking lot	<input type="checkbox"/>
Driveway	<input type="checkbox"/>
Other	<input type="checkbox"/>

34. What was the posted speed limit?

25 mph or less	<input type="checkbox"/>
30 mph	<input type="checkbox"/>
35 mph	<input type="checkbox"/>
40 mph	<input type="checkbox"/>
45 mph	<input type="checkbox"/>
50 mph or more	<input type="checkbox"/>
Do not know	<input type="checkbox"/>
There was none	<input type="checkbox"/>

35. What kind of location?

Urban or suburban (business)	<input type="checkbox"/>
Urban or suburban (residential).....	<input type="checkbox"/>
Country or rural	<input type="checkbox"/>
Expressway	<input type="checkbox"/>
Other	<input type="checkbox"/>

36. Condition of road surface? (check as many answers as appropriate)

Dry	<input type="checkbox"/>
Wet	<input type="checkbox"/>
Snow-packed	<input type="checkbox"/>
Icy	<input type="checkbox"/>
Oily	<input type="checkbox"/>
Loose material on roadway (e.g., gravel)	<input type="checkbox"/>

37. When did the accident happen?

During the week	<input type="checkbox"/>
During the weekend ..	<input type="checkbox"/>

38. At what time did the accident occur?

Daylight	<input type="checkbox"/>
Dawn or dusk	<input type="checkbox"/>
Dark under streetlights	<input type="checkbox"/>
Dark without streetlights ..	<input type="checkbox"/>

39. What were you doing when the accident occurred? (check as many answers as appropriate)

Going straight	<input type="checkbox"/>
On a curve	<input type="checkbox"/>
Turning left	<input type="checkbox"/>
Turning right	<input type="checkbox"/>
Slowing down	<input type="checkbox"/>
Stopped	<input type="checkbox"/>
Changing lanes	<input type="checkbox"/>
Passing another vehicle	<input type="checkbox"/>
Making a U-turn	<input type="checkbox"/>
Backing	<input type="checkbox"/>
Entering or leaving a parked car	<input type="checkbox"/>
Entering traffic from a driveway	<input type="checkbox"/>
Merging	<input type="checkbox"/>
Exiting from an expressway	<input type="checkbox"/>
Other	<input type="checkbox"/>

40. What was the other driver doing when the accident occurred?
(check as many answers as appropriate)

- No other driver involved
- Going straight
- On a curve
- Turning left
- Turning right
- Slowing down
- Stopped
- Changing lanes
- Passing another vehicle
- Making a U-turn
- Backing
- Entering or leaving a parked position
- Entering traffic from a driveway
- Merging
- Exiting from an expressway
- Other

41. How did you try to avoid the accident?

- Applied brakes
- Tried to change lanes
- Drove off road
- Tried to steer around the object or car ..
- Increased speed
- Did not do anything
- Could not do anything
- Other

42. What mistake did the other driver make, if any? (check as many answers as appropriate)

- No other driver involved
- None
- Speed too fast for conditions
- Traveling too slowly
- Did not yield right-of-way
- Did not stop at sign or signals
- Following too closely
- Improper turn
- Did not give proper signal
- Misjudged distance or space needed
- Did not see other car or pedestrian
- Other

43. What mistake did you make, if any? (check as many answers as appropriate)

- None
- Speed too fast for conditions
- Traveling too slowly
- Did not yield the right-of-way
- Did not stop at sign or signals
- Following too closely
- Improper turn
- Did not give proper signal
- Misjudged distance or space needed
- Did not see other car or pedestrian
- Other

44. Were you wearing your safety belts during the accident?

- Yes ...
- No

45. Had you been drinking alcohol prior (within 3 hours) to the accident?

- No
- Had 1 or 2 drinks
- Had 3 or 4 drink
- Had more than 4 drinks ...

46. Had you taken any medication or drugs?

- Yes ...
- No

47. If you were taking medicine or drugs and you know what type, please indicate:

- Analgesics
- Antihistamines
- Oral Hypoglycemics ...
- Antihyperactives
- Stimulants
- Sedatives

48. Had you been seeing a physician or had a medical condition during the period that the accident occurred?

No	<input type="checkbox"/>
Heart or artery problem	<input type="checkbox"/>
Lung problem	<input type="checkbox"/>
Arthritis	<input type="checkbox"/>
Stroke	<input type="checkbox"/>
Epilepsy	<input type="checkbox"/>
Broken bone in arm	<input type="checkbox"/>
Broken bone in leg or hip	<input type="checkbox"/>
Other broken bone	<input type="checkbox"/>
Vision problem <u>NOT</u> corrected completely by glasses or contacts	<input type="checkbox"/>
Hearing difficulty	<input type="checkbox"/>
Diabetes	<input type="checkbox"/>
High blood pressure	<input type="checkbox"/>
Other	<input type="checkbox"/>

You have now completed the questionnaire. Please give it to your instructor.

Thank you very much.

APPENDIX A

POST-DEQ

DRIVING EXPERIENCE QUESTIONNAIRE

NAME: LAST _____ FIRST _____

NRTA/AARP MEMBERSHIP NUMBER (LEAVE BLANK IF NOT A MEMBER)

DATE OF BIRTH: MONTH _____ YEAR _____

SEX: MALE _____ FEMALE _____

DRIVER LICENSE NO: _____ STATE _____

TODAY'S DATE: _____

THIS QUESTIONNAIRE WAS DEVELOPED TO FIND OUT ABOUT PEOPLE'S DRIVING EXPERIENCE. PLEASE ANSWER EACH QUESTION VERY CAREFULLY. IT IS IMPORTANT THAT YOU PROVIDE AN ANSWER FOR EVERY QUESTION, UNLESS OTHERWISE DIRECTED. ALL OF THE INFORMATION WHICH YOU PROVIDE WILL BE KEPT STRICTLY CONFIDENTIAL.

WHEN YOU HAVE COMPLETED THE QUESTIONNAIRE, PLEASE RETURN IT IN THE ENVELOPE PROVIDED. THANK YOU FOR YOUR COOPERATION.

THIS PART OF THE DRIVING EXPERIENCE QUESTIONNAIRE HAS TO DO WITH YOU AND YOUR GENERAL DRIVING HABITS. FOR EACH OF THE QUESTIONS PLEASE CHECK THE BOX THAT CORRESPONDS WITH THE APPROPRIATE ANSWER. REMEMBER TO CHECK ONLY ONE BOX, UNLESS OTHERWISE DIRECTED. BEFORE YOU GET STARTED, REVIEW THE EXAMPLE BELOW.

EXAMPLE:

HOW MANY CHILDREN DO YOU HAVE?

NO CHILDREN..... _____
ONE CHILD..... _____
TWO CHILDREN..... _____
THREE CHILDREN..... _____
MORE THAN THREE CHILDREN..... _____

THE ANSWER CHECKED WITH THE EXAMPLE ABOVE INDICATES THAT YOU HAVE TWO CHILDREN.

1. WHAT IS THE HIGHEST GRADE IN SCHOOL YOU HAVE COMPLETED? (CHECK ONLY ONE)

- 1-6TH GRADE..... _____
- 7-11TH GRADE..... _____
- GRADUATED HIGH SCHOOL..... _____
- SOME COLLEGE..... _____
- GRADUATED COLLEGE..... _____
- ANY GRADUATE STUDIES..... _____

2. ARE YOU NOW EMPLOYED FULL- OR PART-TIME? (CHECK ONLY ONE)

- FULL-TIME PAID EMPLOYMENT..... _____
- PART-TIME PAID EMPLOYMENT..... _____
- FULL-TIME VOLUNTEER EMPLOYMENT... _____
- PART-TIME VOLUNTEER EMPLOYMENT... _____
- NOT EMPLOYED..... _____

3. HOW MANY MILES HAVE YOU DRIVEN IN THE LAST YEAR? (CHECK ONLY ONE)

- LESS THAN 1,000 MILES (LESS THAN 20 PER WEEK)..... _____
- 1,000-2,500 MILES (20-50 MILES PER WEEK)..... _____
- 2,500-5,000 MILES (50-100 MILES PER WEEK)..... _____
- 5,000-7,500 MILES (100-150 MILES PER WEEK)..... _____
- 7,500-10,000 MILES (150-200 MILES PER WEEK)..... _____
- 10,000-15,000 MILES (200-300 MILES PER WEEK)..... _____
- 15,000 MILES OR MORE..... _____

4. HOW OFTEN DO YOU DRIVE (ON THE AVERAGE)? (CHECK ONLY ONE)

- LESS THAN ONCE A WEEK..... _____
- 1-2 TIMES A WEEK..... _____
- 3-5 TIMES A WEEK..... _____
- ONCE A DAY..... _____
- MORE THAN ONCE A DAY..... _____

5. HOW OFTEN DO YOU RIDE WHILE OTHERS DRIVE? (CHECK ONLY ONE)

- ALL OF THE TIME..... _____
- MOST OF THE TIME..... _____
- HALF OF THE TIME..... _____
- SOME OF THE TIME..... _____
- RARELY..... _____
- NEVER..... _____

6. WHAT PERCENT OF YOUR DRIVING IS DONE AT NIGHT? (CHECK ONLY ONE)

- 0%..... _____
- 1-10%..... _____
- 10-25%..... _____
- 25-50%..... _____
- 50-100%..... _____

7. HOW OFTEN DO YOU USE SAFETY BELTS? (CHECK ONLY ONE)

- ALWAYS..... _____
- USUALLY..... _____
- SOMETIMES..... _____
- RARELY..... _____
- NEVER..... _____

8. FOR THE FOLLOWING DRIVING SITUATIONS, INDICATE WHETHER THEY HAVE GOTTEN EASIER, HARDER, OR HAVE REMAINED THE SAME:

- | | EASIER | SAME | HARDER |
|-----------------------------|--------|------|--------|
| A. AT NIGHT..... | | | |
| B. IN SNOW/SLEET/SLUSH..... | | | |
| C. IN RAIN..... | | | |
| D. IN FOG..... | | | |
| E. DURING RUSH HOUR..... | | | |
| F. IN HEAVY TRAFFIC..... | | | |
| G. WHEN TIRED..... | | | |
| H. WHEN UPSET..... | | | |

9. FOR THE FOLLOWING SITUATIONS, INDICATE WHETHER YOU DRIVE MORE FREQUENTLY, LESS FREQUENTLY, OR THE SAME AMOUNT AS YOU USED TO:

LESS SAME MORE

AT NIGHT.....
 DURING WINTER.....
 IN SNOW/SLEET/SLUSH.....
 IN RAIN.....
 IN FOG.....
 ON EXPRESSWAYS.....
 ON CITY STREETS.....
 WHEN UPSET.....
 DURING RUSH HOUR.....
 IN HEAVY TRAFFIC.....
 AFTER DRINKING (IF YOU DRINK).....
 AFTER TAKING MEDICATION.....
 (IF YOU TAKE MEDICATION).....

10. DO YOU HAVE ANY OF THE FOLLOWING MEDICAL PROBLEMS? (CHECK AS MANY ANSWERS AS APPLY)

HEART OR ARTERY PROBLEM.....
 ARTHRITIS.....
 HEARING DIFFICULTY.....
 HIGH BLOOD PRESSURE.....
 OTHER.....

11. HOW MUCH OF YOUR DRIVING OCCURS ON THE FOLLOWING ROADS?

ALMOST ALL MOST SOME LITTLE NONE

EXPRESSWAYS.....
 RESIDENTIAL STREETS..
 BUSINESS STREETS.....
 RURAL.....

12. HOW MUCH OF YOUR DRIVING OCCURS AT THE FOLLOWING TIMES?

ALMOST ALL MOST SOME LITTLE NONE

8-10 A.M.....
 10 A.M. - 12 P.M.....
 12-2 P.M.....
 2-4 P.M.....
 4-6 P.M.....
 AFTER 6 P.M.....

13. HAVE YOU TAKEN ANY KIND OF DRIVER TRAINING COURSE OVER THE PAST YEAR?

YES.....___

NO.....___

THIS PART OF THE QUESTIONNAIRE RELATES TO TRAFFIC VIOLATIONS WHICH YOU MAY HAVE HAD IN THE PAST YEAR. PLEASE DO NOT INCLUDE PARKING TICKETS.

14. HOW MANY TICKETS HAVE YOU RECEIVED IN THE LAST YEAR? (CHECK ONLY ONE)

0.....___

1.....___

2 OR MORE...___

IF YOU HAVE NOT RECEIVED ANY TICKETS IN THE PAST YEAR, GO TO QUESTION 24

15. HOW MANY OF THE VIOLATIONS INVOLVED AN ACCIDENT? (CHECK ONLY ONE)

0.....___

1.....___

2 OR MORE...___

16. WHAT WAS YOUR LAST VIOLATION FOR? (CHECK ONLY ONE)

SPEEDING.....___

FAILURE TO YIELD RIGHT OF WAY....___

IMPROPER PASSING.....___

NOT STOPPING AT STOP SIGN.....___

DISREGARDING TRAFFIC LIGHT.....___

TURNTD FROM WRONG LANE.....___

OTHER IMPROPER TURNING.....___

RECKLESS DRIVING.....___

OTHER.....___

17. HOW MANY ACCIDENTS HAVE YOU HAD IN THE PAST YEAR? (DO NOT COUNT ACCIDENTS WHEN YOUR CAR WAS HIT AFTER IT WAS PARKED). (CHECK ONLY ONE)

0.....___

1.....___

2 OR MORE...___

IF YOU HAVE HAD NO ACCIDENTS IN THE PAST YEAR, YOU HAVE COMPLETED THE QUESTIONNAIRE. THANK YOU VERY MUCH.
IF YOU HAVE HAD ONE OR MORE ACCIDENTS IN THE PAST YEAR, PLEASE CONTINUE.

18. IN THE CHART PROVIDED BELOW, PLEASE INDICATE THE MONTH, YEAR, AND STATE IN WHICH EACH OF YOUR ACCIDENTS OCCURRED. REMEMBER TO GIVE THIS INFORMATION FOR EACH OF YOUR ACCIDENTS OVER THE PAST YEAR, BEGINNING WITH THE FIRST ONE.

	MONTH	YEAR	STATE
FIRST ACCIDENT.....			
SECOND ACCIDENT.....			
THIRD ACCIDENT.....			
FOURTH ACCIDENT.....			

PLEASE ANSWER THE FOLLOWING QUESTIONS ABOUT YOUR LAST ACCIDENT:

19. DID YOU HIT ANOTHER CAR OR OBJECT OR DID THE CAR HIT YOU? (CHECK ONLY ONE)

- YOU BOTH HIT EACH OTHER.....
- YOU HIT ANOTHER CAR OR OBJECT.....
- ANOTHER VEHICLE HIT YOU.....
- OTHER.....

20. WAS THAT CAR OR OTHER OBJECT MOVING? (CHECK ONLY ONE)

- YES.....
- NO.....

21. WHAT DAMAGE WAS DONE TO YOUR VEHICLE IN THE ACCIDENT? (CHECK ONLY ONE)

- MINOR.....
- MAJOR.....
- TOTALED.....

22. WHERE DID THE ACCIDENT HAPPEN? (CHECK ONLY ONE)

- AT CONTROLLED INTERSECTION (WITH TRAFFIC LIGHT OR STOP SIGN).....
- AT UNCONTROLLED INTERSECTION (NO TRAFFIC LIGHT OR STOP SIGN).....
- ON STRAIGHT ROAD.....
- ON A CURVE.....
- EXIT RAMP.....
- ENTRANCE RAMP.....
- DRIVEWAY.....
- PARKING LOT.....
- UNDERPASS.....
- RAILROAD CROSSING.....
- TRAFFIC CIRCLE.....
- BRIDGE.....
- OTHER.....

23. WHAT WAS THE POSTED SPEED LIMIT? (CHECK ONLY ONE)

- 0-20 MPH OR LESS....._____
- 21-40 MPH....._____
- 41 MPH OR MORE....._____
- DO NOT KNOW....._____
- THERE WAS NONE....._____

24. WHAT KIND OF LOCATION? (CHECK ONLY ONE)

- URBAN OR SUBURBAN (BUSINESS)....._____
- URBAN OR SURURBAN (RESIDENTIAL)....._____
- COUNTRY OR RURAL....._____
- EXPRESSWAY....._____
- OTHER....._____

25. WHAT MISTAKE DID THE OTHER DRIVER MAKE, IF ANY? (CHECK AS MANY ANSWERS AS APPLY)

- NO OTHER DRIVER INVOLVED....._____
- NONE....._____
- SPEED TOO FAST FOR CONDITIONS....._____
- TRAVELING TOO SLOWLY....._____
- DID NOT YIELD RIGHT-OF-WAY....._____
- DID NOT STOP AT SIGN OR SIGNALS....._____
- FOLLOWING TOO CLOSELY....._____
- IMPROPER TURN....._____
- DID NOT GIVE PROPER SIGNAL....._____
- MISJUDGED DISTANCE OR SPACE NEEDED....._____
- DID NOT SEE OTHER CAR OR PEDESTRIAN....._____
- OTHER....._____

26. WHAT MISTAKE DID YOU MAKE, IF ANY? (CHECK AS MANY ANSWERS AS APPLY)

- NONE....._____
- SPEED TOO FAST FOR CONDITIONS....._____
- TRAVELING TOO SLOWLY....._____
- DID NOT YIELD THE RIGHT-OF-WAY....._____
- DID NOT STOP AT SIGN OR SIGNALS....._____
- FOLLOWING TOO CLOSELY....._____
- IMPROPER TURN....._____
- DID NOT GIVE PROPER SIGNAL....._____
- MISJUDGED DISTANCE OR SPACE NEEDED....._____
- DID NOT SEE OTHER CAR OR PEDESTRIAN....._____
- OTHER....._____

27. WERE YOU WEARING YOUR SAFETY BELTS DURING THE ACCIDENT?

- YES....._____
- NO....._____

28. HAD YOU BEEN DRINKING ALCOHOL PRIOR (WITHIN 3 HOURS) TO THE ACCIDENT?

YES.....
NO.....

29. HAD YOU TAKEN ANY MEDICATION OR DRUGS?

YES.....
NO.....

30. IF YOU WERE TAKING MEDICINE OR DRUGS AND YOU KNOW WHAT TYPE, PLEASE INDICATE. (CHECK AS MANY ANSWERS AS APPLY)

ANALGESICS.....
ANTI-HISTAMINES.....
ORAL HYPOGLYCEMICS.....
ANTIHYPERACTIVES.....
STIMULANTS.....
SEDATIVES.....

31. HAD YOU BEEN SEEING A PHYSICIAN OR HAD A MEDICAL CONDITION DURING THE PERIOD THAT THE ACCIDENT OCCURRED? (CHECK AS MANY ANSWERS AS APPLY)

NO.....
HEART OR ARTERY PROBLEM.....
ARTHRITIS.....
HEARING DIFFICULTY.....
HIGH BLOOD PRESSURE.....
OTHER.....

YOU HAVE NOW COMPLETED THE QUESTIONNAIRE. PLEASE PLACE IT IN THE ENVELOPE PROVIDED AND RETURN IT BY MAIL.

THANK YOU VERY MUCH.

APPENDIX A
KNOWLEDGE TEST

Pre-course Knowledge Test

Name: Last _____ First _____

Address: _____

Telephone: _____

NRTA/AARP Membership No. _____

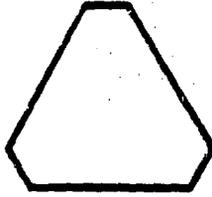
Today's Date: _____

PLEASE READ EACH QUESTION AND CIRCLE THE BEST ANSWER.

1. If your car goes into a skid, you should:
 - A. Pump the brakes
 - B. Apply the brakes firmly
 - C. Avoid using the brakes
 - D. Put your car into neutral

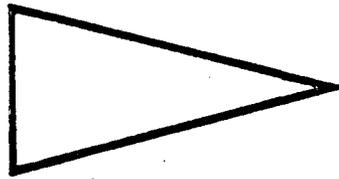
2. In which situation do you have the right-of-way?
 - A. When entering a controlled route
 - B. When already in a traffic circle
 - C. When approaching a merging traffic sign
 - D. When entering a street or highway from a driveway

3. If two vehicles arrive at an uncontrolled intersection at the same time from different directions, who should yield the right-of-way?
 - A. The vehicle on the left
 - B. The vehicle on the right
 - C. Either vehicle
 - D. The slowest moving vehicle



4. When you see a sign shaped like the one above, you will probably see it:
- A. Before entering a narrow bridge
 - B. On the left side of the road
 - C. On the back of a slow moving vehicle
 - D. Just before a curve
5. Depth perception, which is important in knowing when to pass safely:
- A. Increases with age
 - B. Remains the same with age
 - C. Decreases with age
 - D. Increases significantly with age
6. Drivers age 60 and over compared with drivers age 30-50 are involved in:
- A. More than their share of accidents per mile
 - B. An equivalent share of accidents per mile
 - C. Less than their share of accidents per mile
 - D. It varies each year
7. An icy road is most slippery at what temperature?
- A. 32°
 - B. 25°
 - C. 10°
 - D. 0°

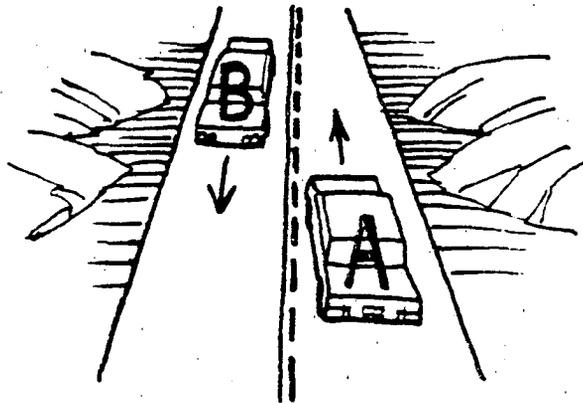
8. When driving in the rain you should do what?
- A. Reduce speed and increase following distance
 - B. Maintain speed with vehicle ahead
 - C. Reduce speed and reduce following distance
 - D. Vary speed to dry out brakes



9. Where might you see a sign shaped like the one above?
- A. On the right side of the road in a No Passing zone
 - B. On the left side of the road in a No Passing zone
 - C. Before very sharp curves in the road
 - D. On roads where there is restricted travel
10. If you are driving through residential streets lined with tall shrubs and hidden driveways and no sidewalks, what should you do?
- A. Keep an eye on the rearview mirror for cars trying to pass you
 - B. Slow down and beep your horn at pedestrians walking along the side of the road
 - C. Drive down the center of the street to improve visibility
 - D. Drive slowly and continually search the environment for potential hazards

11. What should a driver do if the minimum speed limit on a freeway or highway is too fast for him?
- A. Use the freeway only during non-rush hours and only in daylight
 - B. Stay to the right and drive very cautiously by keeping an eye on the rearview mirrors
 - C. Keep off the freeway and select an alternate route
 - D. Stay in the right lane and use the emergency flashers
12. When entering a controlled access highway (turnpike or freeway), what should you do?
- A. Accelerate to the traffic speed and enter highway by merging with traffic at the safest point
 - B. Stop at the end of the entrance ramp and look for an opening in the traffic
 - C. Proceed slowly and enter expressway when safe, trying not to stop
 - D. Because you have the right-of-way, accelerate to the traffic speed and enter the highway quickly
13. If you miss your exit on an Interstate, you should do what?
- A. Turn around at the first U-turn for emergency vehicles area
 - B. Go on to the next exit
 - C. Wait till the highway is clear and then back up
 - D. Stop and back up on the shoulder with your flashers on
14. When rounding a left curve your vehicle tends to do what?
- A. Move to the inside of the lane
 - B. Stay in the center of the lane
 - C. Move to the outside of the lane
 - D. Speed up

15. Why should smoking be avoided when driving at night?
- A. The light from the cigarette can reflect in the windshield
 - B. It can impair night vision
 - C. You can start a fire in the car
 - D. Smoking presents no hazard when driving



16. A road marking like the one pictured above means that:
- A. Car A can pass whenever it is safe
 - B. Car B can pass whenever it is safe
 - C. Passing is prohibited in both directions
 - D. Either car is permitted to pass
17. The best way to increase visibility when backing up is by:
- A. Looking in the rearview mirror
 - B. Looking in both the rearview and side mirrors
 - C. Leaning your head out the window
 - D. Turning around and looking out of the rear window

18. How may eyeglasses adversely affect vision during driving?
- A. Eyeglasses with heavy temples (side pieces) can restrict side vision
 - B. Glare from oncoming headlights at night will reflect into the eyes
 - C. If the glasses slip, they can block the eyes
 - D. Eyeglasses do not adversely affect driving
19. Very slow driving is especially dangerous in which of the following situations?
- A. When approaching the crest of a hill
 - B. Just after passing the crest of a hill
 - C. When making a U-turn
 - D. When making a right turn
20. If you are planning to make a left turn across an intersection and you are waiting in the middle of the intersection for a break in oncoming traffic, which way should your front tires be turned?
- A. To the left
 - B. It depends upon the sharpness of the turn
 - C. Straight ahead
 - D. To the right
21. What do you do when you are exiting a controlled access highway (turnpike or freeway)?
- A. Slow down after you enter the deceleration lane
 - B. Slow down before you enter the deceleration lane
 - C. Start to brake as soon as you signal your intentions to exit
 - D. It is optional whether you signal your exit as long as you are in the lane closest to the exit

22. If you take medication before driving a long distance, what is the most important thing for you to do?
- A. Have another person ride with you
 - B. Be sure to eat a light meal
 - C. Plan on making several rest stops along the way
 - D. Find out the effects of the medication
23. What measure should the driver age 55 and over use in following the vehicle ahead?
- A. 1 car length for ten miles per hour you are traveling
 - B. 2 second following distance
 - C. 3 second following distance
 - D. 10 feet for every ten miles per hour you are traveling
24. You want to change lanes. You can see if a car is in your blind spot:
- A. Only if you check your rearview mirror
 - B. Only if you check your sideview mirror
 - C. Only if you turn and glance over your shoulder
 - D. Only if you check both mirrors
25. Making good use of all mirrors on a car is especially important for those drivers who:
- A. Have peripheral vision
 - B. Have hearing problems
 - C. Drive a lot at night
 - D. Are driving unfamiliar cars

APPENDIX B

AN OLDER DRIVER MANUAL
for
ELDERLY DRIVER RETRAINING

HOW GOOD CAN YOU GET?

A Guide to Even Safer Driving
for Drivers 55 and Up

PREFACE

This booklet covers a host of the on-the-road problems that are especially troublesome for experienced drivers. You may already be faced with some of the problems it talks about. Even if you aren't, this booklet will still be helpful. It will tell you:

- o What problems might develop later on.
- o How you can prevent some of these problems entirely.
- o How you can spot other problems as soon as they arise, and how you can handle them safely.

In sum, no matter how well you drive, using the information in this booklet can help you drive more confidently and more safely--now, and for however many more years you wish to drive.

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HOW DOES AGE AFFECT DRIVING?

Age, in itself, doesn't affect driving. But certain changes that go along with aging can influence how safely a person drives. Some of the changes are all for the better. Others are not.

The Good News

On the plus side, older drivers have a wealth of experience to rely on. Driving is very much a learning experience. And the longer you've been driving, the more you've learned about how to drive safely. Compared to when you first took the wheel, you now know a lot more about what can go wrong, how to spot dangerous drivers, and where these and other traffic problems are most likely to come your way. It's the kind of knowledge that is best learned from experience. You've been gaining experience since the day you started to drive. As a result, you are now better "educated" in safe driving than ever before.

Another big advantage you have is your maturity. All the learning in the world is useless, unless a person knows when and how to put that knowledge to use. Consider the young driver. He may be taught all about traffic safety in a driver education course. But, as the saying goes, youth is impetuous. Young drivers typically are in too great a hurry to take advantage of what they know. They'll drive too fast, or drive right after they've been drinking, or plunge into any number of unsafe situations--even though they know better. Chances are that you're not in as great a hurry with your driving as you were, say, 35 years ago. Most experienced drivers recognize that, if driving conditions are poor, the world won't come to an end if they put off a trip until later. And when they do hit the road, they realize it really does pay to be cautious and deliberate in their driving.

These two traits--experience and mature judgment--make for excellent drivers.

The Not-So-Good News

There is, however, a minus side associated with aging. Like it or not, physical problems tend to set in as the years add up. Physical changes in vision, hearing, and other areas usually begin in the late 20s or early 30s. So, there's nothing new about having to cope with these problems now. What is different, however, is that these gradual changes tend to pick up steam at about age 50 or 55. Naturally, the degree of change that occurs varies widely from person to person. Some folks in their 60s and 70s are sharper physically than many 30 year olds, even though they are no longer as finely tuned as they were at that age.

HOW IMPORTANT ARE SHARP REFLEXES?

Sharp reflexes can help a driver react quickly to dangerous situations. And, it's a fact of life that few experienced drivers have reflexes as sharp as they were at age 20.

A Do-It-Yourself Reflex Test

If you want to get a rough idea of how well your reflexes stack up, grab a watch with a second hand and, in a moment, turn to the next page. A box of jumbled numbers appears there. Simply point out the numbers in order--starting with "1" and going through "12"--and time yourself. Then come back to this page.

How did you do? Granted, it's not the most scientific test in the world. But if you took six seconds, you can consider yourself as having excellent reflexes. If you took 7-9 seconds, odds are you have lost a step or two. Still, you can rate your reflexes as being pretty good. Ten or more seconds? It's an indication that your reflexes have slipped quite a bit. But that doesn't mean you can't drive safely.

After all, sharp reflexes have never been a guarantee of safety. No matter how fast or slow your reflexes are, you can help protect yourself by reserving plenty of time to react to dangers. One way to leave yourself time to handle trouble safely is to start looking for it early.

Looking Far Ahead

Good drivers get a jump on trouble by looking far down the road--15 seconds ahead, to be exact. No, that doesn't mean they're just staring into space. Naturally, you have to watch what's happening closer ahead and on all sides as well. But you should glance about 15 seconds ahead often enough to have a pretty good idea of what to expect throughout a trip.

How far ahead is 15 seconds? That all depends on how fast you're driving. In city traffic, you'll travel about one block in 15 seconds. So you should be looking about one block ahead. At highway speeds, you'll cover about 1/4 mile (three city blocks) in 15 seconds. If that seems to be "a far piece down the road," it is. But consider this: At 55 mph, it takes 100 yards (the length of a football field) for most drivers to stop their car--after they've already decided they need to stop. They need the rest of that quarter of a mile to spot the trouble in the first place, consider what to do, and then make sure that what they want to do is truly safe.

How can you tell if you're not looking far enough ahead? If you find you have to make a lot of sudden stops, that's a sure-fire sign. Another is finding yourself being boxed in. If you often have to wait for traffic in your lane while other lanes of traffic flow smoothly, you probably aren't looking far enough ahead.

DO DRIVERS STOP IN FRONT OF YOU SUDDENLY?

Looking far ahead can help you avoid a lot of panic stops. But sometimes the driver ahead will slam on his brakes for no apparent reason. The only way to guard against this kind of danger is to keep a good following distance from the car ahead.

Knowing this, experienced drivers seldom tailgate blatantly. But you don't have to be riding right up on another car's rear bumper to be following too closely. As drivers get older, they need to keep a larger following distance to keep safe.

Why? Part of the answer lies in slower reflexes. But age-related changes in the eyes are a big factor as well.

Vision and Sudden Stops

Three visual abilities affected by aging are color detection, depth perception, and distance adaption. All three abilities can help drivers detect, and react safely to, sudden stops ahead. Here is how aging can affect these abilities:

- o Color Detection--Red colors do not appear bright to many older eyes. Therefore, it may take them twice as long to detect the flash of brake lights.
- o Depth Perception--It's your depth perception that tells you whether you're getting closer to the car ahead. It's also an ability that tends to weaken over the years.
- o Distance Adaption--Every time you shift your gaze from the road, to the mirrors, to the dash, your eyes must readjust their focus. Older eyes tend to refocus more slowly.

Keeping Your (Safe) Distance

The best way to offset these problems is to give your eyes more time to spot a sudden stop ahead--by putting a little extra room between you and the car in front. How much space should you open up? Three-seconds worth. Here's how to figure a three-second following distance:

- o Pick out an object in the roadside ahead. Most anything will do for a marker--a tree trunk, a fire hydrant, a telephone pole, a sign, a shadow, etc.
- o As soon as the rear bumper of the car ahead passes your marker, start ticking off the seconds. Count: "one thousand one, one thousand two, one thousand three."
- o If the front bumper of your car reaches the marker before you've finished saying "one thousand three," drop back.

By keeping a full three seconds between you and the car ahead, your eyes will have enough time to see everything they need to see clearly and accurately. And you'll have enough time and space left to react safely--without a panic stop.

If three seconds sounds like a lot of space, it is. Some drivers will try to argue that no one can keep that much following distance--that other cars will keep cutting in. It's true that some drivers will cut in. But it's also true that they'll pull out very shortly--to pass the guy you were following originally. If you have some doubts about the likelihood of keeping a three-second gap, just give it a try. Keeping it is easier than you might think.

DO CARS SUDDENLY COME OUT OF NOWHERE?

You know the situation. You're driving along, thinking you have the road pretty much to yourself. You start to switch lanes, only to be jolted back into your own lane by a horn blast. Sure enough, there's a car right next to you.

Driving Blind...Without Knowing It

Of course, that car didn't come out of the blue. It sneaked up from behind while you were looking elsewhere. Many drivers don't check what's going on behind and to the sides. There's a natural tendency to concentrate on what's going on ahead. After all, that's where you're headed. But since trouble can come from any direction, drivers need to check their mirrors frequently. Unfortunately, regular rearview and side mirrors can't give you a full view of everything behind. Even when properly adjusted, standard mirrors leave you with two blindspots. Both are large enough to hide a car.

Getting Rid of Blindspots

One way to handle the blindspots is to glance over your shoulder. But stiffness in the neck or even a bit too much weight tends to make shoulder checks harder to do for some drivers. If shoulder checks are difficult for you, another way to eliminate blindspots is to install special mirrors.

Replace your regular mirrors with larger ones. Put a panoramic rear-view mirror inside. Outside, put larger side mirrors--right and left. The outside mirrors might be even more helpful in getting rid of the blindspots if they have angled surfaces or if you attach a smaller convex (curved) mirror in the corner of a straight mirror. A totally curved outside mirror should be avoided, however. Convex mirrors make things seem further away than they really are, giving the impression that you have more room for making a lane change than is actually available. A combination of mirrors will let you detect other cars with the curved surface, while the flat surface lets you judge how close those cars are to you.

If you don't wish to install special mirrors, there really is no choice but to make a shoulder check--even if it takes a special effort to do so. If you have trouble turning your head for a shoulder check, here are some ways to make it easier for you:

- o Raise your seat. If the driver's seat itself can't be raised, use a seat cushion. When you're sitting higher, you won't have to turn around quite so far to see what's off to the side.
- o If you wear glasses, be sure to pick a style with narrow side pieces. This will unblock your "corner of the eye" view so you won't have to turn your head as far to see into a blind spot.

Following these tips also can help make it easier for you to back up safely.

The Rigors of Backing Up

Backing safely is physically demanding. You must twist your whole body to the right and turn your head even more--until you get a clear, over-the-shoulder view through the back window. Grabbing the back of the front seat helps drivers twist properly. But stiffness may make it impossible for some drivers to twist all the way around--period. The temptation, then, is to trust in luck and their mirrors. Unfortunately, mirrors can't give a clear view of everything in the path of a backing, turning car--no matter what kind you have. Looking out the driver's window is even worse. It leaves everything on the passenger side of the car out of sight.

If you should find backing to be difficult, the best way to deal with the problem is to avoid it whenever possible. Try to pick a spot that will allow you to pull out straight ahead when you're ready to leave.

How to Avoid Parallel Parking

If parallel parking is particularly hard on you, consider using a commercial lot with valet parking. If valet parking is out of the question, try to schedule trips that will require you to parallel park at times when traffic will be lightest. This will increase your chances of finding two or three empty spaces in a row. If you can find such a space, you can pull straight in without having to back.

ARE OTHER DRIVERS IN TOO BIG A RUSH?

No question about it...there are too many speed demons on the road. They drive like there's no tomorrow--nonking at people who keep a sane speed, zipping around them impatiently, cutting inside and passing on the right. It's more than a bother. It's dangerous. You know just how dangerous it can be. The question is: What can you do about it? No, you can't slow other drivers down or improve their manners. But, you can protect yourself from them.

Stick to Your Guns

The first thing to do is to keep driving at whatever speed feels most comfortable to you. Most experienced drivers tend to drive somewhat slower than others--for good reason. They know that the dangers which go along with high speeds far outweigh whatever benefits speeding might yield in terms of time saved. Also, going slower is a natural and needed response to changes in side (peripheral) vision.

As eyes mature, they tend to provide a narrowing field of vision. The more limited your side vision, the faster you seem to be going. Why? Because as people drive, objects along the roadside come into view and then whiz by as you pass them. The narrower your field of vision, the faster these objects pass into and out of sight--making it seem as though you're going faster. The easiest way to slow down the action is to cut your speed. If you allow speeders to pressure you into going faster than what feels comfortable, you'll wind up driving faster than your eyes can take in the information you need to keep safe.

Keeping Speeders in Their Place

Aside from "sticking to your guns" about speed, what can you do to protect yourself from impatient drivers? Here are some tips:

- o If there are two or more lanes on your side of the road, stay in the lane where cars are moving at a speed closest to your own. If a lot of people want to drive too fast, it's usually best to stay in the far right lane. Traffic there tends to move more slowly, so odds are that's where you'll find the closest "fit" with your speed. Moving to the right also leaves the left lane(s) free for drivers who insist on going faster.
- o If possible, avoid driving during rush hours when streets and highways are jammed with people in a hurry. By driving during non-rush hours, you'll have fewer cars and fewer impatient drivers to deal with.

- o If someone starts tailgating and honking, don't speed up. Odds are he'd only tailgate you faster. And don't flash your brake lights to make him think you're stopping. When he realizes he's been tricked, he might get mad and do something even more foolish than before. The best way to handle a tailgater is to get him in front of you. To do that, slow down gradually, and move toward the right as soon as you get to a passing zone. That will make it easier for him to pass.
- o If cars really stack up behind you, slow down and pull off the road altogether (where it is safe to do so). Then wait until the line clears out. After all, it's better than suffering the honks and gestures of impatient drivers. And, it'll keep everyone's temper from getting out of control. Use this tip only as a last resort, however. Pulling onto a road from the roadside can be as dangerous as being tailgated. Be absolutely sure no one is coming before pulling back onto the road.

DO YOU SOMETIMES "MISS" A SIGN?

Have you ever been surprised to find your lane has ended? Usually this means that you missed the sign telling you to move over to another lane.

Many experienced drivers miss signs. Either they don't see a sign at all, or they don't see it until it's too late to do anything about it. It's not that they don't pay attention when they drive. The plain fact is that older eyes sometimes have trouble spotting signs and reading them.

Why Signs Get Easier to Miss

Spotting signs is largely a function of side vision. Almost everything you see is seen first in the corner of your eyes. Your mind takes it all in and decides what should be given direct attention. Unfortunately, as side vision narrows, it becomes easier to miss something on the roadside--like a sign.

Also, while riding along, a driver has only a limited amount of time between the moment when a sign becomes close enough to see and the time when it passes out of view. Because of age-related changes in the speed with which eyes can focus, experienced drivers often find themselves rather close to a sign before they can bring it into focus. This leaves them with less time to read and react to the sign. Also, reading may be more difficult because of a loss of "dynamic acuity"--the ability to see something clearly while moving. If you have a problem with dynamic acuity, you may have to be very close to a sign before you can read what it says.

How to Make Signs Stand Out

What can you do to make it easier to spot and react to signs in time? Here are some tips:

- o Keep scanning back and forth between the sides of the road. This will bring more things into your direct view and help make up for any loss in side vision.
- o Drive on familiar roads. You can't miss a sign or signal when you know it is coming up. Also, the eye takes about half as long to spot an expected object as it does to find an unexpected object.
- o Learn to read signs by shape and color. When you see a red, octagon sign, you know what the sign is saying long before you're close enough to read the letters "STOP."

Each of the traffic signs most important to your safety has a shape all its own, to help you get its message early.

A "Sign Language" Test

Try reading these signs by shape alone. What does each shape tell you?

You probably had no trouble with the first two signs. The "yield" triangle and the "caution" diamond are common sights.

The pentagon shape means: Caution, school children may be crossing. If the last shape stumped you, there's good reason: You won't find it on a sign post. It's found on the backs of vehicles such as farm tractors and heavy construction vehicles that can't go faster than 25 mph. If you'd been told that this sign had a dark red border and a yellow-orange center, it would've been easier to make the correct identification.

Of course, all sorts of traffic signs are out there on the road. Each gives a message from its shape and color. For information on more kinds of signs, check the driver manual published by the state. (You can get a copy from the nearest office of the driver licensing agency.)

ARE ROADS GETTING TOO CONFUSING?

There's no doubt that driving is a lot more complicated than it used to be. You have to deal with more cars, more lanes, and higher speeds. Traffic engineers try to help sort things out--and keep traffic moving smoothly--by using special signals and pavement markings. Unfortunately, some drivers find these special devices to be more confusing than helpful. Three of the most taxing types of "speciality" items are: arrow signals, reversible lanes, and shared left-turn lanes.

Arrow Signals

Arrow signals have been around for years. Still, they sometimes manage to trip up even the most experienced drivers. Take the example shown below.

Almost everyone knows that this combination--a green arrow paired with a green circle light--means it's okay to make the turn. In fact, when a green arrow is paired with either a green or a red circle, it usually means the turn is protected. That is, traffic coming from the opposite direction will be stopped while you make your turn.

A problem can arise, however, when the green arrow goes out as a driver approaches the signal, leaving only the green circle showing. Sometimes a driver in this situation will stop, feeling that his "right" to turn has gone with the arrow. The main thing to remember is that you can still go ahead and make the turn providing that (1) the green circle light is still on and (2) the way is still clear to make the turn.

Red arrows pose a different problem. A red arrow does not mean that drivers can never turn in the direction indicated. All a red arrow means is that, if you want to turn in that direction, you'll have to wait until a green arrow comes on. Then you can make the turn.

Reversible Lanes

Around cities, rush hour traffic is very heavy going into town in the morning and out of the city in the evening. To help traffic move along, some lanes may be used by cars going in the morning and out at night. These are called reversible lanes. Because they can be dangerous, they are marked with special lines, signals, and signs. The lines used are double, yellow, "broken" lines, like those below.

As soon as you see these lines, check the side of the road or overhead for signs and signals that tell you which lane(s) you can use.

Where signals are used, there will be one for each lane of traffic. Here's how to use them.

- o A red X means the lane is not open to traffic going in the direction you're going. Never drive in a lane with a red X over it.
- o A green arrow, pointing down, means that lane is "going your way." You can use it.
- o A steady yellow X tells you to move out of that lane into one under a green arrow. A yellow X lane will soon become a red X lane, bringing traffic straight toward you.
- o A flashing yellow X says you can use that lane--but only to make a left turn. If you do wish to make a left turn, don't move into this lane until you're near your turn-off. Your turn won't be protected. So make sure the lane carrying oncoming traffic is clear before making the turn.

Shared Left-Turn Lanes

Have you ever seen a road marked like this? It means the center lane

can be used only for making a left turn. The catch is, drivers moving in either direction can use the same lane for making left turns. Not too many roads are painted this way. Shared left-turn lanes usually crop up only where narrow roads have been widened to handle traffic for shopping centers or other developments.

Sharing a lane with oncoming traffic can be dangerous. The three keys to use shared lanes safely are:

- o Don't get in the turn lane too soon. The longer you drive in the center lane, the more likely you are to meet someone coming the other way. Give yourself just enough time to enter, straighten out your car, signal, and (if you must) stop.
- o Watch out for cars pulling out of entrances and side streets. They may cross in front of you, cutting you off in the middle of your turn.
- o DO NOT use the center lane for anything but turning left. If you don't want to turn, stay out of it. And NEVER use the center lane for passing.

The state's driver manual may be able to give you more information on how to use shared left-turn lanes.

Unfamiliar and Overloaded Roads

Reversible and shared left-turn lanes can be confusing because they are not very common. But "normal" roads can be confusing if you aren't familiar with them. And even familiar roads can present confusing situations when they are packed with traffic.

The best way to keep from being confused is to keep to the roads and routes you know best. If you must take an unfamiliar route, plan ahead. Get an up-to-date map of where you're going and study it. Note the names of the streets you will be using and the distances between them. Maybe talk to someone who's been there before, and ask about landmarks that will help you keep track of exactly where you are along the way. If possible, take someone along to remind you of turns coming up. Whatever the route you take--familiar or unfamiliar--take it during light traffic periods of the day.

What if, despite all your precautions, you do find yourself lost or in some other confusing situation? In this case, what you don't do is just as important as what you do. Don't stop in traffic to get your bearings. This just invites a rear-end collision. If you need to take time to sort things out, wait until you can pull out of traffic. A gas station is a good place to get both your bearings and new directions.

You may not always need new directions to figure out what's gone wrong and what you should do next. Say you miss a turn and realize it the second you go by. Again, the key to handling the situation lies in not trying to deal with the situation on the spot. Don't stop and try to back track. There's always another, safer way to get where you want to be. This is true even on expressways. If you miss your exit, just go on to the next one. You can almost always circle around and get back to your exit within 10-15 minutes. Continuing ahead and doubling back is lots safer than trying to back up in traffic.

ARE GAPS IN TRAFFIC HARDER TO JUDGE?

Have you ever pulled up to a intersection, seen a car coming on the cross street, and then started to pull out--only to be stopped in your tracks by a frantic horn blast from the same car as it whizzes by? If so, you're not alone.

An Eye for Speeds

Judging the speed of other cars accurately is one of the hardest jobs in driving. But judging speeds can be especially hard for older eyes because of problems with depth perception. As was mentioned earlier, older eyes often need a little more time to get a true picture of how fast others are coming.

Because judging speeds can be troublesome, some experienced drivers tend to rely on how fast cars usually come down a given road to determine whether or not there is enough room to pull into an intersection safely. This leaves them open to an unpleasant surprise. The approaching car may be coming faster than usual.

To avoid this kind of problem, try giving your eyes a little extra time to judge how fast the other car is moving. And don't enter or cross through a gap in traffic until you're absolutely sure it's big enough.

Temptations to Pick the Wrong Gap

Too many drivers try to squeeze into a gap that they know isn't really big enough. Several factors can contribute to this tendency. One is an assumption that "the other guy" will make room once you start to pull out. That's a risky assumption to make. But some drivers do it because it has worked for them in the past. However, drivers who rely on someone else to look out for them are asking for an accident. Sooner or later, they'll get it.

Another factor is feeling "pressured" by other drivers to hurry up and get through an intersection. This feeling often surfaces among drivers wanting to turn left. If oncoming traffic is heavy, you may have to wait quite a while for it to clear out enough to turn safely. While you're waiting, traffic behind may start to stack up. These other drivers may start to get impatient. How can you handle such a situation?

Picking the Right Gap

The first thing to remember is to not let yourself be pressured into making an unsafe turn. Don't push your luck by trying to push your way into a gap you just think might be big enough. If the back up gets too big or starts making you too nervous, change your route. Instead of turning left, turn right or go straight if you have the chance. This will get the other drivers off your back. And you can find another place where turning will be easier.

Can you think of a couple of intersections where turning left is really worrisome? The best way to handle these locations is to avoid them. Use other routes with less nerve-racking intersections. And, of course, plan to take your trips at times when traffic is lightest. This will make it easier to find good gaps in traffic--whether you want to turn left or right or simply go straight ahead.

IS IT TOUGH TO MAKE SHARP TURNS?

Turning the wheel quickly can be a major effort. Some drivers try to cope with sharp turns by trying to round them out. The result is a buttonhook turn, as illustrated below.

Swinging wide just before making a turn can create a problem.

Dangers of Turning Wide

The biggest danger in the situation above is that the driver, by swinging into the left lane, might hit someone in his left-side blindspot. The risk is great for several reasons:

- o It's easy to forget about checking the blindspot on one side when you're concentrating on turning in the other direction.
- o If someone is in your left blindspot, the last thing he's expecting is for you to move into his lane. Your turn signal says you're going to turn right.
- o Even if you've checked the left-side before swinging out, it may not still be clear when you move that way. Someone directly behind you might decide to pass rather than slow down while you make your turn. This could result in you and the other driver moving to the same spot in the left lane at the same time.

And, while this swing-out is creating problems to the left, it's also inviting trouble to the right. Put yourself in the place of a driver behind. You see the driver ahead signal for a right turn and, the next thing you know, he's swinging left. What would you make of it? A lot of drivers will assume that the person ahead has put on the wrong signal by mistake. They think he meant to signal a left turn. Consequently, they'll keep up speed and try to pass on the right. When the driver ahead swings right...it's another intersection crash. By the way, it's the buttonhooking driver who gets the ticket.

Taking the Trouble Out of Turning

The only safe--and legal--way to make a turn is to stay in the lane closest to the direction you want to go. If you tend to swing wide when turning, here are some suggestions for making a turn just as easily and more safely.

- o Slow way down. The slower you go, the less quickly you have to turn the wheel. The problem with slowing way down is that the driver behind may not expect you to cut your speed so much. To warn him that you will be slowing a lot, flash your brakelights three or four times quickly--well in advance of the turn. If necessary, make him think you're going to come to a complete stop.
- o If hand-over-hand turning is difficult, try "walking the wheel." To walk the wheel: keep your hands at the 3 o'clock, 9 o'clock position; with one hand, move the wheel a few inches in the direction you want to turn; hold the wheel, let the other hand "walk" the wheel a few more inches while the first goes back to its starting point. Keep "inching" the wheel around in this fashion through the turn.

After completing a turn remember to check your dash to make sure your signal has gone off. This is especially important for drivers with hearing problems, since they may not hear a left-over signal ticking away.

ARE EXPRESSWAYS GETTING TO BE MORE TROUBLE THAN THEY'RE WORTH?

When expressways first open, they generally live up to their names. There aren't many cars, and you can usually zip right along. But over the years, more drivers shift over to the new route. The result is a crowded highway that is hard to get on. Once you're on, traffic is apt to be bumper-to-bumper. In sum, expressways can be pretty nerve-racking.

Nevertheless, expressways are still the safest roads to drive on. Once you're on them, there are no stop lights or signs to miss and no cross traffic to worry about.

What's Wrong With Highways

All of these advantages are important. Yet many experienced drivers shy away from super-highways. The reasons most often cited are:

- o People drive too fast on them.
- o Getting on them is too hard.
- o Getting off is too dangerous.

As for the first reason, it's true that many people do drive too fast. But it's also true that about half the drivers on these roads are going no faster than the speed limit. As long as you feel comfortable driving at least 45 mph (the minimum speed limit on those roads), you won't be in any great danger from other drivers. Just remember to keep in the lane where traffic is moving closest to your speed.

As for getting on and off super highways--there is a certain level of difficulty involved. Still, entering and leaving highways is a fairly simple art. Here's a quick review of the basics.

How to Enter Highways (The Best of Times)

The key to getting onto a highway is to make full use of the entrance ramp. The main idea is to start picking up speed as soon as you get on the ramp, so that you're going at the same pace as traffic on the main highway by the time the ramp ends. In addition to picking up speed, you should start looking at the highway as soon as you get on the ramp. You need to see two things: where the cars are, and how fast they're going. This will help you find a good gap in traffic and let you see how fast you should be going by the time you reach the end of the ramp.

Here's what to watch while on an entrance ramp:

- o Check what traffic is doing in all lanes on the highway. Someone in the center or left lane may pull into the right-hand lane--plugging the gap you had planned to use.
- o Don't forget to keep track of what's happening on the ramp ahead. The car in front of you may have to slow down or stop--especially if the driver hasn't used the ramp properly. You can't afford to keep your eyes trained on the highway when you're not alone on the ramp.
- o Be sure to check your left blind spot just before entering the highway. Someone not paying attention in the far lane may pick just that time to switch into "your" gap.

How to Enter Highways (The Worst of Times)

Naturally, there are times when it's not possible to speed up smoothly and join the main traffic flow. Maybe the highway is very crowded. Or maybe the car ahead slows or stops on the ramp. In these situations, try to avoid slowing at the end of the ramp. If you must slow down--either to stay clear of the car ahead or to get in synch with a gap in traffic--do this while you're still on the first half of the ramp.

By slowing on the first half of the ramp, you'll still have enough ramp left to gather speed before entering the highway.

What if, despite doing everything right, you find you still must slow at the end of the ramp, the only thing you can do is to wait. Patiently. You'll need a very big gap before starting to merge from a stop or near stop. Remember: The gap should be big enough to allow you to build up to highway speed without forcing cars already on the highway to slow down.

How to Get Off Highways

Getting off expressways is usually easier than getting on them. The most important key to leaving the freeway safely is to make full use of the exit ramp. Do not begin to lower your speed while you are still on a "through" lane. Wait until you are on the special exit lane.

If you brake before you get in this lane, you run the risk of being rear-ended. Even though drivers should expect lane changes and slow downs at any expressway entrance and exit, a lot of them simply don't pay close enough attention. By not slowing until you are off the highway and in the slow-down lane, you protect yourself from the possibility that the driver following you is one of the inattentive variety. Signaling your turn also will help: The flashing light will grab his attention.

General Guidelines for Using Highways

In general, the newer the highway, the easier and safer it will be to get on and off it. That's because entrances and exits on newer highways tend to have longer, more gently curving ramps. More importantly, the entrances and exit ramps are separate. On older highways, cars entering and leaving must share the same lane. This can create problems. If you are trying to enter, for instance, a car may cut in front of you to exit. Worse, that car will be slowing down at the same time you are building to highway speed. It makes for a lot more changes in speed and direction among all cars. And you must see and react to all of it.

What can you do? If you are trying to enter the highway, remember that traffic already on the highway--including people leaving the highway--have the right-of-way. And be extra careful to check your blind spot--in the far lanes as well as the one you will enter.

As always, it's best to time your trip so that you'll be on the interchange some time other than rush hour. Good timing will allow you to keep the problems that go with getting on and off highways to a minimum.

IS NIGHT DRIVING GETTING MORE DIFFICULT?

Cats don't see as well at night as they do during the day--and neither do drivers. But, while seeing well at night is difficult for everyone, it tends to get even harder as you get older.

Why Night Driving Gets Harder

Again, changes in the eye are responsible for the extra hardship. Older eyes often have the following problems:

- o They need more light to see things clearly. Most people aged 60 need more than twice as much light than do 20 year olds to get a clear picture of an object.
- o They also have a lower tolerance for bright lights--which means it takes less light to cause temporary blinding from the headlights of other's cars.
- o They can't handle changes in lighting levels as easily. Typically, a 55 year old takes eight times as long to recover from glare as does a 16 year old.

Because of these changes, night driving can be more tiring (the eyes have to work much harder) and dangerous for experienced drivers.

Many experienced drivers deal with the problem by never driving at night. That's the best possible course of action. However, for those occasions when you absolutely must drive at night, here are some suggestions on how to cope.

How to Get Enough Light

To help your eyes get the extra light needed to see clearly:

- o Give them a chance to adjust to darkness--especially if you have just come from a brightly lit room. Let your eyes adjust to night conditions while your engine warms--at least 30 seconds. And remember, it doesn't have to be pitch black before light levels are lowered. Give your eyes time to adjust to other low-light conditions--such as twilight, foggy or hazy days.
- o Use all available light. If you're driving in the city, stick to well-lighted roads. On the highways, use your high beams as much as possible (that is, whenever they won't blind the driver ahead of you or an oncoming driver.)
- o Make sure you're getting full use out of your headlights. If you think they aren't throwing light far enough ahead, have them checked and, if necessary, adjusted. And keep them clean. Dirty lenses can cut the amount of light put out by headlights by 90%!

- o If you smoke, try not to do it while you're driving. In addition to putting up a smoke screen--literally--smoking reduces night vision. It also dirties the windshield. Whether you smoke or not, you should always keep the windshield clean.
- o Don't overdrive your headlights. Make sure you aren't driving so fast that you couldn't stop in time to avoid hitting something lying just beyond the reach of your lights.

The Importance of Headlights

Of all these tips, the most important are those concerning how you use your headlights. People tend to make two major errors in the way they use them:

- o They overestimate how far their headlights let them see.
- o They don't use their high beams often enough.

The Limited Benefits of Headlights

Drivers tend to put too much stock into how much headlights help them see. If there is no other light on the road, most headlights let you see clearly only about 250 feet ahead--even with high beams on. That's about the same distance it takes most drivers to stop a car going 50 mph. At speeds faster than 50 mph, you would be overdriving your headlights.

Another common problem is that drivers don't use their highbeams as often as they should. They tend to leave their low beams on, rather than go to the "bother" of flicking their highs on and off. But highbeams are well worth the "bother." They can help you see danger before it's too late to avoid it.

How to Handle Glare

To help your eyes handle headlight glare:

- o Use a day/night rearview mirror. Switch it to the "night" setting as soon as you turn on your own lights.
- o Avoid looking at others' headlights. Even their low beams can reduce your ability to see, since your eyes must readjust to less light once headlights are past.
- o If an on-coming car has it's highbeams on, flick your highs on and off quickly, to let the other driver know he's giving you trouble.
- o If flashing your highs doesn't work, look away from the other car, and look at the far right side of the road. Usually there will be a white line painted there to help guide you in lane.
- o If you're extremely sensitive to glare, you may want to close your left eye while looking to your right. This will keep at least one eye from being dazed.

Since one of the problems is the length of time it takes older eyes to adjust to different levels of light, this is another reason for using your high beams whenever they won't bother other drivers. The higher level of light from your highs will mean your eyes have less adjusting to do when recovering from other drivers' lights--both high and low beams. A key thing to avoid doing, however, is to "get back" at someone who is blinding you with his high beams. If you leave on your highs, you may blind him. This only increases your chances of a crash.

DO LONG TRIPS WEAR YOU OUT?

Of course, a long trip will tire anyone. The real question, though, is: How long is a long trip? It differs for every driver. But most people find that the distance that feels "long" for them, gets shorter as they get older. At age 25-30, you may have been able to travel 500 miles a day, or more, before feeling really tired. But trip length isn't simply a matter of how many miles you cover or how many hours you're on the road.

How to Measure Trip Length

More than anything else, trip length is a matter of how you feel. As long as you stay fresh and relaxed, a trip will seem short. The moment you start feeling tired or uncomfortable, your trip is too long. When that happens, it's easy to become less attentive to what's happening on the road. Also, tired drivers tend to:

- o react more slowly
- o make more errors in judgment
- o take chances to get the trip over with a little sooner.

All in all, a tired driver is an unsafe driver.

Planning For a Long Trip

It's not hard to keep fatigue from setting in. All it takes is a little planning. If you've never made the trip before, get an up-to-date map to plan your route. In choosing the route that's best for you, it's a good idea to take super highways wherever possible. In addition to being generally the fastest way to go, interstate highways are safer and less demanding. (You won't have to worry about traffic signals, and cross traffic, for instance.) Motor clubs are a good source for maps; some even offer a route selection service. Additionally, motor clubs can alert you to road repair work or other events that may not show up on a map but are worth avoiding.

Once you've picked the route you want to take, set a realistic goal for each day of driving. You're the only one who can determine the proper limit for a day's drive for you. But a good rule of thumb is: No more than 300 miles a day, assuming good weather and good roads. Since you can't always count on the weather, a 200-250 mile limit will probably be best. You also might want to set a time limit. Four to six hours on the road is a good day's work for the average driver. Many people may want to drive less.

After you've set a general goal for each day's drive, you'll need to do a little fine-tuning:

- o Check along the route to make sure you won't be going through or around a city during the morning or evening rush hours.
- o Make sure that your schedule permits you to reach that day's destination before dusk.
- o Reserve a hotel or motel room in advance.

Rush hours and the hours of dusk and darkness are the most dangerous times to be on the roads. They also can be the most tiring. Thirty minutes of rush hour driving or straining your eyes against a setting sun can seem to last forever; suddenly, a short trip is transformed into a lengthy ordeal. Having a reservation will help you resist the temptation to push on if you reach your day's destination a little earlier than planned. It will also help you avoid the frustration of "no vacancy" signs and pushing on and on, trying to find a place to put up for the night.

Making a Long Trip

To be sure the trip goes as planned, here are a few more pointers.

- o Get a good night's rest before you start out.
- o If you want to eat before starting, eat lightly. A heavy meal can leave you feeling a little less alert.
- o Take a rest stop every hour or two. A five or 10 minute break can do wonders. A quick stretch or cup of coffee will make you more alert when you get back on the road.
- o If you've a passenger along, share the driving. Switch places at each rest stop. You'll both feel better when you get where you're going.

DO YOU TAKE MEDICINE?

Everyone needs medication now and then. But taking medicine can cause driving problems. Experienced drivers have more than their share of medicine-related problems for a variety of reasons:

- o Chronic illness requiring continuing medication is common. Thus, medicine often is in the driver's system continuously.
- o Multiple illnesses, requiring several different kinds of medication, are common. Combinations of medicine can be very hazardous to driving, as they often produce unpredictable and very strong side effects.
- o Intense or unexpected reactions to a single medicine occur frequently. For instance, sedatives prescribed to relax people may, in fact, result in excitement or irritability.

Medicine and Driving

Various types of drugs commonly prescribed by doctors are listed below, along with their usual side effects on driving.

ANALGESICS (painkillers)--usually prescribed for arthritis and rheumatism. Typical effects: drowsiness; inability to concentrate.

ANTIHISTAMINES--usually prescribed for allergies or colds. Typical effects: inattention; drowsiness; confusion; blurred vision; dizziness.

ANTIHYPERACTIVES--prescribed for high blood pressure. Typical effect: drowsiness.

ORAL HYPOGLYCEMICS--prescribed for diabetes. Typical effects: drowsiness; inability to concentrate.

SEDATIVES--prescribed for nerves or anxiety. Typical effects: drowsiness; loss of coordination, judgment and alertness.

STIMULANTS--prescribed for weight control, depression or fatigue. Typical effects: overexcitability; false sense of alertness; confused thinking.

In reviewing this list, it's important to remember that the side effects mentioned are only what is most likely to happen. No one, not even your doctor, can predict how any one of these medicines will affect your driving.

How to Handle the Effects of Medicine

Another important point: patent medicines such as cold tablets or cough syrup can affect you just as easily as a prescription drug. Here are some tips to help you handle over-the-counter medicines and prescriptions safely:

- o Always read the warning labels carefully.
- o If you are using a medicine for the first time, be sure you know how it affects you before you try to drive. Since even your doctor can't be sure what may happen, you'll have to try out the medicine first.
- o Tell your doctor about every drug you are taking--including over-the-counter medicines and those prescribed by other doctors. Ask about possible side effects for each medicine and each combination of medicines. Ask how these effects may affect your driving in particular.
- o Never take more of any drug than what has been prescribed by the doctor. And don't take it more frequently than is advised.
- o Never take a drug that has been prescribed for someone else. The same pill that helped your best friend calm down a bit may make you so drowsy that you fall asleep at the wheel. Or, it may turn you into a bundle of nerves.

The main thing to keep in mind is that most any medicine can affect your driving. If you must drive when you are on medication of any kind, be extra careful behind the wheel.

CAN YOU DRINK AS WELL AS YOU USED TO?

Many people who drive also drink. And, as they get older, these people often find that alcohol "hits" them a little harder than it used to. That's normal. Alcohol is a depressant, which means it slows bodily functions--reflexes, thought processes, and the like. When you're young and in peak physical shape, you can withstand that kind of slowdown a lot better than when things have slowed down somewhat to begin with.

Adding to this age-related problem is the likelihood of other drugs (medicines) being present. Almost all medicines interact with alcohol in one way or another. Often, this interaction causes great drowsiness or loss of energy. Other, equally dangerous reactions can result from mixing alcohol with medicine.

If you do drink, you should know that everyone's ability to drive safely is affected by as little as one drink.

What's One Drink?

Each of the above is considered to be one drink. The question is, which contains the most alcohol?

- a. The can of beer
- b. The glass of wine
- c. The shot of liquor

Generally speaking, all three have about the same amount of alcohol. However, some drinks--a glass of port or sherry, for instance--may contain the alcohol equivalent of two beers (two drinks).

How can just one drink affect your driving? By affecting your judgment. After just one drink, it's tougher to tell exactly what kind of shape you're in. After two drinks, it's even harder to realize that you've already been hit hard by alcohol. Too many drivers just keep on drinking at that stage--dangerously unaware of their own condition.

Dealing with Drinking--and Driving

Some people suggest various "remedies" to shake off the effects of drinking before they drive. Three of the most popular suggestions are listed below. Which one works best?

- a. Drink a few hot coffees.
- b. Take a cold shower.
- c. Take a brisk walk around the block.

Fact is, none of these remedies will do anything to restore judgment or any other abilities impaired by alcohol. At best, they may wake people up a bit. But safe driving requires far more from a driver than simply that he stay awake.

There is only one thing that can offset the effects of alcohol. Time. On the average, the human body can get rid of one drink an hour. There's no way to speed up the process. It's simply a matter of waiting and letting Nature take her course.

Knowing this, it's possible to set reasonable limits on drinking. To be safe, never have more than one drink an hour and always wait a full hour after the last drink before getting behind the wheel. (Remember, "doubles" and heavy wines count as two drinks--a two-hour wait would be in order.) Under no circumstances should you have "one for the road."

If the limits suggested above aren't to your liking, you can approach the problem from another angle. Rather than limit your drinking, cut out the driving aspect. Let someone who hasn't been drinking drive you home. Call a cab. Stay where you are overnight. The important thing is to break up the deadly combination of alcohol and driving.

ARE SEAT BELTS A BIG NUISANCE?

Modern safety belts are better designed than were the early models. As a result, safety belts may be used more easily and comfortably than ever before. If you've never worn belts, or if you use them only "every so often," the fact that belts are easier to use should make a difference in the way you drive.

Why Safety Belts are Worth a Second Look

Wearing safety belts has never been more in your best interest than it is now. And it'll keep on getting more important. Why? Because of changes in traffic conditions and changes in you.

Changes in traffic--More and more cars are on the road every year. Not surprisingly, traffic accidents, deaths and injuries are on the upswing as well. Also, odds are the car you drive now or the next car you buy will be smaller. While a smaller car is easier to handle, it typically will give you less protection in a crash than would a larger car. All these changes add up to a greater need for the type of protection safety belts can give.

Changes in you--More than ever, you have a bigger stake in protecting yourself in a crash. Accident studies show that drivers aged 55 and up are more likely to be killed in event of crash than any other age group. Your age group also is more likely to be injured in a crash. In particular, fractures, shock and complications are more likely to result. Finally, if you should be injured in a crash, odds are that you'll be laid up longer and recover more slowly than would have been the case when you were younger.

These changes are all reasons to protect yourself as much as possible whenever you drive. How, when, and where you drive and when you drive can provide you with a good bit of protection. But risks are part of everyone's driving, no matter how well you drive. And, mile for mile, drivers 55 and over, face a greater risk of accident than do younger drivers.

How much protection can you expect to get from your seat belts? The answer may surprise you. Not wearing your belt doubles your chance of being seriously hurt in the event of a crash. A simple lap belt cuts your chances of being killed in a crash by half. And using a lap/shoulder belt combination cuts your chances of being killed by two-thirds to three-quarters.

Arguments Against Using Safety Belts

Those are some reasons for wearing safety belts. But what about the other side? How many of the following arguments against using belts have you heard?

"They can trap you in the car."

"I'd rather be thrown clear."

"They can cause internal injuries."

"I only drive close to home--and slowly--so I don't need them."

"They make it harder to drive."

You may have heard all of these arguments at one time or another. Maybe you've even expressed them yourself. If so, here are a few more facts you should consider.

Trapped in Car--A lot of people picture fiery explosions or cars sinking under water when they think of accidents. But outside of the television shows and the movies, such accidents hardly ever occur. Less than one-half of 1% of all accidents involve fire or submersion. Even when such crashes do occur, people are better off using belts. They'll help you stay conscious and free of serious injury--keeping you in good enough shape to unbuckle your belt and get out. No one can get out if he's unconscious or seriously hurt.

Thrown Clear--To be thrown clear, you have to be thrown. In a crash, that usually means going through a window and then landing somewhere--hard. If you land in the street, there's an extra chance of being run over while you lie there. Studies show you're 25 times more likely to be killed or hurt seriously when you are "thrown clear." Four of every five people who were killed by being thrown clear would have lived if they'd been able to stay inside the car.

Internal Injuries--If worn correctly, safety belts will not cause internal injuries. When belts are worn snug over the hips (not the stomach) and across the chest, about the worst that can happen--assuming it's a very bad crash--is getting some bruises over the hip bone. Considering the alternatives--a fractured skull for instance--a few bruises look pretty good.

Short, Low-Speed Trips--Short, slow trips are not safe trips. Three of four fatal crashes occur within 25 miles of home. More than half of all injury-producing crashes occur at speeds of less than 40 miles per hour. If you think low speeds can't be dangerous, think about this: In a 30 mph crash, the force involved is equal to that of a jump from a three-story building. Do you know anyone who could "catch" himself and break a three-story fall with his arms?

Harder to Drive--If belts make it hard to drive, why does every race car driver wear them? Fact is, belts don't keep you from making any move you need to make while driving. All they do is keep you behind the wheel--the one place you need to be when driving. It's not that hard to be dislodged from behind the wheel. Have you ever hit a pothole and been bounced around? Sometimes, that kind of thing will nudge a driver away from the wheel--and right into an accident. By keeping you behind the wheel, belts keep you in position to control the car.

Considering Children's Needs

One final point about safety belts concerns you if you have grandchildren or great grandchildren. By wearing your safety belts whenever you ride with them, you can set a good example. By insisting that they wear belts whenever you ride with them, you can help them develop a belt use habit that may well save their lives. When you consider that most people will be in at least two traffic crashes during their lifetime, the need to get into the habit of using seat belts early is obvious.

If the children you care about are under five years old or weigh less than 40 lbs., they'd be better off in a child restraint than in adult belts. If you drive with small children a lot, buying a car seat would be a very smart, very loving thing to do.

A car seat is also about the best gift you can give to new parents. Don't let anyone try to tell you his child doesn't need a car seat "because he's so small I can just hold him in my arms." In a 30 mph crash, a 15-pound baby can suddenly weigh as much as 450 pounds. It takes a child restraint to keep that baby safe. And child restraints do just that. Restraints cut children's chances of being seriously injured by two-thirds. Their chances of being killed are slashed by 90% when they ride in a properly adjusted car seat.

ALL IN ALL, HOW DANGEROUS IS IT OUT THERE?

As was stated at the beginning, the age-related problems discussed in this booklet affect each person differently. Visual problems, for instance, develop earlier in some people than in others. Some problems may never develop. If a problem does occur, it might be very mild or quite severe. In sum, the degree of danger created by age-related changes varies widely from person to person, and from driving situation to driving situation.

Looking on the Bad Side...

Generally speaking, driving does appear to become significantly more dangerous at about age 55. Drivers aged 55 and up have more accidents per mile driven than any other age group, with the exception of very young drivers (those aged 16-24). There is no question that most drivers find it gets harder to handle traffic dangers safely as they move beyond their middle years.

Looking on the Good Side...

Per person, drivers 55+ have fewer accidents than any other age group. The number of accidents is low because most experienced drivers recognize that driving has become more troublesome for them. And they change their driving habits accordingly. Most importantly, experienced drivers cut back on the amount of driving they do. They cut out unnecessary trips. They let others drive while they ride. And they tend to do their driving in the safest possible conditions--during the day, at times and on roads where traffic is lightest. Those changes reduce the number of dangers they must face. Experienced drivers' willingness to alter their driving habits in these ways is a direct result of their self-awareness and good judgment.

It's Up to You

This booklet has discussed some of the problems facing many experienced drivers. It also has suggested some ways of dealing with them safely. You're the only person who can tell how many of these problems are your problems.

- o How much should you drive?
- o Where and when should you drive?
- o What conditions should you avoid at all costs?
- o What else can you do to make each trip as safe and enjoyable as possible?

These are important questions. Only you can answer them.

ILLUSTRATION #1

A DO-IT-YOURSELF REFLEX TEST

4	3	10	12
6	11	8	9
1	7	2	5

ILLUSTRATION #2

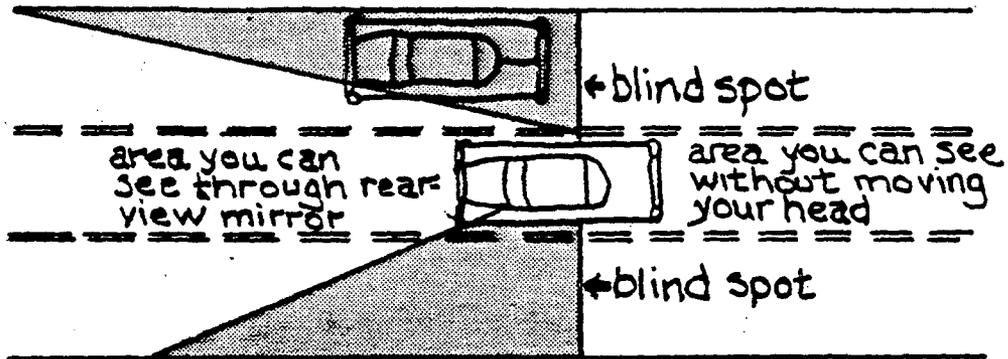


ILLUSTRATION #3



ILLUSTRATION #4

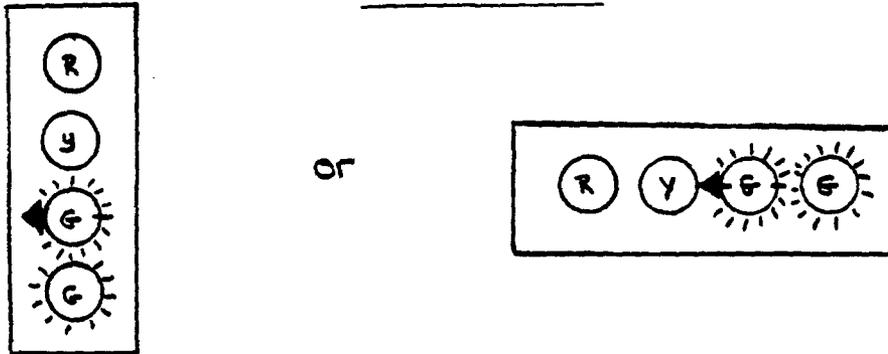


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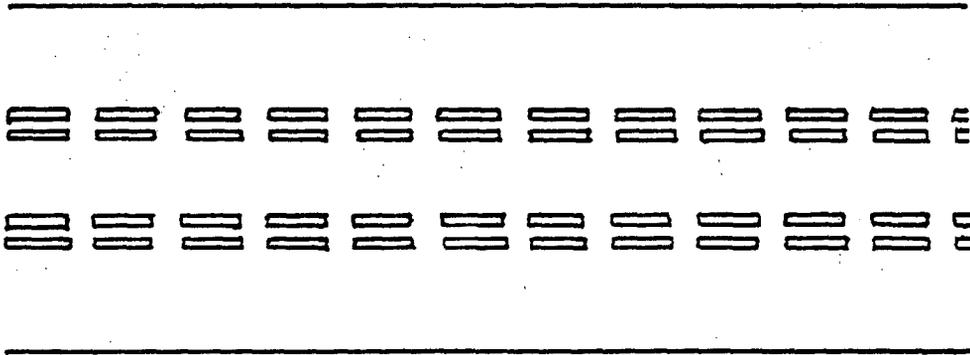


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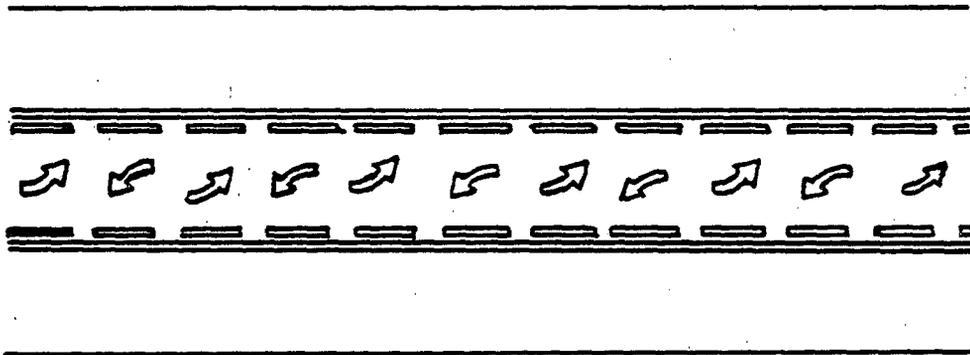


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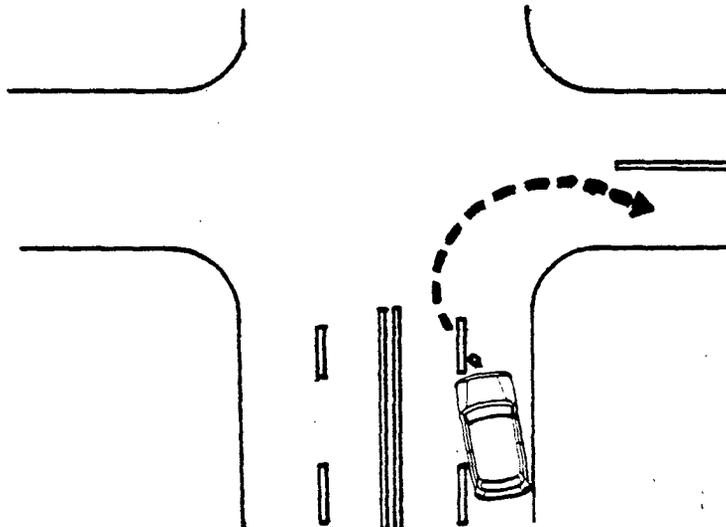


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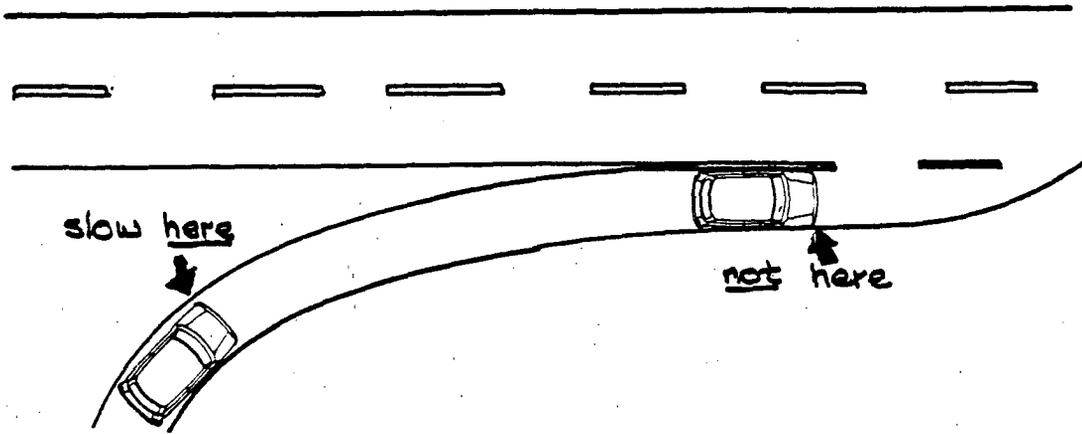


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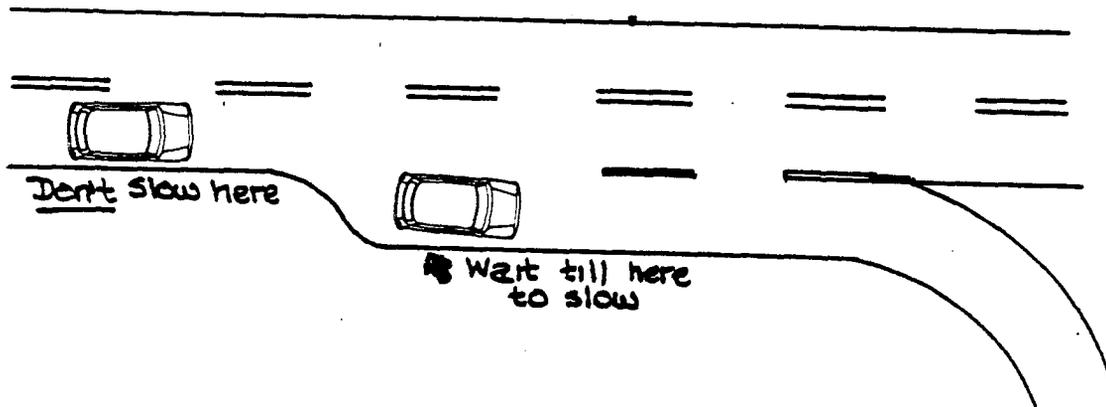


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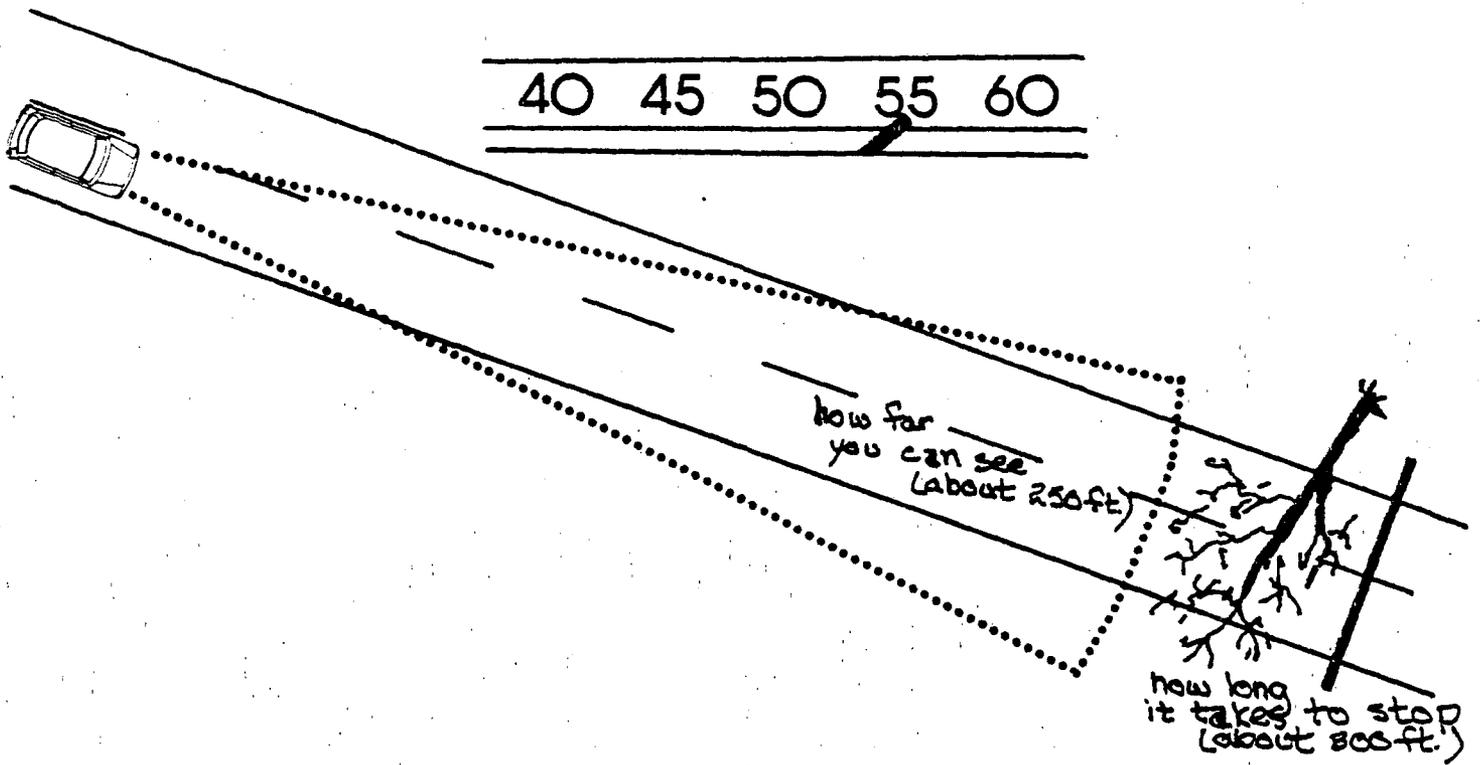


ILLUSTRATION #11

