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16. Abstract The driving environment has become more complex as numerous traffic control devices have been developed and modified. This report documents activities that identify critical driver behavior issues that should be emphasized in teenage driver and traffic safety education courses. Survey assessments of teenage drivers and older drivers were conducted to evaluate driving operations and traffic control devices that are problematic and should be focused upon during the education process. The survey results are summarized and will be used to develop information for driver education curricula and in the development of brochures, newsletter articles, and/or information to be accessed through an Internet web site.			
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**DRIVER BEHAVIOR CHARACTERISTICS OF
TEENAGE DRIVERS AND OLDER DRIVERS**

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DISCLAIMER

The contents of this report reflect the views of the authors, who are responsible for the opinions, findings, and conclusions presented herein. The contents do not necessarily reflect the official views or policies of the Texas Department of Transportation (TxDOT) or the Federal Highway Administration (FHWA). This report does not constitute a standard, specification, or regulation, nor is it intended for construction, bidding, or permit purposes. This report was prepared by Angelia H. Parham (TN-100,307) and Garry L. Ford.

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CHAPTER 1

INTRODUCTION

BACKGROUND

This report documents the second-year activities of TxDOT Project 1794. Project 1794 was initiated to build upon the recommendations of Project 1261 by identifying teenage driver and adult safety instructor needs to develop targeted educational products and programs (1,2). These products and programs will include specific information on traffic control devices that should be included in the driver education curriculum and in the *Texas Drivers Handbook* (3). They may also include the development of brochures, videos, newsletter articles, and/or information to be accessed through an Internet web site.

The original objectives of the project were to:

- identify which traffic control devices have the potential of being misunderstood,
- identify the driver audience(s) that should be emphasized in the educational effort,
- identify target media efforts to educate drivers on traffic control devices, and
- develop and implement these projects.

A secondary focus was added to the project to identify driver behavior issues that are considered critical to reducing traffic crashes and improving traffic safety. Teenage driver education and adult safety education curriculum materials will emphasize these driver behavior issues. These goals and objectives were/are met or are to be met through a series of tasks over a 36-month period. These tasks are listed in three phases.

Phase I

- 1) Develop and administer a survey of law enforcement personnel to identify general perceptions and problems associated with adult driver comprehension of traffic control devices;
- 2) Develop and administer a survey of teenage driver education instructors to identify general perceptions and problems associated with teenage driver comprehension of traffic control devices;
- 3) Develop and administer a survey of teenage drivers to identify comprehension deficiencies prior to their obtaining a driver's license;
- 4) Establish a technical working group comprised of representatives from the Texas Department of Transportation, Texas Education Agency, the Texas Department of

Public Safety, and organization(s) that represent teenage driver and traffic safety education instructors; and

5) Document the research results in the first-year report.

Phase II

- 1) Identify critical driver behavior issues that should be emphasized in teenage driver and traffic safety education courses;
- 2) Develop preliminary ideas for incorporating this information into curriculum materials; and
- 3) Document the research results in a second-year report.

Phase III

- 1) Develop and implement a driver education program that targets the most problematic traffic control devices and driver behavior issues with the goal to reduce the likelihood of motorists being involved in a fatal crash and improving the overall safety of the transportation system; and
- 2) Document the research implementation in a third-year report and project summary report.

FINDINGS AND RECOMMENDATIONS

During Phase I of this study, the researchers identified perceptions and problems associated with teenage drivers, driver education instructors, and law enforcement personnel. The researchers used results of these evaluations to develop recommendations for improving teenage driver understanding of traffic control devices. This information is documented in *Report 1794-1: Educating Drivers on Traffic Control Devices (4)*.

During Phase II of the study, the researchers identified critical driver behavior issues for teenage drivers and older drivers as presented in this report. Researchers also made recommendations for changes and additions to the *Texas Drivers Handbook (3)* chapter on signals, signs, and markings. This information was provided to TxDOT in the form of a technical memorandum. These recommendations provide for implementation of results into education curricula for teenage drivers, revisions to the *Texas Drivers Handbook (3)*, as well as ideas for outreach materials that can be developed during Phase III of this study.

CHAPTER 2

SURVEY OF TEENAGE DRIVERS

Teenage drivers are over-represented in traffic crashes when compared to all other drivers. Furthermore, motor vehicle crashes are the leading cause of death for 15- to 20-year-olds (5). Risk is highest at age 16, where the crash rate per mile driven is almost three times as high as it is for 18- to 19-year-olds (5). As a young driver, it is important to have a thorough understanding of the causes and problems of traffic crashes. Furthermore, an understanding of traffic control devices, traffic facilities, and driving conditions is essential in safe driving.

The perceptions, concerns, and suggestions of teenage drivers related to traffic issues and educational materials can help educators/professionals develop materials that will aid in better understanding. This information can also be used in the development of a driver education curriculum, teaching techniques, or the engineering and design of transportation facilities and control.

Researchers developed and administered a survey instrument to obtain information on the perceptions, concerns, and suggestions of teenage drivers. The survey was administered to 482 teenage drivers enrolled in driver education programs in Texas. The objectives of this survey were to:

- identify teenage drivers' perceptions of the causes and problems related to traffic crashes and teenagers;
- query teenage drivers for suggestions they may have in reducing traffic crashes;
- determine the problem areas related to driving conditions, traffic facilities, and traffic control; and
- identify the types of educational materials and travel information that would be most useful to teenage drivers.

SURVEY DEVELOPMENT

The survey instrument developed by the research team was directed at teenage drivers between the ages of 15 and 18. The survey was to be administered at a driver education program, and it was completed during driver education classroom hours. To minimize the time taken away from the driver education instructor, the survey instrument was designed to be completed within five minutes.

The survey covered six general topic areas: demographic information, traffic crashes, educational materials, driving conditions, roadways/intersections and types of traffic control devices, and traveler information. The survey instrument was one page, front and back, and

required participants to write on the survey. Additionally, a student assent form was developed and administered before the actual survey. A copy of the survey form is included in Appendix A.

SURVEY ADMINISTRATION

The survey was administered at four driver education programs located in four Texas cities (Arlington, Houston, San Antonio, and Tyler). Each program had one or more driver education classrooms in various areas of the city. The driver education programs were chosen by their level of interest and by the time constraints of the researchers.

The survey was administered to 482 teenage drivers enrolled in a driver education program. The surveys were mailed to the driver education administrator of each program, and they were administered on the first day of formal instruction. After completion of the survey, each administrator returned the completed survey forms to the researchers. The researchers then reduced the surveys onto a database and analyzed the data. When the administrators returned the surveys, the researchers forwarded a two-page copy of the preliminary results and a copy of the “Know Your Vital Signs” (6) video to the driver education administrators.

SURVEY RESULTS

A database was developed to simplify the process of entering, analyzing, and reporting the survey results. The following sections summarize the results and findings of this survey.

Sample Characteristics

Questions 1–4 asked respondents to provide general demographic information. Table 1 summarizes the characteristics of the teenage drivers participating in the survey. Fifty-one percent of the participants were male and 49 percent were female. The majority of those participating in the survey were 15 years old. Sixty-five percent indicated that they drive or plan to drive a passenger car or sports car.

Table 1. Characteristics of the Teenage Driver Survey.

Characteristics		Number	Percent (%)
Gender	Male	247	51
	Female	233	49
Age	15	265	55
	16	130	27
	17	67	14
	18+	13	3
Current level of education	9 th grade	73	15
	10 th grade	128	27
	11 th grade	215	45
	12 th grade	44	9
	High school graduate	17	3
Type of vehicle	Passenger car	216	45
	Sports car	95	20
	Pick-up truck	64	13
	Sports utility vehicle	85	18
	Other	8	2
Total¹		482	100

¹Individual totals may not reflect the overall total. A few participants chose not to answer some or all of the demographic questions.

Traffic Crashes

Questions 5–8 asked teenage drivers to provide their thoughts on traffic crashes and how traffic crashes relate to drivers of all ages and other teenage drivers. Three questions on the survey were related to the causes and problems associated with traffic, and one question asked teenage drivers how teenage traffic crashes can be reduced. Questions 5, 6, and 8 were open-ended questions and were intended to not limit the answers that teenagers might give. Question 7 listed common problems relating to teenagers and driving and asked the respondents to rate the problems on a scale from 1 to 5 (with 1 being not serious and 5 being very serious). “Other” was listed to provide a space where the respondents could write any other problems they feel are important. The parentheses after the response indicates the number of respondents.

Question 5. What do you think is the major cause of traffic crashes for drivers of *all ages*?

Top 5 Responses (out of 472)*	Number	Percent (%)
1. Drinking	196	42
2. Not paying attention	136	29
3. Carelessness	63	13
4. Speeding	58	12
5. Drugs	20	4

*A few participants had more than one response.

Question 6. What do you think is the major cause of traffic crashes for *teenage drivers*?

Top 5 Responses (out of 470)*	Number	Percent (%)
1. Drinking	171	36
2. Speeding	97	21
3. Inexperience	80	17
4. Not paying attention	63	13
5. Carelessness	49	10

*A few participants had more than one response.

Question 7. How serious do you think the following problems are relating to *teenagers*?

Please rate on a scale from 1 to 5, with 1 being not serious and 5 being very serious.

Rank	Problem	Average Rating
1.	Drinking and driving	4.3
2.	Not paying attention when driving	4.0
3.	Traffic crashes	3.9
3.	Showing off when driving	3.9
3.	Aggressive / risky driving	3.9
4.	Driving at speeds higher than the speed limit	3.8
5.	Following another driver too closely	2.9
6.	Riding with and driving around other teenagers	2.7
Other:	Racing (6)	4.4
	Running red control signals (6)	4.0

Question 8. What are your suggestions on how to reduce *teenage driver* traffic crashes?

Top 5 Responses (out of 278)*	Number	Percent (%)
1. More education	88	32
2. Stricter laws	33	12
3. Stop/enforce drinking laws	27	10
4. Raise driver age	16	6
5. Reduce speed	10	4

*A few participants had more than one suggestion.

Educational Materials

Educational materials are important to teenage drivers since they are the primary means of teaching important driving information. Question 9 was intended to identify what type of educational materials could effectively convey important information to teenagers. Additionally, the question was intended to identify the types of educational materials teenage drivers prefer and would possibly use. Question 9 listed common types of educational materials and asked the respondents to rate the effectiveness of the materials on a scale from 1 to 5 (with 1 being least effective and 5 being most effective).

Question 9. What type of *educational materials* could be effective to inform *teenagers* of important driver information?

Please rate on a scale from 1 to 5, with 1 being least effective and 5 being most effective.

Rank	Educational Materials	Average Rating
1.	Internet website/software	3.3
2.	High school/college newspaper	3.2
3.	Newspaper/magazine articles	3.0
4.	<i>Texas Drivers Handbook</i>	2.8
5.	Brochures/handouts	2.2
Other:	Television/movies (32)	4.5
	Speakers (15)	4.5

Driving Conditions

Question 10 asked teenage drivers what driving conditions they have the most difficulty driving in. The objective of this question was to identify teenage driver difficulties in order to develop educational materials. Question 10 listed common driving conditions and asked the respondents to rate the driving conditions on a scale from 1 to 5 (with 1 being not difficult and 5 being very difficult).

Question 10. Under which *driving conditions* do you (or would you) find most difficult to drive? *Please rate on a scale from 1 to 5, with 1 being not difficult and 5 being very difficult.*

Rank	Driving Conditions	Average Rating
1.	Rain/wet pavement	3.5
2.	Roadway construction	2.9
2.	Nighttime/dark conditions	2.9
2.	Traffic congestion	2.9
3.	Freeway speeds (60-70 mph)	2.7
4.	Low-speed city streets (25-35 mph)	1.8
Other:	Snow/ice (28)	4.6
	Extreme weather (6)	4.3

Roadways/Intersections and Traffic Control

The teenage driver survey included various types of roadways and intersections, as well as general types of traffic control. The questions were intended to identify which roadways/intersections and types of traffic control can be of concern to teenage drivers. Identifying these concerns can assist in the development of educational materials and designing/implementing traffic systems.

Question 11 asked the respondents what roadways and intersections they find difficult to drive. The question provided a list of roadways and intersections, including different types of freeway facilities. Question 12 asked teenage drivers what type of traffic control they find difficult to understand. The question included various types of traffic control that were grouped into six subtypes: signs (all types), pavement markings, traffic signals, school zones, railroad crossings, and construction zones. Both questions 11 and 12 asked the respondents to rate the types of roadways/intersections and traffic control on a scale from 1 to 5 (with 1 being not difficult and 5 being very difficult).

Question 11. On what type of roadways or intersections do you (or would you) find most difficult to drive? Please rate on a scale from 1 to 5, with 1 being not difficult and 5 being very difficult.

Rank	Roadways or Intersections	Average Rating
1.	Freeway entrance/exit ramps	3.2
2.	Freeways	3.1
3.	Freeway frontage roads	3.0
4.	Curved roads	2.7
5.	Flashing beacon intersections	2.4
6.	City streets	2.2
6.	Signalized intersections	2.2
7.	Stop sign controlled intersections	2.0
8.	Rural roads (roads outside the city)	1.8
Other:	Blind spots (1)	5.0
	Get lost easy in Dallas (1)	4.0

Question 12. What type of traffic control do you find most difficult to understand? Please rate on a scale from 1 to 5, with 1 being not difficult and 5 being very difficult.

Rank	Traffic Control	Average Rating
1.	Pavement markings	2.0
2.	Construction zones	2.0
3.	Railroad crossings	1.5
3.	School zones	1.5
3.	Traffic signals	1.5
4.	Signs	1.0
Other:	Police officers who control traffic (1)	4.0

Traveler Information

The final question of the survey was designed to identify the types of travel information that teenage drivers find helpful. This information could be useful in designing and implementing Intelligent Transportation Systems (ITS) and Advanced Traveler Information Systems (ATIS). Question 13 listed common travel information and asked the respondents to rate how helpful the information would be on a scale from 1 to 5 (with 1 being least helpful and 5 being most helpful).

Question 13. What type of *travel information* do you (or would you) find most helpful?

Please rate on a scale from 1 to 5, with 1 being least helpful and 5 being most helpful.

Rank	Travel Information	Average Rating
1.	Traffic incident/crash location	3.8
1.	Lane closures/construction	3.8
2.	Alternate routes	3.7
2.	Traffic congestion location	3.7
3.	Weather	3.4
4.	Travel times	2.8
5.	Transit (bus, train) schedules	2.5
Other:	Maps (4)	4.8

Summary of Results

A total of 482 teenage drivers between the ages of 15 and 18 participated in the survey. The survey covered traffic engineering topics such as traffic crashes, driving conditions, roadways/intersections, traffic control, and traveler information. The survey also asked teenage drivers to suggest ways to reduce traffic crashes and ways to effectively communicate driver information.

Teenage drivers indicated that drinking and driving was the primary cause of traffic crashes for both teenage drivers and for all drivers. Furthermore, drinking and driving were rated as the most serious problem relating to teenagers and driving. This indicates that the current efforts to educate young drivers, both in high school and in driver education, are working. The results also indicated that teenage drivers are aware that speeding and inexperience are major causes of teenage traffic crashes.

Rain/wet pavement, snow/ice, and “extreme” weather were noted as the most difficult conditions to drive in. Other driving conditions of concern to teenage drivers were roadway construction, nighttime/dark conditions, and traffic congestion. Freeways, freeway entrance/exit ramps, and freeway frontage roads were noted as the most difficult roadways to drive on by teenagers. This indicates that teenage drivers have a difficult time with the high speeds, merging/yielding maneuvers, and traffic congestion of a freeway system. Teenage drivers indicated they have the most difficult time understanding pavement markings and construction zones. This area of misunderstanding was also identified in the first year of this study (4).

For ATIS and ITS, teenage drivers noted traffic incident/crash location and lane closure/construction location as most helpful. Teenage drivers also indicated that Internet web sites/software and high school/college newspapers are an effective means to inform other teenagers of important driver information.

CHAPTER 3 SURVEY OF OLDER DRIVERS

There is cause for concern when older drivers are behind the wheel because they have higher rates of fatal crashes per mile driven, per 100,000 people, and per licensed driver than any other group except younger drivers (see Figure 1). In 1997, 7326 people 65 years and older died in motor vehicle crashes: this is 3 percent more than in 1996 and 38 percent more than in 1975. Older drivers do not deal as well as younger ones with complex traffic situations, and multiple-vehicle crashes at intersections increase markedly with age. Older drivers are also more likely to get traffic citations for failing to yield, turning improperly, and running stop signs and red lights. Older drivers are also more susceptible than younger drivers to medical complications following motor vehicle crash injuries; this means they are more likely to die from their injuries (7).

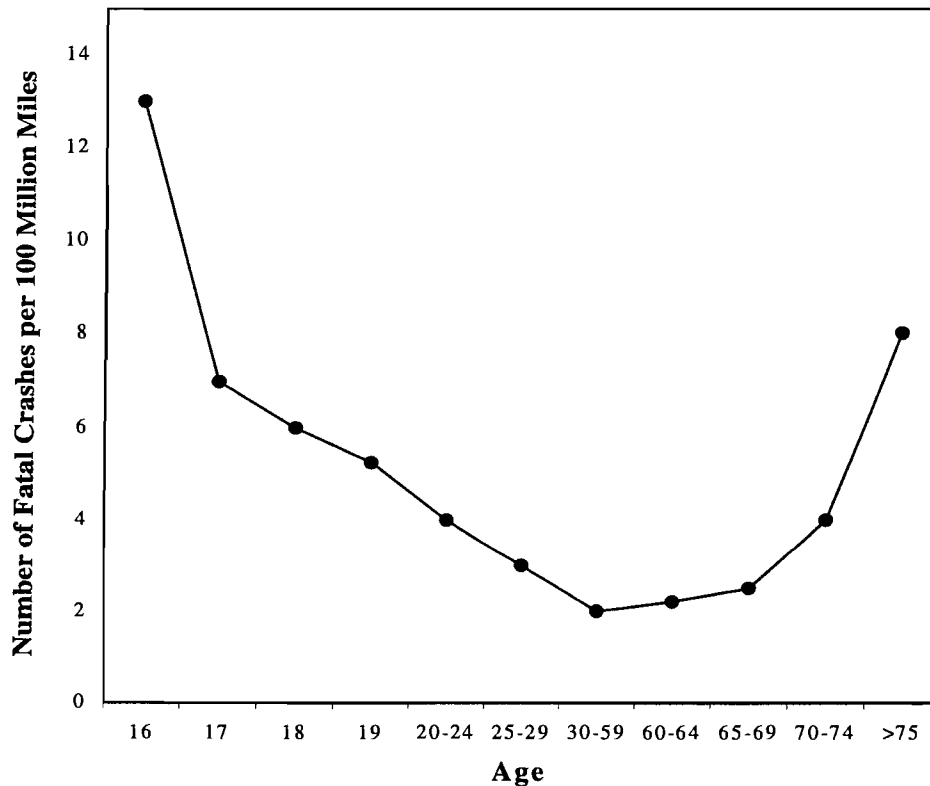


Figure 1. Fatal Crash Involvement per 100 Million Miles by Driver Age, 1995–1996 (7).

Older driver perceptions, concerns, and suggestions are critical in developing materials to aid in better driver understanding. In order to better understand older driver perceptions and concerns,

researchers developed and administered a survey to determine the areas that are difficult for older drivers. The objectives of the survey were to:

- identify older drivers' understanding of traffic control devices;
- identify driving maneuvers that are difficult for older drivers;
- identify when and where older drivers drive most often; and
- identify information that would be helpful to older drivers.

SURVEY DEVELOPMENT

A survey instrument was developed for drivers over the age of 50. A database of 1100 older drivers was randomly selected from older drivers currently licensed in Texas. The survey questions included driver age group, operations and driving tasks that are difficult, information about daily trips, the meaning of basic sign shapes, a list of driving courses completed, and suggestions for making driving easier and for driver education materials. A copy of the survey is included in Appendix B.

SURVEY ADMINISTRATION

Surveys were mailed to the 1100 randomly selected older drivers within the state of Texas. Researchers developed a database to enter, analyze, and report the survey responses.

SURVEY RESULTS

A total of 107 survey responses were received for a response rate of 10 percent. The results of the survey are summarized in the following pages.

OLDER DRIVER SURVEY

1. What is your age group? (Please circle one.)

Age	Number of Respondents	Percent (%)
50 – 54	14	13
55 – 60	14	13
61 – 65	8	8
66 – 70	20	19
71 – 75	22	21
76 – 80	11	10
81 – 85	11	11
86 or above	6	6
Total	107	100

2. Which of the following operations do you find difficult? (Please check all that apply.)

Category	Responses	Percent (%)
Driving at nighttime	41	30
Backing up	27	19
Passing on two-lane highways	19	14
Driving on a busy (congested street)	15	11
Recognizing traffic control signs	6	4
Driving on the freeway	14	10
Other *	12	9
Understanding left-turn movements at traffic signals	3	2
Accelerating at a green light	1	1

*** Other**

- A lot of signs are behind or partly behind trees or objects of some kind especially in cities
- Angry people not knowing how to enter or exit a freeway
- Driving on hwy with uncontrolled access when speed limit is 70
- Driving when speeding cars pass on the left or right and you want to change lanes
- Judging my distance on incoming traffic..retired myself from driving
- Looking back to enter thoroughfare
- Merging into #820 during busy time
- Nothing in particular
- No problem yet
- Reading info from roadway
- Rainy slippery roads
- Watching other drivers

3. How many trips do you make on a daily basis? (A trip to and from the grocery store is considered *one* trip.) (Please check one.)

Number of Trips	Number of Responses	Percent (%)
0-3	69	65
4-6	30	28
7-10	5	5
>10	2	2

4. During what hours? (Please check all that apply.)

Times	Number of Responses	Percent (%)
7-9 a.m.	61	17
9 a.m. - 12 p.m.	76	21
12 -2 p.m.	41	11
2-5 p.m.	62	17
5-6 p.m.	41	11
6-8 p.m.	53	14
Later than 8 p.m.	36	10

5. What is the average length of these trips? (Please check one.)

Options	Number of Responses	Percent (%)
Less than one mile	8	6
1-5 miles	33	27
6-10 miles	33	26
11-15 miles	17	14
16-20 miles	12	10
Greater than 20 miles	23	19

6. Do you drive after dark? (Please circle one.)

Options	Responses	Percent (%)
YES	84	79
NO	23	21
Total	107	100

If so, how frequently? (Please check one.)

Options	Number of Responses	Percent (%)
Once per day	40	45
Once per week	32	37
Once per month	8	9
Less than once per month	8	9
Total	88	100

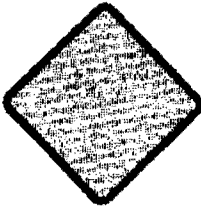
7. Which of the following driving tasks do you find difficult? (Please check all that apply.)

Operation or Traffic Control Device	Responses	Percent
Seeing and Reading signs (basic shapes)	23	19
Other*	17	14
Seeing in a work or construction zone	14	11
Understanding what to do in a work or construction zone	14	11
Seeing pavement markings	13	11
Maintaining space cushions between you and the cars around	12	10
Telling the distance between my vehicle and the next vehicle	8	7
Reaction time when stopping or avoiding hazards	6	5
Traffic control in a school zone or pedestrian right-of-way	5	4
Understanding signs	4	3
Seeing the colors on traffic signals	3	2
Understanding pavement markings	3	2
Understanding traffic signals	1	1
TOTAL	123	100

*** Other**

- Can't really interpret signs from shape alone
- Construction zone signs without speed stated in MPH but threatening a fine for speeding
- Driving on a highway without controlled access when speed limit is 70 MPH
- Driving in fast speed zones and having to observe the speeders. Speed limit too high.
- Guessing what the driver before me and on the side are going to do next
- I find it difficult to have to compensate for the inadequacy of other drivers.
- I stopped driving when I became a dangerous driver.
- If you maintain the proper space, someone will pull in front.
- Keeping distance between vehicles will cause somebody to cut in.
- Multiple lanes and an ambulance comes down the road on the other side: What do you do?
- Marking on freeways—1000ft people go to last minute to squeeze in, need officer to enforce night
- Others blocking passing lane and passing and pulling right or turning right
- Telling which lane to be in for a particular change of freeway
- Reading small street names at night
- Staying alert to weaving speeding vehicles around me
- Street signs are poor.

8. Choose the best answer that explains what the shape is used for:



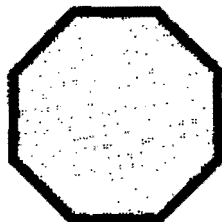
Options	Number of Responses	Percent (%)
Generally used for guide signs	38	34
Railroad advance warning sign	11	10
Exclusively to warn of possible hazards on the roadway	56	50
Not sure	8	6
Total	113	100

9. Choose the best answer that explains what the shape is used for:



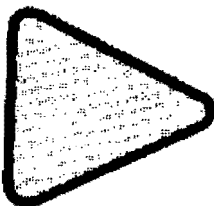
Options	Number of Responses	Percent (%)
Warning of a no passing zone	17	15
Generally used for guide signs	81	77
Exclusively for yield signs	0	0
Not sure	8	8
Total	106	100

10. Choose the best answer that explains what the shape is used for:



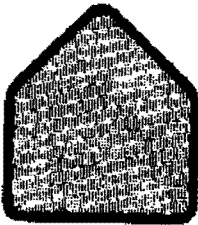
Options	Number of Responses	Percent (%)
Generally used for regulatory signs	12	11
Slow moving vehicle	0	0
Exclusively for stop signs	99	88
Not sure	1	1
Total	112	100

11. Choose the best answer that explains what the shape is used for:



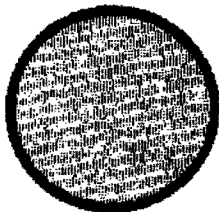
Options	Number of Responses	Percent (%)
Slow moving vehicle	24	21
Warning of no passing zone	58	51
Generally used for guide signs	14	12
Not sure	18	16
Total	114	100

12. Choose the best answer that explains what the shape is used for:



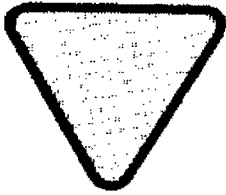
Options	Number of Responses	Percent (%)
School advance warning and crossing sign	97	86
Exclusively for yield signs	5	4
Generally used for regulatory signs	3	3
Not sure	8	7
Total	113	100

13. Choose the best answer that explains what the shape is used for:



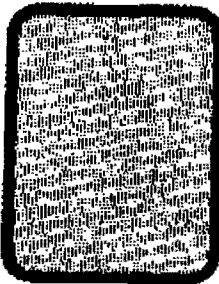
Options	Number of Responses	Percent (%)
Slow moving vehicle	14	13
Railroad advance warning sign or evacuation route	79	70
Exclusively to warn of possible hazards on roadway	2	2
Not sure	17	15
Total	112	100

14. Choose the best answer that explains what the shape is used for:



Options	Number of Responses	Percent (%)
Warning of no passing zone	18	16
Exclusively for yield signs	86	76
Slow moving vehicle	5	5
Not sure	4	4
Total	113	100

15. Choose the best answer that explains what the shape is used for:



Options	Number of Responses	Percent (%)
Generally used for regulatory signs	102	89
Railroad advance warning sign or evacuation route	3	3
Exclusively for stop signs	2	2
Not sure	7	6
Total	114	100

16. How often do you travel on freeways (interstates)? (Please check one.)

Options	Number of Responses	Percent (%)
More than once per week	76	68
Once per month	20	17
Five times per year	10	8
Once per year	8	7
Total	114	100

17. What makes you uncomfortable about driving on a freeway? (Check all that apply.)

Options	Number of Responses	Percent (%)
Speed	56	39
Number of lanes	6	4
Congestion or number of drivers	34	24
Number of interchanges	8	6
Nothing at all	39	27
Total	143	100

**18. Would you consider taking a driver education course designed for older drivers?
(Please circle one.)**

Options	Number of Responses	Percent (%)
YES	86	72
NO	32	28
Total	118	100

19. Are there any traffic signs in particular that you have difficulty seeing or understanding? (Please circle one.) Yes or No If yes, what?

Options	Number of Responses	Percent (%)
YES	35	33
NO	74	67
Total	109	100

- Brand new signs that have figures
- Closed lanes need lots of advance warning as do school zones
- Color, size, distance, reflections
- I can't readily identify a sign by shape alone. However, I have no difficulty reading or understanding a sign that is written.
- Lanes for changing to a different freeway. Some signs are directly over the correct lane to be in and other signs don't tell you which lane to be in.
- Letters on signs at night especially
- Obstructed by bushes or trees
- Ones located behind trees and shrubs, old, dull, missing, letters on signs. Too much information on sign (i.e. more than one set of hours prohibited...lettering too small)
- Road construction signs are indefinite or difficult to understand. They should be identified as to the nature of the construction and miles per hour to be enforced. Doubling fines is good but most motorists are still not observing the posted speed limit.
- Some directions at interchanges
- Some print is too small.
- Sometimes street name signs are in inconspicuous locations or on opposite side of street and too small letters. This causes hesitation at intersections when looking for a particular street.
- Sometimes signs are hard to see.
- Street signs. Colors vary from city to city and lettering is too small.
- Those on right side of road/street while driving in the inside lane
- Too many signs at some roads or intersection encourages one to miss seeing one; also advertisement signs
- Yield signs should be placed sooner (prior to slowing down).

20. What would make driving easier for you? (Check all that apply.)

Options	Number of Responses	Percent (%)
Larger signs	41	22
Larger letters on signs	33	18
More street lighting	33	17
Larger traffic signals	15	7
Larger pavement markings	21	11
Brighter signs	23	12
More symbol signs	6	3
Other*	18	10
Total	190	100

*** Other**

- Advance warnings
- All lanes need to be striped brightly as to be visible in inclement weather
- Better maintained streets and highways
- Earlier signs before you miss your turn; ensure they are not hidden/obstructed by large trees, etc.
- 'Keep Off' signs
- Less hostile drivers
- More plain signs near schools
- On intersections mark directions: S. N. E. W.. I or others have no sense of direction
- Other drivers obeying traffic signs
- Other people's driving safety
- Reflectors on lane lines and medians
- Signs and signals in line with the driving lanes—consistent language statewide
- Strobe lights for east and west traffic (sometimes can't see them at sunrise and sunset)
- The state choosing distances for all signs and right wording
- Warning signs given time to obey when you get there
- When possible, street names on signs in center of intersection
- Yellow street lights rather than white
- Plainer pavement markings

21. Have you ever taken a driver education or defensive driving course? (Please circle one.) If YES, please explain what type of course it was and approximately when you took it.

Options	Number of Responses	Percent (%)
YES	78	66
NO	39	34
TOTAL	115	100

Defensive Driving

- 1993—defensive driving course as a result of an undeserved ticket
- Defensive driving approximately five years ago
- Defensive driving course about five years ago
- 1995—Defensive driving
- Drivers license man gave it possibly 30 years ago, Defensive ?
- Defensive driving course 24 years ago
- Defensive driving, 1998
- Defensive driving in Odessa, Texas, in March 1999
- Defensive driver course for a ticket
- Defensive driving, 1993
- Defensive driving 8 years ago
- 4 years ago. 10 years ago defensive driving
- Defensive driving; 5 years
- Remedial after a speeding ticket 4 years ago
- Smith system driving every other year since 1985. Defensive driving course 1996. Texas A&M advanced driving course in 1992 and 1995
- Regularly since the early sixties. However the last one four years ago was a childish show. I was the only one not taking it for ticket dismissal. The instructor juggled balls to keep students entertained and furnished all answers to the test. I am looking now for one directed towards older citizens.
- Defensive driving 1992
- Probably 15 years ago. I did not come to a complete stop at a stop sign.
- Approximately 10 years. The garbage truck was high and I did not see sign 2 lanes left. He was in second lane and I passed and he hit me. Trucks are too high when behind them to know if green or red.
- During my 59 years of licensed driving, I have had six moving violation citations. Three of these six “tickets” came in a ten day period in 1961...I was assigned to a 16 hour course that covered all the regulations and normal driving demeanor and etiquette.

AARP

- Last one was nearly 2 years ago.' AARP course
- AARP—last class-Mar '99
- AARP sponsored drivers education that reduced insurance rates about 5 years ago
- I teach AARP 55 Alive Course
- AARP taken in May 1999—defensive driving
- AARP 6 years
- AARP 55-Seniors. Last One—2-19-97

Driver Education

- High school
- I took a course given at our school about 12 years ago. I do all the driving.
- Drivers Ed-high school
- A school related class in high school
- 1958–59 high school drivers education one-year course
- Drivers Ed in high school—1963
- High school driving course back when it was a credit toward graduation
- Senior citizens center station, Texas March 1998
- Mature driving. 55 Alive-1995
- In 1954 I took a one week driver education
- Took driver education when I first began driving about 1961 or 62
- Drivers education for drivers license tests only
- Drivers Ed, 1959
- Drivers education course, 1959

Military Courses

- For more than 20 years. Last '97 for every year, AVP US Military
- Approximately 1958 when applying for a military drivers license, plus numerous safety courses
- Took test for Ohio Driver License in early 60s, took test for California Drivers License in 70s, took driving lessons and test for British Drivers license in late 80s, and have owned Texas Drivers License forever

Safety Courses

- Drivers safety course
- Explanation of road signs, school zones, speeding-residential areas-parking-studied the rules of these areas. 22 years ago in 1976. Do not slow down to see other accidents on opposite side of the interstate; only on your lanes
- A poorly taught/designed class about 6 years ago 1988 for speeding on freeway!
- Was an “S.S.A” instructor for FLA Highway in the 50s and 60s (SSA=Safety, Survival, and Acquisition)

Miscellaneous

- 10 years ago
- At work, 1956
- Standard drivers course to lower insurance rates
- Lecture and discussion 20 years ago
- Took it in 1998; take every 3 years

22. What do you suggest that should be included in a driver education course to make driving safer?

Speed Limit

- Emphasize on speeding and what consequences can occur if an accident happens
- Lower speed limit
- There was an excellent television course in the early sixties where one had to identify possible dangers on a test sheet. Today's courses have deteriorated. More and more people are speeding, what I would like to see are traffic cameras documenting infractions, then sending automatic ticketing. No side show courses that guarantee passing or ticket dismissal
- Teach drivers to be comfortable with speed. Slow vehicles are extremely dangerous on expressways/freeways. Usually they are driven by older drivers
- Emphasis on driving the speed limit posted. If driver feels uncomfortable with 55/60 driver should stay in right hand lane

Road Rage

- How to control temper while driving
- More emphasis on road rage in elders as well as younger drivers
- Find way to end road rage like more unmarked police cars

None

- I have no suggestions
- Nothing. People will be people
- No comments
- I have no idea! Since (good) judgement can't be taught, accidents will continue at current or accelerated levels.
- I cannot say
- No suggestions

Courtesy

- Courtesy! Defensive driving. The other drivers are not watching out for you!
- Think and respect others. Yield when necessary.
- Teaching people to be more considerate on the streets
- Courtesy towards others and more friendliness
- Avoid accident, respect others, recognize the force of a motor vehicle and its potential power
- Courtesy in driving as well as safety
- Emphasize defensive driving and courtesy
- Driving courtesy
- Courtesy for fellow drivers
- Driver courtesy! Driving the speed limit on freeways. Too many people drive 15–20 under the speed limit. This creates as much hazard as speeders.
- Teach drivers not to zip in and between cars. Most never signal. Teach drivers not to follow too close behind the car ahead.
- Emphasize no tailgating because of space necessary to come to a stop and tailgate cause too many accidents. Drive friendly. Always prepare to yield right of way. Stop and do not move at stop signs..red lights..then proceed. These are violations most obvious each day by many motorists.
- Drivers should learn not to tailgate other cars, because driving too close at any speed is not safe and makes a lot of people nervous. Also, their headlights make it hard to see in the rearview or side mirror.
- Awareness of those in front of you, beside you, and behind you. Anticipate bad driving by others and never assume the other driver saw you

Lane Changing

- Emphasis on lane changes and merging traffic lanes
- On changing lanes
- How to manipulate lane changing in intersections where lanes are merging and the same lanes need to be over to get to the correct freeway

Senior Citizens

- Re-education of senior citizens is good. Stress courtesy as well as rules
- Speed older drivers; at times too slow below speed limits
- I think when people have little TIAs or related illnesses, they should give up driving.
- Statistics that cause most of the wrecks are explained, so maybe at least older drivers could be better educated and more aware of the problems.
- That more people be more careful when driving. If you are a senior driver, please don't drive too fast and lose control of the car.

Drinking and Driving

- To show what drinking and driving can do to others and their family
- Don't drink alcohol while driving

Enforcing the Law

- Enforcing the traffic laws we have and greater fines would help as much as driver education. People are not using the education they have.
- Take peoples' licenses when they become dangerous to other travelers as well as themselves..or at least refuse to let them drive.
- New traffic laws passed and traffic control signs newly introduced
- Taking more into the importance of driving slower in wet or icy conditions. Not tailgating—drive friendly use passing lane for passing; don't block the highway
- Drivers of passenger cars and trucks should become more familiar with the working of 18 wheelers, especially speed and stopping distance

High School Students

- More hours behind the wheel with an instructor. School kids in Texas spend only 8 hours behind the wheel with an instructor and then don't even take a driving test—the instructor just passes them and will automatically pass “favorite” students or students taking athletics. I know—this was the case with my son. 8 hours behind the wheel is not enough to then turn them loose on the busy freeways, etc.
- No drivers license to high school students—they are a menace to everyone on the road..especially those in El Paso Texas and New Mexico.
- Our young people need more hours behind the wheel for practice with a driver's education teacher.
- Instructions for younger drivers in inclement weather, rain, sleet, snow, etc. Most kids are lost when it begins to rain.
- More education and training before drivers license
- In middle school, before the students are of age to drive, require all students to take a drivers education course that includes a trip to the morgue.

Courses

- AARP is an excellent course
- Video of correct and incorrect driving. Many in this age group cannot read and understand. A picture to them is more powerful than words
- Defensive driving with consequences of speed
- (1) Clarify and emphasize turns on red lights. (2) Clarify and emphasize proper turning technique..i.e.. turning into some lane from L lane to L lane, etc. (3) The purpose and meaning of solid white lines (4) Do closely spaced white bumps = a solid white line?
- There should be more instruction on concepts to help drivers recognize they are sharing the road with people of varied abilities and temperaments
- Tell drivers to use their direction lights well ahead of their turns.
- Dangers of going through red lights.
- Driver etiquette (how you should act); the seriousness of driving; driving should be fun. Not how to scare people or how to make them have heart attacks
- Stress leaving enough space between cars and not to cut in

23. If continuing education is required for all drivers, what should be emphasized?

Tailgating, Speeding, Etc.

- Excessive speed, tailgating, hydroplaning in rain, use of turn signals, aggressive driving: drivers know these but apparently don't feel it applies to them.
- Tailgating, passing
- Speeding, wearing (seat) safety belt
- Stay within speed limits. Stay focused on your driving. Obey all signs.

Defensive Driving

- To always drive defensively, watching out for the other guy—try integrating driving on snow or ice: a lot of people don't have a clue, and that causes accidents. Some of us have to go to work regardless of the weather!
- A need to be more safety conscious while driving—slow down and have more space between cars especially in bad weather.
- Defensive driving techniques. Many Texans drive too fast, run yellow and red lights, speed while changing lanes, road rage—what to do and not do. Drivers who pass on right when you are in the right lane
- Defensive driving, stopping at stop lights and signs
- Defensive driving
- Defensive driving course should be required to get drivers license. Any driver any age. Speed limit too high. Driving friendly, politeness and compassion for other drivers. Seatbelts. Eye glasses for all that need them

Safety

- All safety regulations—especially seatbelt; no smoking; no drinking or cell phones
- Safety—following too close and too fast approaching stop signs and red lights
- (1) Safety (2) Pay attention to other drivers.
- Safety yielding. Observe signs. Have respect for others. Courtesy. Most of all—slow down.
- Speed of safety
- Safety (2 people)

Courtesy

- (1) Consideration for other drivers (2) Keep in the right-hand lane except when passing , and (3) Continually be aware of traffic around you
- Driver friendly–the road is for all drivers
- Safety-consideration-politeness-courtesy-no tailgating-use of turning signals, slow down before coming to stop signs
- Road courtesy–sadly lacking in TX
- Attitude of drivers; being more courteous toward other drivers; laws were made for everyone–you are not excluded. A video, slowly narrated, showing in animation or live what driver is to do when approaching a multilane intersection. Make specific to local streets
- Obey law and be courteous. Do not demand right of way. Speed kills. Use turn signals every time.
- That the car is not an extension of one's ego but a means of transportation courtesy. A more realistic picture of the consequences. (I worked as an EMT) Use designated drivers.
- Courtesy
- Courtesy and defensive driving

Other Types of Classes

- There should be combined education for cars and 18–wheelers for the purpose of understanding operating and precautions for both
- Actually have driving courses that teach drivers what their cars can do and that they can be a great, safe mode of transportation
- Basic drivers education for all drivers, not just school children. Age is not a factor. Ability only should be the guide; if a person exhibits inability to safely handle a vehicle do not permit a license to be given that person.

Miscellaneous

- I have no idea
- Same as Question 22 (2 people)
- Over 65 drivers should be retested and refreshed on rules and signs.
- Make all drivers take it every 5 years
- Too many different signs. One sign about 2 feet higher. Read them.

Other Topics

- Alertness. Good physical condition
- Condition of driver
- Yielding ROW. Entering freeway-acceleration lane
- Keep control of your car
- Anything that would help reduce the anger and hostility of so many drivers.
- Lane change
- Inclement weather and high speed handling of a vehicle. Highway speeds are now at 70 MPH.
- Control of speed and recognizing conditions. Self control on “fitness to drive” i.e. fatigue, drinking, etc. Assist people in knowing what critical vehicle maintenance activities should be done and where.
- Speed limit
- Adherence to rules and regulations
- How to keep a better car
- There is no one particular thing to be emphasized. Learn the traffic laws and rules to follow them with some common sense and wisdom
- Traffic signs and symbols, potential road hazards, vehicle safety and maintenance, courtesy and patience on the road, construction warning and enforcement
- Constant awareness of the road and other drivers around you. Not letting children, radios or anything else cause them to take their eyes off the road unless they stop
- Habit

24. Do you have other comments or suggestions?

Greater Enforcement

- More patrol cars on road—that seems to make good drivers out of everyone! We drive the speed limit to be left in the dust.
- Arrest and heavily penalize “reckless” drivers ...aka road ragers
- Enforce speed limits for all vehicles/cars/trucks, etc.
- Impose heavy fines for violators, minimum of \$200 for traffic violations—especially speeding, running stop signs/red lights. Second violation—minimum of \$1000, jail time. Third Violation—jail time; throw away key.

Cell Phones

- No phone use while driving
- I think the cell phone should be outlawed. How can a driver give all his or her attention to driving, talking on the phone?

Continued Education And Testing

- Please reinstate having people to pass a driving test before letting them on highways, freeways, and busy streets. Whether old or young, the uneducated, unknowing novice is the one at risk, but we, the older experienced drivers, can be at risk when they don't know how to drive
- Re-education should be done in a take-at-home refresher class as it's difficult to sit for long periods of time for older folks.
- I think all of us over 65 years should have refresher courses. I personally study the newest driving handbook because I drive with grandchildren a lot and I can help them as well as myself
- In reviewing the sign shapes I find that the stop/yield sign shapes make an impression. I find that reading the signs is used mostly, not the shapes.
- At a designated age, drivers should have to take a drivers test before renewing license
- Education that would help drivers themselves realize when they need to stop driving and education that might help younger drivers remain within the law as they drive
- More people should be made to take drivers "Ed" plus a fine.
- Send reminder of Driver Guidance Signal with license renewal each time you renew
- Raise the age limit for drivers to 20 years without school drivers ed course
- All drivers take defensive driving course at least every 2–3 years
- Drivers should be retested periodically, especially if there are traffic tickets, accidents, evidence of lack of vehicle control
- The driver test should include how to enter and exit a freeway. Minimum speed limits should be enforced on freeways.

Illness/Eyesight

- About three years ago at age 78, I realized that my reflexes were no longer such as to make quick decisions—so I "voluntarily" gave up driving. (I began driving at age 13 and never was involved in an accident).
- I had prostate cancer and took radiation; if blood count is low, like 7 or less, drivers will go to sleep driving on highway. I do not know how this can be emphasized. Medical problems will cause accidents.
- I find a fair number of older adults who can't pass driver's vision test or who have serious health problems and are still driving because they are not checked every two years or so. Occasionally even truck drivers.
- Age limit should be enforced or certain illness.

Other Comments

- I have a question for you. Why do the state and cities put up speed limit signs and let the traffic drive at any speed they want to? It looks like a waste of money to me to put the signs up. One unlikely person has to pay for speeding once in a while so he pays for all the rest.
- Why was I asked to answer these questions? R.S.V.P
- Strongly recommend that qualified safety personnel ride periodically with 18-wheelers with video camera to film traffic problems
- 2 don't drive every day, and 2 don't drive far, but to drive for needs, and it don't upset me at all.
- Probably will help road safety and rage. Thank you and drive carefully
- Be careful
- Older drivers become more defensive with age. As a result they become cautious and slower, thus more dangerous in moving at speed, traffic.
- Why is it necessary for all major roads in a community to be under repair at the same time? I have had a license for 53 years. Have driven cross country alone, driven in NYC, L.A., D.C., and many states. The TX driver is the most discourteous I have met.
- If every one drove the speed limit and stayed on their side of the road, it would be much safer. (1) A tactful policy for adults and children to report their aging parents inability to drive safely and revoke their license without their parents knowledge that their adult children turned them in due to unsafe driving (2) No trees, shrubs, or hard sculptures within 25 feet of intersection. (3) Faster the speed, the bigger the sign (4) PBS stations to air specific topics for local area.
- I feel that the senior driver is your best driver because we are more aware of the danger that is in driving and we will be more careful.
- Older drivers should understand that slower (35 in a 70 mph zone) is not always safer
- Lower speed limits from 50 to 65 miles per hour at certain times of day or night
- Don't let young children seated in the back stand up behind driver nor hold on to the drivers seatbelt.

No Comment

- No (6)
- None (3)
- Not at this time

Summary of Results

A total of 106 drivers over the age of 50 responded to the survey of older drivers. Forty percent of those drivers were between the ages of 66 and 75. The operations noted as difficult by the most drivers included driving at night, backing up, and passing on two-lane highways. Sixty-eight percent of the respondents make three or less trips per day; 37 of these trips are before noon, and 53 percent of the trips are between one and five miles in length. Eighty-four respondents indicated that they drive at night; 38 respondents drive after dark once per day and 32 respondents drive after dark once per week.

Drivers indicated that they found the following driving tasks difficult: seeing and reading signs (including understanding basic shapes), seeing in work or construction zones, understanding what to do in a work or construction zone, seeing pavement markings, and maintaining space cushions between their vehicle and the vehicles around them.

When asked to identify sign meaning by looking at the shape only (no color or wording), drivers identified the signs correctly by the percentage shown in Table 2. These results indicate that drivers have a good understanding of most sign shapes, with a 75 percent or greater response rate for the shapes for guide signs, stop signs, school advance and crossing signs, yield signs, and regulatory signs. The sign shapes that are *not* as well recognized are the diamond (warning signs), the pennant (no passing signs), and the round shape (railroad advance crossing signs and evacuation route signs).









Sixty-eight percent of respondents indicated that they travel on freeways (interstates) more than once per week. Survey respondents indicated that speed and congestion made them most uncomfortable driving on a freeway. However, 27 percent indicated that nothing makes them uncomfortable driving on a freeway. Seventy-two percent indicated that they would consider taking a driver education course designed for older drivers. Sixty-seven percent indicated that there are not any traffic signs in particular that they have difficulty seeing or understanding; however, there are 17 responses describing signs or letters on signs that are difficult to see. Larger signs, larger letters on signs, and more street lighting were rated highest as items that would make driving easier.

Sixty-six percent of respondents replied that they have taken a driver education or defensive driving course. The types of courses described include defensive driving, AARP, high school driver education course, military courses, and other safety courses. When asked for suggestions for driver education courses, the top responses were to include sections on: courtesy, road rage, speed limit, drinking and driving, high school students (requiring them to spend more time on the road), senior citizens (explaining causes of crashes and guides for knowing when to stop driving), enforcing the law, and lane changing. Respondents noted that if continuing education is required for all drivers, sections on tailgating, speeding, defensive driving, safety, and courtesy

should be included. When asked for other comments or suggestions, respondents noted that: continued education and testing are important; enforcement is important and should be increased and that fines should be stricter; and that eyesight and illness play a critical role in driving and should be monitored.

These survey results indicate that older drivers do have concerns about the driving environment and have difficulty with some traffic control devices and traffic operations. Because the sample size is small, additional older driver research will be conducted in the third year of this project.

Table 2. Results of Older Drivers Identifying Signs by Shape.

Sign Shape	Correct Sign Shape Use	Percentage of Correct Responses
	Exclusively to warn of possible hazards on the roadway	50
	Generally used for guide signs	77
	Exclusively for stop signs	88
	Warning of no passing zone	51
	School advance and crossing sign	86
	Railroad advance warning sign or evacuation route	70
	Exclusively for yield signs	76
	Generally used for regulatory signs	89

CHAPTER 4

SUMMARY

Driver behavior characteristics for teenage drivers and older drivers were investigated through surveys administered to these groups as described in Chapters 2 and 3. The survey results are summarized in this chapter, and this information will be used in developing materials in the third year of the research project.

TEENAGE DRIVERS

Teenage driver survey results indicate that the current efforts to educate young drivers, both in high school and in driver education, are working. The results also indicate that teenage drivers are aware that speeding and driving inexperience are the major causes of teenage traffic crashes.

Teenage drivers noted that rain/wet pavement, snow/ice, and “extreme” weather are the most difficult conditions to drive in, along with roadway construction, nighttime/dark conditions, and traffic congestion. Teenage drivers listed freeways, freeway entrance/exit ramps, and freeway frontage roads as the most difficult roadways to drive. This indicates that they have a difficult time with the high speeds, merging/yielding maneuvers, and traffic congestion of a freeway system. Teenage drivers indicated they have the most difficult time understanding pavement markings and construction zones; this area of misunderstanding was also identified in the first year of this study (2).

Teenage drivers noted traffic incident/crash location and lane closure/construction location information as most helpful for ATIS and ITS. Teenage drivers also indicated that Internet web sites/software and high school/college newspapers are effective methods of informing teenagers of important driver information.

OLDER DRIVERS

The operations noted as difficult by the most older drivers included driving at night, backing up, and passing on two-lane highways.

Older drivers indicated that they found the following driving tasks most difficult: seeing and reading signs (including understanding basic shapes), seeing in work or construction zones, understanding what to do in a work or construction zone, seeing pavement markings, and maintaining space cushions between their vehicle and the vehicles around them.

Results indicate that drivers have a good understanding of most sign shapes when asked to identify sign meaning by looking at the shape only (no color or wording). The sign shapes that

are *not* as well recognized are the diamond (warning signs), the pennant (no passing signs), and the round shape (railroad advance crossing signs and evacuation route signs).


Sixty-seven percent of older drivers indicated that there are not any traffic signs in particular that they have difficulty seeing or understanding; however, there are 17 responses describing signs or letters on signs that are difficult to see. Larger signs, larger letters on signs, and more street lighting were rated highest as items that would make driving easier. Sixty-six percent of respondents replied that they have taken a driver education or defensive driving course. The types of courses described include defensive driving, AARP, high school driver education course, military courses, and other safety courses. When asked for suggestions for driver education courses, the top responses were to include sections on: courtesy, road rage, speed limit, drinking and driving, high school students (requiring them to spend more time on the road), senior citizens (explaining causes of crashes and guides for knowing when to stop driving), enforcing the law, and lane changing. Respondents noted that if continuing education is required for all drivers, sections on tailgating, speeding, defensive driving, safety, and courtesy should be included. When asked for other comments or suggestions, respondents noted that: continued education and testing are important; enforcement is important and should be increased and fines should be stricter; and eyesight and illness play a critical role in driving and should be monitored.

These survey results indicate that older drivers do have concerns about the driving environment and have difficulty with some traffic control devices and traffic operations. Because the sample size is small, additional older driver research will be conducted in the third year of this project.

RELATED RESEARCH

TxDOT Report 1274-S, “Traffic Control Devices in Texas Border Areas” (8), recommends that the only effective means of improving understanding for several traffic control devices is through driver education, training, or outreach efforts. An example of the information relevant to this report is provided in Table 3. This information will be considered in the development of driver education materials in Phase III of this research project.

Table 3. Devices Recommended for Emphasis in Driver Education (5).

Name	Code	Illustration	Emphasis
Railroad Advance sign	W 10-1		Difference between advance and crossing signs
Sign shape and color			Traffic sign color and shape color
All pavement markings			Difference between yellow and white markings

CHAPTER 5 REFERENCES

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7. “Fatality Facts: Elderly.” Insurance Institute for Highway Safety. Website: http://www.hwysafety.org/safety_facts/fatality_facts/elderly.htm.
8. H. Gene Hawkins, Jr. *Traffic Control Devices in Texas Border Areas: Summary of Research and Recommendations*. Research Report 1274-S, Texas Transportation Institute, College Station, Texas, March 1999.

APPENDIX A

SURVEY OF TEENAGE DRIVERS

This appendix contains a copy of the survey instrument that was administered to 482 teenage drivers enrolled in a driver education program. The survey was administered in four Texas cities.



Texas Transportation Institute

TEENAGE DRIVER SURVEY



1. What is your gender? Male Female
2. What is your age? 15 16 17 18+
3. What is your current level of education?
 9th grade 10th grade 11th grade 12th grade High School Graduate
4. What type of vehicle do you drive or plan to drive?
 Passenger Car Sports Car Pick-Up Truck
 Sports Utility Vehicle (SUV) Other _____

5. What do you think is the major cause of traffic crashes for drivers of *all* ages?

6. What do you think is the major cause of traffic crashes for *teenage* drivers?

7. How serious do you think the following problems are relating to *teenagers*?

Please rate on a scale from 1 to 5, with 1 being not serious and 5 being very serious.

	Not Serious				Very Serious
■ Traffic Crashes	1	2	3	4	5
■ Driving at Speeds Higher than the Speed Limit	1	2	3	4	5
■ Aggressive / Risky Driving	1	2	3	4	5
■ Showing Off when Driving	1	2	3	4	5
■ Not Paying Attention when Driving	1	2	3	4	5
■ Drinking and Driving	1	2	3	4	5
■ Riding With and Driving Around other Teenagers	1	2	3	4	5
■ Following Another Driver Too Closely	1	2	3	4	5
■ Other _____	1	2	3	4	5

8. What are your suggestions on how to reduce *teenage* driver traffic crashes?

9. What type of educational materials could be effective to inform *teenagers* of important driver information?

Please rate on a scale from 1 to 5, with 1 being least effective and 5 being most effective.

	Least Effective				Most Effective
■ Brochures / Handouts	1	2	3	4	5
■ Texas Driver Handbook	1	2	3	4	5
■ Newspaper / Magazine Articles	1	2	3	4	5
■ High School / College Newspapers	1	2	3	4	5
■ Internet Web Site / Computer Software	1	2	3	4	5
■ Other _____	1	2	3	4	5 (over)

10. Under which *driving conditions* do you (or would you) find most difficult to drive?

Please rate on a scale from 1 to 5, with 1 being not difficult and 5 being very difficult.

	Not Difficult				Very Difficult
■ Rain / Wet Pavement	1	2	3	4	5
■ Roadway Construction	1	2	3	4	5
■ Traffic Congestion	1	2	3	4	5
■ Nighttime / Dark Conditions	1	2	3	4	5
■ Freeway Speeds (60-70 mph)	1	2	3	4	5
■ Low-Speed City Streets (25-35 mph)	1	2	3	4	5
■ Other _____	1	2	3	4	5

11. On what type of *roadways* or *intersections* do you (or would you) find most difficult to drive?

Please rate on a scale from 1 to 5, with 1 being not difficult and 5 being very difficult.

	Not Difficult				Very Difficult
■ City Streets	1	2	3	4	5
■ Rural Roads (Roads Outside the City)	1	2	3	4	5
■ Freeways	1	2	3	4	5
■ Freeway Frontage Roads	1	2	3	4	5
■ Freeway Entrance / Exit Ramps	1	2	3	4	5
■ Curved Roads	1	2	3	4	5
■ Signalized Intersections	1	2	3	4	5
■ Stop Sign Controlled Intersections	1	2	3	4	5
■ Flashing Beacon Intersections	1	2	3	4	5
■ Other _____	1	2	3	4	5

12. What type of *traffic control* do you find most difficult to understand?

Please rate on a scale from 1 to 5, with 1 being not difficult and 5 being very difficult.

	Not Difficult				Very Difficult
■ Signs	1	2	3	4	5
■ Traffic Signals	1	2	3	4	5
■ Pavement Markings	1	2	3	4	5
■ School Zones	1	2	3	4	5
■ Construction Zones	1	2	3	4	5
■ Railroad Crossings	1	2	3	4	5
■ Other _____	1	2	3	4	5

13. What type of *travel information* do you (or would you) find most helpful?

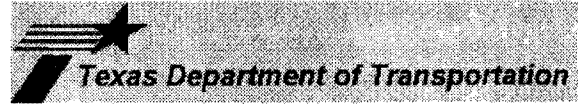
Please rate on a scale from 1 to 5, with 1 being least helpful and 5 being most helpful.

	Least Helpful				Most Helpful
■ Weather	1	2	3	4	5
■ Traffic Congestion Location	1	2	3	4	5
■ Traffic Incident / Crash Location	1	2	3	4	5
■ Lane Closures / Construction	1	2	3	4	5
■ Transit (Bus, Train) Schedules	1	2	3	4	5
■ Travel Times	1	2	3	4	5
■ Alternate Routes	1	2	3	4	5
■ Other _____	1	2	3	4	5

FINISHED... THANK YOU FOR COMPLETING THE SURVEY!

APPENDIX B
SURVEY OF OLDER DRIVERS

This appendix contains a copy of the survey instrument that was mailed to 1100 randomly selected older drivers within the state of Texas.



Older Driver Survey

The **Texas Transportation Institute (TTI)** is conducting a research survey for the **Texas Department of Transportation (TxDOT)** to develop educational materials to improve driver comprehension of traffic control devices. Previous engineering research has identified many signs, signal displays, and pavement markings that older drivers of all backgrounds have difficulty in comprehending. Traffic control devices that are misunderstood can lead to serious safety concerns. Therefore, the objectives of this survey are as follows:

- ◆ Obtain input from drivers that are 50 years of age or older on information that is needed to be taught in classrooms related to traffic control devices, as well as identify problem areas for students;
- ◆ Based on this input and on previous engineering research, develop educational materials targeting specific audiences and specific traffic control devices.

Please take a few minutes to fill out and complete this survey. Your input is extremely important for the success of this project and will greatly assist in the development of improved educational and curriculum material.

If you have any questions or comments, please contact Angelia Parham at the address or phone number below. Thank you for your time and assistance. Please proceed to the next page.

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OLDER DRIVER SURVEY

1. What is your age group? (Please circle one)

- | | |
|---------|-------------|
| 50 - 54 | 71 - 75 |
| 55 - 60 | 76 - 80 |
| 61 - 65 | 81 - 85 |
| 66 - 70 | 86 or above |

2. Which of the following operations do you find difficult? (Please check all that apply.)

- Backing up
- Accelerating at a green light
- Passing on two-lane highways
- Recognizing traffic control signs
- Understanding left-turn movements at traffic signals
- Driving on the freeway
- Driving at nighttime
- Driving on a busy (congested) street
- Other _____

3. How many trips do make on a daily basis? (A trip to and from the grocery store is considered *one* trip.) (Please check one.)

- 0-3
- 4-6
- 7-10
- >10

4. During what hours? (Please check all that apply.)

- 7 - 9 AM
- 9 - 12 AM
- 12 - 2 PM
- 2 - 5 PM
- 5 - 6 PM
- 6 - 8 PM
- Later than 8 PM

5. What is the average length of these trips? (Please check one.)

- Less than one mile
- 1 - 5 miles
- 6 - 10 miles
- 11 - 15 miles
- 16 - 20 miles
- Greater than 20 miles

6. Do you drive after dark? (Please circle one.)
If so, how frequently? (Please check one.)

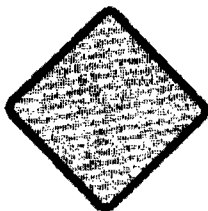
YES NO

- Once per day
- Once per week
- Once per month
- Less than once per month

7. Which of the following driving tasks do you find difficult? (Please check all that apply.)

- Seeing and reading signs (basic shapes)
- Understanding signs
- Seeing the colors on traffic signals
- Understanding traffic signals
- Seeing in a work or construction zone
- Understanding what to do in a work or construction zone
- Seeing pavement markings
- Understanding pavement markings
- Telling the distance between my vehicle and the next vehicle
- Reaction time when stopping or avoiding hazards
- Traffic control in a school zone or pedestrian right-of-way
- Maintaining space cushions between you and the cars around
- Other _____

8. Choose the best answer that explains what the shape is used for:



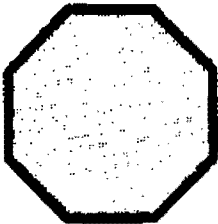
- Generally used for guide signs
- Railroad advance warning sign
- Exclusively to warn of possible hazards on the roadway
- Not sure

9. Choose the best answer that explains what the shape is used for:



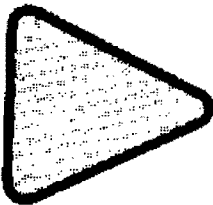
- Warning of a no passing zone
- Generally used for guide signs
- Exclusively for yield signs
- Not sure

10. Choose the best answer that explains what the shape is used for:



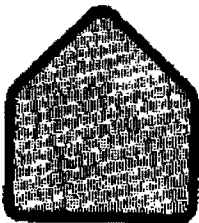
- Generally used for regulatory signs
- Slow moving vehicle
- Exclusively for stop signs
- Not sure

11. Choose the best answer that explains what the shape is used for:



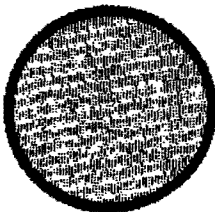
- Slow moving vehicle
- Warning of no passing zone
- Generally used for guide signs
- Not sure

12. Choose the best answer that explains what the shape is used for:



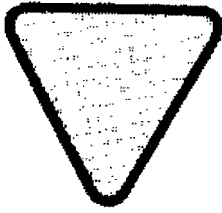
- School advance warning and crossing sign
- Exclusively for yield signs
- Generally used for regulatory signs
- Not sure

13. Choose the best answer that explains what the shape is used for:



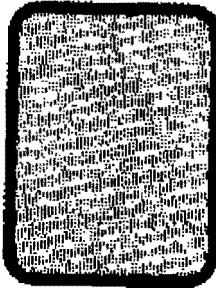
- Slow moving vehicle
- Railroad advance warning sign or evacuation route
- Exclusively to warn of possible hazards on roadway
- Not sure

14. Choose the best answer that explains what the shape is used for:



- Warning of no passing zone
- Exclusively for yield signs
- Slow moving vehicle
- Not sure

15. Choose the best answer that explains what the shape is used for:



- Generally used for regulatory signs
- Railroad advance warning sign or evacuation route
- Exclusively for stop signs
- Not sure

16. How often do you travel on freeways (interstates)? (Please check one.)

- More than once per week
- Once per month
- 5 times per year
- Once per year

17. What makes you uncomfortable about driving on a freeway? (Check all that apply.)

- Speed
- Number of lanes
- Congestion or number of drivers
- Number of interchanges
- Nothing at all

18. Would you consider taking a driver education course designed for older drivers? (Please circle one.) YES NO

19. Are there any traffic signs in particular that you have difficulty seeing or understanding? (Please circle one.) YES NO

If YES, please list the sign(s) and explain.

20. What would make driving easier for you? (Check all that apply.)

- Larger signs
- Larger traffic signals
- Larger pavement markings
- Larger letters on signs
- More street lighting
- Brighter signs
- More symbol signs
- Other _____

21. Have you ever taken a driver education or defensive driving course? (Please circle one.) YES NO

If YES, please explain what type of course it was and approximately when you took it.

22. What do you suggest that should be included in a driver education course to make driving safer?

23. If continuing education is required for all drivers, what should be emphasized?

24. Do you have other comments or suggestions?

(This information is optional.)

Name _____

Address _____

City _____

State _____ Zip Code _____

Phone _____

Thank you for completing the survey!

Please return the survey to:

Angelia Parham
Texas Transportation Institute
Texas A & M University
College Station, TX 77843-3135