

# **Motorist Comprehension of Florida's School Bus Stop Law and School Bus Signalization Devices**

**FINAL REPORT**

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June 1997

## EXECUTIVE SUMMARY

### INTRODUCTION

In May 1995, the Center for Urban Transportation Research (CUTR) conducted a study on behalf of the Florida Department of Education (DOE) that investigated the frequency and extent with which drivers in Florida were illegally passing stopped school buses during a typical school day. From this study, approximately 10,600 vehicles were recorded to be illegally passing stopped school buses during a typical school day in 58 of the 67 school districts in Florida. This alarming number of illegal passes of stopped school buses raises several broad and important issues about drivers in Florida. First, how well do drivers in Florida understand various traffic control devices including signalizations and traffic signage and, second, how well do drivers in Florida understand their driving responsibilities as defined in certain state traffic laws? Any program to increase the comprehension of drivers about the meaning of various traffic control devices and traffic laws must include a combination of corrective measures selected from law enforcement, education, and engineering.

Based in part on the findings from the illegal passing study, this current study sought to answer the following two questions: (1) "Do drivers in Florida understand their responsibilities as defined in *Section 316.172, F.S.*, the school bus stop law?"; and (2) "Do drivers in Florida comprehend the meaning of the various signalizations used on school buses to communicate to them that a school bus is either coming to a stop or is stopped for the express purpose of loading or unloading children at a school bus stop?"

### METHODOLOGY

In order to answer these questions, a survey was developed to ascertain the extent of driver knowledge regarding the school bus stop law and various school bus signalizations. To gather the requisite information, a simple, one-page, 18-question survey was developed in English and Spanish. The first six questions on the survey contained different driving scenarios involving school buses that are about to stop or are already stopped to load or unload children at school bus stops while displaying proper signalizations (yellow flashing warning lights or red flashing loading lights and stop signal arms) that motorists might encounter when driving. The six scenarios are as follows:

1. *When a school bus stops to unload children on a two-lane roadway, only vehicles traveling in the same direction as the school bus are required to stop.*
2. *When a school bus stops to load children on a four-lane roadway that has a center lane used for left turns by drivers from either direction, vehicles traveling in the opposite direction on the other side of the roadway as the school bus are not required to stop.*
3. *When a school bus stops to unload children on a four-lane roadway that is divided by a raised concrete barrier, only vehicles traveling in the same direction as the school bus are required to stop.*
4. *When a school bus stops to load children on a four-lane roadway divided by an unpaved median at least five feet wide, vehicles traveling in the opposite direction on the other side of the roadway as the school bus are not required to stop.*
5. *When a school bus stops to load children, all vehicles that are required to stop must remain stopped until all of the children have boarded the school bus.*
6. *When a school bus is displaying yellow flashing warning lights, vehicles traveling in both directions on a two-lane roadway are required to stop.*

For each of the six scenarios, three multiple-choice answers were provided: one “correct” response (either true or false), one “incorrect” response (either true or false), and one “I don’t know” response. (The response “I don’t know” technically does not represent an “incorrect” response, per se. However, to simplify the reporting of the descriptive results and to increase the approximation of the Chi-Square tests using the sample data, the lone “incorrect” response and the lone “I don’t know” response were combined to represent a single “incorrect” or “undesirable” response. This methodological treatment should be kept in mind by the reader when interpreting the results related to the six questions that pertain to the school bus stop law and various school bus signalizations.) The remaining 12 questions on the survey inquired about a host of respondent demographic and socio-economic traits such as age, gender, and ethnic heritage as well as other information deemed pertinent to the objectives of this study.

The surveys were administered to drivers at a random sample of 30 driver license examining offices throughout Florida. Express permission was granted to CUTR by the Division of Driver Licenses (DDL) to use the offices as data collection points before proceeding with the selection and use of the offices. The sample of offices included those in both urban and rural areas of the state. A total of 10,000 surveys were subdivided among the offices and mailed to the supervisor at each office. The subdivision of surveys that were sent to each office was based on the average number of customers at each office during a typical week of operation. During the actual surveying, the surveys were distributed to customers by office staff during a three-day survey period (Tuesday through Thursday). The staff at the offices were instructed to administer the surveys to office customers at the start of business on the first day and continue distributing them until either depleted the supply or until the end of business on the third day, whichever came first. A total of 4,540 drivers of various ages, ethnic heritages, educational backgrounds, and driving experience completed a survey for this study.

## **SUMMARY OF FINDINGS**

Based on the sample data, the study found significant confusion on the part of respondents regarding their driving responsibilities as defined in the school bus stop law, as well as significant confusion on the part of respondents regarding the intent of the various school bus signalizations. The amount of respondent confusion, as determined by the percent of incorrect responses to the six survey questions that measured driver knowledge about the school bus stop law and various school bus signalizations, ranged from a low of 14.4 percent for Question 1 to a high of 90.5 percent for Question 5. The results indicate that there are certain driving situations involving whether or not to stop for school buses that present more of a problem for respondents than other situations. The scenario that reads “*when a school bus stops to unload children on a two-lane roadway, only vehicles traveling in the same direction as the school bus are required to stop*” elicited the least amount of confusion on the part of individuals in the sample. This scenario represents the most basic situation that drivers are likely to encounter in the driving environment involving school buses that are in the process of loading or unloading children and displaying proper signalization at school bus stops. Nevertheless, 14.4 percent of the respondents answered the scenario in Question 1 incorrectly. In addition, this scenario represents the highest incidence of illegal passes as documented by the aforementioned study. This finding suggests that, while many motorists clearly do not understand the school bus stop law contained in this scenario, many more motorists are, in fact, intentionally violating the school bus stop law. According to the sample data, low income Hispanic males age 15 to 24 years with less than a high school education and who drive less than 10,000 miles in a given year are the most apt to be confused when confronted with a comparable scenario in the driving environment. Three factors, recent review of the *Florida Driver’s Handbook* (1996), issuance of a citation for violation of the school bus stop law, and the number of miles driven

by individuals in the sample, significantly affected the responses to this scenario, as determined by the Chi-Square tests. Apparently, gender and exposure to driver safety education about the school bus stop law and various school bus signalizations had no significant effects, either positive or negative, on the responses to this scenario.

In comparison, the scenario in survey Question 5 evoked the most confusion by respondents in the sample. The scenario in Question 5 reads, “*When a school bus stops to load children, all vehicles that are required to stop must remain stopped until all of the children have boarded the school bus.*” Regarding appropriate driver action in this scenario, the *Florida Driver’s Handbook* (1996) states that, “[drivers] must remain stopped until all children are clear of the roadway and the bus signal has been withdrawn.” The *Handbook* (1996) clearly states that traffic is not allowed to proceed forward until all children are clear of the roadway and the bus signals have been withdrawn. However, 90.5 percent of the respondents are confused about when to proceed after all children that were visible to them have boarded the school bus. Although the pretest of the survey instrument did not reveal any significant difficulties associated with answering this question, the high percentage of incorrect responses to this question might have been caused by respondents misinterpreting the question’s intent. Specifically, the wording of this question may have implied that the bus signals were withdrawn simultaneously with the last student boarding the school bus. Therefore, some caution is urged when interpreting the results for this question. Based on the sample data, Asian females 65 years and older with less than a high school education whose primary language is not English and who have annual household incomes between \$10,000 and \$29,999 were most apt to exhibit confusion about when to proceed forward. These particular respondents were also most apt not to have reviewed the *Florida Driver’s Handbook* (1996) nor to have been exposed to driver safety education about the school bus stop law and various school bus signalizations prior to completing the survey for this study. Chi-Square tests revealed that age, gender, recent review of the *Florida Driver’s Handbook* (1996), and the number of miles driven in a given year affected the responses to this scenario, according to the sample data. The tests also revealed that level of formal education, repeated exposure to school buses in the driving environment, and exposure to safety information about the school bus stop law and various school bus signalizations had no bearing on the responses to the scenario in survey Question 5.

Other driving situations that involved stopping for school buses also evoked significant confusion on the part of sample respondents. The scenarios in survey Questions 2, 3, and 4 that required traffic to stop for school buses on multi-lane roadways divided by either painted pavement markings indicating a two-way center left-turn lane (Question 2) or some form of physical separation between travel lanes such as a concrete separator (Question 3) or an unpaved median at least five feet in width (Question 4) confused respondents regarding exactly what is the proper action on their part when confronted with a comparable situation in the driving environment. Regarding proper driver action for the scenario in Question 2, the *Florida Driver’s Handbook* (1996) states, “Painted lines or pavement markings are not considered to be barriers.” In addition, regarding proper driver action for the scenarios in Questions 3 and 4, it also states, “If the highway is divided by a raised barrier or an unpaved median at least five feet wide, you do not have to stop if you are moving in the opposite direction of the [school] bus.” Based on the sample data, about 45 percent of the respondents displayed confusion about their driving responsibilities when confronted by a stopped school bus while traveling in the opposite direction on a multi-lane roadway that has painted pavement markings indicating a two-way center left-turn lane. Further, the scenarios in survey Questions 3 and 4 indicated that 17.8 percent of the individuals in the sample are confused about whether or not to stop for a school bus that is stopped on a multi-lane roadway separated by some type of raised barrier and 39.8 percent are confused about whether or not to stop for a school bus that is stopped on a multi-lane roadway separated by an unpaved median at least five feet wide, as specified in the *Handbook* (1996), respectively. Apparently, based on the sample data, unpaved medians that are at least five feet wide confound drivers more whether they are required to stop or not for a school bus (traveling in the opposite direction as the school bus) that has stopped to load

or unload children than some type of physical separation between opposing travel lanes such as a concrete separator. Lastly, according to the Chi-Square tests, gender, ethnic heritage, the number of miles driven in a given year, and annual household income of respondents all had a significant effect on the responses to Questions 2, 3, and 4. Only region of the state where a respondent completed a survey did not significantly effect the responses to survey Questions 2, 3, and 4.

The results suggest that, in general, the knowledge of drivers in Florida regarding their responsibilities as defined in the school bus stop law is significantly lacking. The study team recommends that any program to increase the knowledge of drivers in Florida about the school bus stop law should focus on education first, enforcement second, and to a lesser degree, engineering countermeasures. A key direction for improving driver knowledge of the school bus stop law and the meaning of the various school bus signalizations is driver education. Driver education about the school bus stop law can take many forms, including Public Service Announcements (PSA) and other forms of message reinforcement including placing information in automobile license tag renewal notices and rental car contract signoffs and on billboards.

Another key avenue for improving driver knowledge of the school bus law is through enforcement. Efforts should be made to amend the school bus stop law to include tougher penalties for violation, including increased points and fines and the possibility of performing community service and/or serving jail time for repeat offenders. In addition, steps should be taken to promote the need for targeted enforcement throughout the statewide law enforcement community to include periodic "enforcement blitzes" and other enforcement strategies.

In the area of engineering, the Florida Department of Transportation should provide highway signage at areas around school bus stops that advise local traffic that school buses make frequent stops in the area and that they are required, by law, to stop for school buses.

Last, it should be stressed that the results reported in this study revealed information about what respondents indicated they would do in certain driving situations involving stopped school buses. Using the information from the sample data, there is no way to conclusively determine how respondents will actually behave when confronted with a comparable situation in the driving environment.

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## PREFACE

This research study sought to answer the following question: “Do licensed drivers in Florida understand their driving responsibilities as defined in Florida’s school bus stop law (*Section 316.172, F.S.*) when approaching a stopped school bus that is loading or unloading children at a school bus stop?”. In order to answer this query, a survey was developed to ascertain the extent of driver knowledge regarding the school bus stop law and various school bus signalizations. To gather the requisite information, a simple, one-page, 18-question survey was developed. The first six questions on the survey contained different driving scenarios involving school buses that are about to stop or are already stopped to load or unload children at school bus stops while displaying proper signalizations that motorists might encounter when driving (yellow flashing warning lights or red flashing loading lights and stop signal arms). The remaining 12 questions on the survey inquired about a host of respondent demographic and socio-economic characteristics as well as other information deemed pertinent to the objectives of this study.

The surveys were administered to drivers at a random sample of 30 driver license examining offices throughout Florida in both urban and rural areas. A total of 10,000 surveys were subdivided among the offices and mailed to the supervisor at each office. The subdivision of surveys that were sent to each office was based on the average number of customers at each office during a typical week of operation. During the actual surveying, the surveys were distributed to customers by office staff during a three-day period (Tuesday through Thursday). The staff at each of the offices was instructed to administer the surveys to office customers at the start of business on the first day and continue distributing them until either they depleted the supply or until the end of business on the third day, whichever came first.

Using the driver license examining offices as the data collection points for gathering the necessary information to complete this study provided an easy, effective, consistent, and low cost means of collecting large amounts of high quality data with little disruption to drivers and staff at the offices. In addition, they were logical places to access current drivers since the individuals that enter the offices represent a dynamic cross-section of the demographic and socio-economic subgroups in their respective regions of the state.

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## **ACKNOWLEDGMENTS**

Sincere appreciation is extended to Ms. Sandra Lambert and Mr. James Gamble from the Department of Driver Licenses of the Florida Department of Highway Safety and Motor Vehicles for their assistance and to the driver license examining office staff who distributed the surveys, collected them, and returned them for analysis. Finally, special thanks is extended to Louise Caldwell, Linda Fultz, and Charlie Hood of the School Transportation Management Section of the Florida Department of Education for their comments and suggestions regarding the content of this final report.

## I. INTRODUCTION

In May 1995, the Center for Urban Transportation Research (CUTR) conducted a study on behalf of the Florida Department of Education (DOE) that investigated the frequency and extent with which drivers in Florida were illegally passing stopped school buses during a typical school day. From this study, approximately 10,600 vehicles were recorded to be illegally passing stopped school buses during a typical school day in 58 of the 67 school districts in Florida. This alarming number of illegal passes of stopped school buses raises several broad and important issues about drivers in Florida. First, how well do drivers in Florida understand various traffic control devices including signalizations and traffic signage and, second, how well do drivers in Florida understand their driving responsibilities as defined in certain state traffic laws? Any program to increase the comprehension of drivers about the meaning of various traffic control devices and traffic laws must include a combination of corrective measures selected from law enforcement, education, and engineering.

Based, in part, on the findings from the illegal passing study, this current study sought to answer the following two questions: (1) "Do drivers in Florida understand their responsibilities as defined in *Section 316.172, F.S.*, the school bus stop law?"; and (2) "Do drivers in Florida comprehend the meaning of the various signalizations used on school buses to communicate to them that a school bus is either coming to a stop or is stopped for the express purpose of loading or unloading children at school bus stops?".

Title XXIII, Motor Vehicle, Chapter 316, Section 172, Florida Statutes, State Uniform Traffic Control states the following regarding the procedures for traffic to stop for a stopped school bus and the penalties for non-compliance:

*Section 316.172, Florida Statutes (1995) Traffic to stop for school bus.*

(1) *Any person using, operating, or driving a vehicle on or over the roads or highways of this state shall, upon approaching any school bus used in transporting school pupils to or from school which is properly identified in substantial accordance with the provisions of s. 234.051 and which displays a stop signal, bring such vehicle to a full stop while the bus is stopped, and the vehicle shall not pass the school bus until the signal has been withdrawn. Pursuant to the provisions of s. 318.18(7), F.S. any person who violates the provisions of this subsection shall be subject to a penalty of \$100. In addition to such penalty, for a second or subsequent offense within a period of five years, the department shall suspend the driver's license of the person for a period of not less than 90 days nor more than 6 months.*

(2) *The driver of a vehicle upon a divided highway where the one-way roadways are separated by an intervening unpaved space of at least five-feet or physical barrier need not stop upon meeting or passing a school bus which is on a different roadway.*

(3) *Every school bus shall stop as far to the right of the street as possible before discharging or loading passengers and, when possible, shall not stop where the visibility is obscured for a distance of 200 feet either way from the bus.*

The *Florida Driver's Handbook* (1996) states the following regarding the procedures that apply to traffic stopping for a stopped school bus that is loading or unloading students at a school bus stop:

*On a two-way street or highway, all drivers moving in either direction must stop for a stopped school bus which is picking up or dropping off children. You must remain stopped until all children are clear of the roadway and the bus signal has been withdrawn.*

*If the highway is divided by a raised barrier or an unpaved median at least five-feet wide, you do not have to stop if you are moving in the opposite direction of the bus. Painted lines or pavement markings are not considered to be barriers. If you are moving in the same direction as the bus, you must always stop - and not go forward until the bus signal has been withdrawn.*

If drivers in Florida do not thoroughly understand their driving responsibilities and fully comprehend the meaning of the school bus stop law as defined in *Section 316.172, F.S.*, and the section in the *Florida Driver's Handbook* (1996) that applies to traffic stopping for school buses, then unsafe interaction between motorists and school-age children at or near school bus stops will take place that may ultimately result in collisions and/or children needlessly being injured, or perhaps, killed.

## **II. METHODOLOGY**

The objective of this study was to measure the extent of driver comprehension regarding their driving responsibilities as stated in the school bus stop law when approaching a school bus that has stopped for the express purpose of loading or unloading children at a school bus stop. The first step was to determine the sample population needed to gather the requisite information. Because inferences were to be made about all licensed drivers in Florida, information was collected on a statewide basis. To accomplish this, a randomly-generated, cross-sectional sample of 30 (approximately 21 percent) urban and rural driver license examining offices (hereafter referred to as offices) in Florida was used as points for distribution of the surveys to the driving public. The offices were randomly selected from the total universe of operating offices in Florida. According to the Division of Driver Licenses' (DDL) Web site, the total universe of operating offices in the state was estimated to be 140 at the time of the study.<sup>1</sup> The three DDL Field Operations bureaus (North, Central, and South) were used to further segregate the randomly-selected offices by region of the state (the three bureaus are further subdivided by the DDL into territories). The decision to distribute the surveys to drivers at the 30 offices was due primarily to the fact that the offices provided an easy, effective, consistent, and low cost means of collecting large amounts of high quality data with little disruption to drivers and staff at the offices. In addition, these offices were chosen as logical places to recruit respondents because the individuals that enter them represent a dynamic cross section of demographic and socio-economic groups in Florida.

Respondents at the sample of offices were not limited to individuals completing a driver license examination or renewing/replacing an existing license, but included those persons accompanying these individuals as well. The study's methodology resulted in information being collected only for individuals 15 years of age and older. Since the minimum legal age in Florida for obtaining a Learner's Driver License is 15 years, individuals under the age of 15 were not included as part of the study. Further, when driving, regardless of age, individuals holding a Learner's Driver License must be accompanied by a Class A, B, C, D, or E licensed driver 21 years of age or older who is occupying the closest seat to the right of the individual. The State of Florida requires individuals to be at least 16 years of age or older before being eligible to obtain a Class D or E driver license to operate a non-commercial vehicle, 21 years of age or older before being eligible to obtain a Commercial Driver License (CDL) to operate a commercial vehicle, and 18 to 20 years of age before being eligible to obtain a CDL to operate a commercial vehicle for intrastate-only (inside

Florida) driving. Individuals holding a CDL are eligible to operate a commercial motor vehicle that has a gross vehicle weight rating of 26,001 pounds or more, is designated to transport 16 passengers or more including the driver, or is a vehicle required to be placarded when carrying hazardous materials. CDLs are designated by the State of Florida as Class A, B, or C licenses.

The study's methodology included four tasks: (1) a literature review, (2) development and pretest of the survey instrument, (3) data collection, and (4) data analysis. The specific results of the four tasks are contained in the following sections.

### **III. LITERATURE REVIEW**

Prior to developing the survey instrument and determining the study's sampling methods, a literature review was conducted to determine if studies of similar nature had previously been conducted. Through an extensive literature search, no studies were identified that specifically investigated motorist comprehension of a particular traffic law such as a school bus stop law. However, studies were identified that investigated driver and pedestrian comprehension of a variety of traffic control devices and the assessment of motorist and pedestrian interactions. Hawkins et al. (1993) conducted a survey of 1,745 Texas drivers to assess their comprehension of the most critical traffic control devices, including regulatory signs such as "Yield" and "Slower Traffic Keep Right," warning signs such as "Curve Ahead" and "Watch for Ice On Bridge," and a variety of pavement markings such as a single, broken, yellow center line and preferential diamond lane markings. Their findings suggest that the driving public in Texas does not fully understand some of the critical regulatory and warning signs shown to them and that their comprehension level of some critical pavement markings had not improved in 10 years. Tidwell and Doyle (1993) conducted a nationwide study to determine how adeptly individuals understand pedestrian safety issues. Specifically, they focused on how well study respondents assessed pedestrian involvement in traffic accidents, their knowledge of pedestrian traffic-related control devices, and pedestrian-related laws. Tidwell and Doyle's study found significant lack of knowledge on the part of study participants regarding several pedestrian safety control devices, including the flashing "Don't Walk" and "Walk" signals as well as a variety of other pedestrian safety control devices. Review of these studies was particularly important to this research since they provided guidance in determining an appropriate sampling methodology to use, the types and breadth of questions that should be emphasized, and the specific wording of questions on the survey instrument.

### **IV. QUESTIONNAIRE DEVELOPMENT**

The second task in the study was to develop a pretest survey instrument that focused on obtaining information about driver comprehension of the school bus stop law and the various school bus signalizations, as well as other important information such as respondent demographic and socio-economic characteristics. Several individuals from a variety of organizations including the School Transportation Management Section (STMS) of the DOE and the DDL were asked to provide input regarding the wording and content of the questions on the pretest survey and its overall format. With their assistance, the specific wording of the questions on the pretest survey and its overall format were decided. In addition, it was also decided that the questions on the pretest survey should be ordered and stratified based on the type of information being requested, as follows:

1. respondent knowledge and comprehension of the school bus stop law and various school bus signalizations;
2. interaction of respondents with school buses in the driving environment; and
3. demographic and socio-economic information about respondents such as their age, ethnicity, gender, and annual household income.

The ordering and stratification of similar questions on the pretest survey served several purposes.

First, the questions were ordered according to their perceived importance by respondents to the overall objectives of the study: those questions that pertained to driver knowledge of the school bus stop law and various school bus signalizations were listed first on the survey and those that asked for respondents' demographic and socio-economic characteristics were listed at the end.

Second, questions were stratified according to the type of information being requested. The stratification of similar questions served two purposes: (1) it eliminated respondents from having to switch their train-of-thought back and forth from questions asking dissimilar information, and (2) it encouraged respondents to provide thoughtful and well-founded responses. It was hoped that ordering the questions in this manner would facilitate ease of response and improve the overall response rate of the survey. Third, the specific ordering of the questions attempted to cognitively link certain questions in a fashion that created a sense of vertical flow or continuity throughout the entire survey instrument. This specific ordering method was especially important since the survey required a variety of responses based on the respondent's knowledge and facts.

During the development of the pretest survey instrument, it was decided that a higher response rate might be obtained from a short, one-page survey rather than a longer one. In addition, to increase the response rate and to minimize possible sample bias, an identical survey was offered in Spanish. As a result, a simple, one-page, 18-question survey instrument was developed. The first group of questions focused on driver knowledge of the school bus stop law and the various school bus signalizations. Each question in the first group contained a different driving scenario that motorists are likely to encounter in the driver environment involving a school bus that is approaching or is already stopped at a school bus stop on different roadway types and displaying various signalizations. In addition to the written scenario in Question 2, a diagram was provided to further clarify the question's intent for respondents. The second group of questions on the survey focused on the daily interaction of respondents with school buses in the driving environment and their exposure to information related to the school bus stop law. The remaining group of questions on the survey inquired about a host of respondent demographic and socio-economic characteristics. For the purpose of anonymity, respondents were instructed not to put their name or other identifying marks on the survey. Copies of the English and Spanish survey instruments are provided in Figure 1 and Figure 2, respectively.

Assessment of the survey instrument was a multiple-step process involving evaluation of the pretest survey and the design of the final survey instrument. The purpose of pretesting the survey was two-fold. First, the pretest was used to evaluate the suggested format and wording of the questions on the survey via respondent answers to the survey during the actual pretest. Second, the pretest was used to identify and correct any problems associated with administration of the final survey instrument by office staff to customers at the sample of offices.

With express permission from the DDL headquarters, the pretest survey was administered to customers during a two-hour period at the office located at 14220 North Nebraska Avenue in Tampa, Florida, by CUTR staff on February 11, 1997. This office was chosen primarily due to its high volume and diverse mix of customers and its close proximity to CUTR. During the pretest, customers at the office were asked by CUTR staff to complete a survey. Once finished completing the survey, each individual was interviewed in-depth by CUTR staff to determine if there was any confusion regarding the intent of a particular question(s) on the survey and what, if anything, could be done to make the question(s) more understandable and whether the overall format of the survey was acceptable. Based on the results and observations from the pretest of the survey, several questions on the survey were modified, deleted, added, and/or reordered.

## V. DATA COLLECTION

The final surveys were sent to the sample of offices for distribution by staff to customers. A total of 10,000 surveys (9,250 in English and 750 in Spanish) were subdivided among the 30 offices and mailed on March 7, 1997, to the supervisor at each office. Each office was sent a discrete number of surveys based on the average number of customers at each office during a typical week of operation. In order to minimize any sample bias that may be caused by administering the survey during a single day, each office was instructed to distribute the surveys to customers on Tuesday, March 11, 1997; Wednesday, March 12, 1997; and Thursday, March 13, 1997. Each office was instructed to distribute the surveys to customers at the start of business on the Tuesday and continue distributing them until either they depleted the supply or until the end of business on the Thursday, whichever came first.

A quota sampling plan was developed for the final survey. An aggregate quota was devised for the sample of offices at which the survey was administered. An aggregate representative sample quota of 3,000 responses was targeted for the offices, or 1,000 surveys per bureau. The research team felt that this aggregate sample size would be large enough to permit meaningful analysis of the survey questions that pertain to respondent knowledge of the school bus stop law and various school bus signalizations between the respondent subgroups including men and women of differing ethnic and age groups as well as different levels of driving exposure, for example. In addition, the stratification of the total sample into the three bureaus also permitted meaningful analysis by specific region of the state. The size of the sample quota was selected such that the results would be representative of the total population of drivers in Florida with respect to a variety of demographic and socio-economic traits. Other information of interest included the type of driver license respondents possess and exposure of respondents to driver safety education about the school bus stop law. To further ensure that the sample would be representative of drivers in Florida, both rural and urban offices throughout the state were used in the sample.

The staff at the offices were instructed to distribute a survey to every individual taking a driver license examination, renewing or replacing an existing driver license and to those persons accompanying individuals visiting the offices who were age 16 and older holding a valid Class A, B, C, D, or E driver license. The staff at the offices were also given specific instructions to make sure that the customers taking the driver license examination understood that participation in the survey for this study would in no way effect the outcome of their driver license examination. To further alleviate this potential problem, staff at the offices were instructed to give each person a survey after they completed the driver license examination, when possible. In most instances, it was assumed that the individuals who had just completed an examination were either waiting for their results or for their new driver license to be processed. Further, the staff at the offices were instructed to approach potential respondents without regard to individual characteristics. This was done in order to avoid the possibility of introducing bias into the sample. The only screening question asked by the office staff was for the purpose of ascertaining if potential respondents were Class A, B, C, D, or E licensed drivers.

As was the case with the pretest of the survey, express permission from the DDL headquarters was obtained before proceeding with the selection and use of the sample of offices as data collection points. With the aid of the DDL, a contact person (in most cases, the office supervisor) was established at each sampled offices to oversee the distribution and collection of the surveys upon completion by customers. This person was also responsible for returning the surveys to CUTR for analysis.

**FIGURE 1**  
**ENGLISH SURVEY INSTRUMENT**

**Knowledge of School Bus Stop Law Survey**  
**WE NEED YOUR HELP!**

This survey is part of a statewide effort to improve the safety of children at school bus stops in Florida. The Center for Urban Transportation Research (CUTR) at the University of South Florida (USF) is conducting this research.

Please note that your participation is entirely **voluntary**. It will **not** in any way affect the outcome of your driver license examination. Please do **not** put your name on the survey. If you are willing to help us improve the safety of children at school bus stops, please take a moment of your time to answer the following questions to the best of your ability. Please read the questions very carefully. Thanks in advance for your help in completing the survey. Please return the completed survey to a driver license examining office attendant.

1. When a school bus stops to unload children on a two-lane roadway, only vehicles traveling in the same direction as the school bus are required to stop.  
1 \_\_\_ True                      2 \_\_\_ False                      3 \_\_\_ I don't know
2. When a school bus stops to load children on a four-lane roadway that has a center lane used for left turns by drivers from either direction (see drawing at right), vehicles traveling in the opposite direction on the other side of the roadway as the school bus are not required to stop.  
1 \_\_\_ True                      2 \_\_\_ False                      3 \_\_\_ I don't know
3. When a school bus stops to unload children on a four-lane roadway that is divided by a raised concrete barrier, only vehicles traveling in the same direction as the school bus are required to stop.  
1 \_\_\_ True                      2 \_\_\_ False                      3 \_\_\_ I don't know
4. When a school bus stops to load children on a four-lane roadway divided by an unpaved median at least five feet wide, vehicles traveling in the opposite direction on the other side of the roadway as the school bus are not required to stop.  
1 \_\_\_ True                      2 \_\_\_ False                      3 \_\_\_ I don't know
5. When a school bus stops to load children, all vehicles that are required to stop must remain stopped until all of the children have boarded the school bus.  
1 \_\_\_ True                      2 \_\_\_ False                      3 \_\_\_ I don't know
6. When a school bus is displaying yellow flashing warning lights, vehicles traveling in both directions on a two-lane roadway are required to stop.  
1 \_\_\_ True                      2 \_\_\_ False                      3 \_\_\_ I don't know
7. Have you ever been issued a ticket for failing to properly stop for a school bus that was in the process of loading or unloading children?  
1 \_\_\_ Yes                      2 \_\_\_ No
8. Have you ever received information about the school bus stop law in a driver's training course, a public service announcement on TV or the radio, or in newspapers or magazines?  
1 \_\_\_ Yes                      2 \_\_\_ No
9. During the course of an average day of driving, how many school buses do you encounter that are loading or unloading children at school bus stops?  
1 \_\_\_ None                      2 \_\_\_ One                      3 \_\_\_ Two                      4 \_\_\_ Three                      5 \_\_\_ Four or more
10. You are...?                      1 \_\_\_ Male                      2 \_\_\_ Female
11. Your age is...? \_\_\_\_\_ (please indicate with a number)
12. Your ethnic heritage is...?                      1 \_\_\_ White                      2 \_\_\_ Black                      3 \_\_\_ Hispanic                      4 \_\_\_ Asian                      5 \_\_\_ Other
13. Your total annual household income is...?  
1 \_\_\_ less than \$5,000                      2 \_\_\_ \$5,000 - \$9,999                      3 \_\_\_ \$10,000 - \$19,999  
4 \_\_\_ \$20,000 - \$29,999                      5 \_\_\_ \$30,000 - \$49,999                      6 \_\_\_ \$50,000 or More
14. The estimated number of miles you drive per year is...?                      1 \_\_\_ Less than 10,000                      2 \_\_\_ 10-20,000                      3 \_\_\_ More than 20,000
15. The highest level of formal education that you have completed is...?  
1 \_\_\_ Less than High School                      2 \_\_\_ High School/GED                      3 \_\_\_ Technical School (beyond high school)                      4 \_\_\_ Attended College  
5 \_\_\_ Associate/Bachelor's Degree                      6 \_\_\_ Graduate work or degree                      7 \_\_\_ Professional Degree (Doctor/Lawyer/etc.)
16. What type of license do you have?                      1 \_\_\_ Operator                      2 \_\_\_ Commercial                      3 \_\_\_ Motorcycle                      4 \_\_\_ Learner's  
5 \_\_\_ None
17. Is English your primary language?                      1 \_\_\_ Yes                      2 \_\_\_ No
18. Have you recently reviewed your *Florida Driver's Handbook*?                      1 \_\_\_ Yes                      2 \_\_\_ No

**Please return the completed survey to a driver license examining office attendant.**  
**Thank you very much for helping us improve the safety of children at school bus stops.**

**FIGURE 2**  
**SPANISH SURVEY INSTRUMENT**

**ENCUESTA DE CONOCIMIENTO DE LEYES DE PARADA DE BUSES DE ESCUELA**

**NECESITAMOS SU AYUDA!**

Esta encuesta es parte de un esfuerzo estatal para mejorar la seguridad de niños en las paradas de buses de escuela en Florida. El Centro de Investigación para Transporte Urbano (CUTR) en la Universidad del Sur de Florida (USF) esta conduciendo esta investigación.

Por favor note que su participación es enteramente **voluntaria**. Esto **no** afectará el resultado del examen para licencia de manejar. Por favor **no** coloque su nombre en la encuesta. Si usted está dispuesto(a) a ayudar a mejorar la seguridad de niños en las paradas de buses de escuelas, por favor tome un momento de su tiempo para contestar las siguientes preguntas lo mejor que pueda. Por favor lea las preguntas cuidadosamente. Gracias adelantadas por ayudar a completar esta encuesta. Por favor entregue la encuesta completa en la oficina del examen para licencia de manejar.

1. Cuando un bus de escuela se detiene para desembarcar niños en un camino de dos canales, solamente los vehículos que viajan en la misma dirección del bus de escuela tienen que detenerse.  
1 \_\_\_ Verdadero                      2 \_\_\_ Falso                      3 \_\_\_ No se
2. Cuando un bus de escuela se detiene para embarcar niños en un camino de cuatro canales el cual tiene un canal para cruzar a la izquierda en cualquier dirección (ver dibujo a la derecha), vehículos que viajan en la dirección contraria al otro lado del camino del bus de la escuela tienen que detenerse.  
1 \_\_\_ Verdadero                      2 \_\_\_ Falso                      3 \_\_\_ No se
3. Cuando un bus de escuela se detiene para desembarcar niños en un camino de cuatro canales el cual está dividido por una barrera de concreto, solamente los vehículos que viajan en la misma dirección del bus de escuela tienen que detenerse.  
1 \_\_\_ Verdadero                      2 \_\_\_ Falso                      3 \_\_\_ No se
4. Cuando un bus de escuela se detiene para embarcar niños en un camino de cuatro canales el cual es dividido por una mediana no pavimentada de cinco pies de ancho, vehículos que viajan en la dirección contraria al otro lado del camino del bus de escuela no tienen que detenerse.  
1 \_\_\_ Verdadero                      2 \_\_\_ Falso                      3 \_\_\_ No se
5. Cuando un bus de escuela se detiene para embarcar niños, todos los vehículos que tienen que detenerse deben permanecer parados hasta que todos los niños hayan abordado el bus de escuela.  
1 \_\_\_ Verdadero                      2 \_\_\_ Falso                      3 \_\_\_ No se
6. Cuando un bus de escuela esta mostrando luces amarillas intermitentes, vehículos en ambas direcciones en un camino de dos canales tienen que detenerse.  
1 \_\_\_ Verdadero                      2 \_\_\_ Falso                      3 \_\_\_ No se
7. Alguna vez ha obtenido un "ticket" por fallar a una apropiada parada de un bus de escuela que estuvo en el proceso de embarcar o desembarcar niños?  
1 \_\_\_ Sí                      2 \_\_\_ No
8. Ha recibido alguna vez información acerca de ley de parada de bus de escuela en un curso para manejar, un anuncio de servicio público en televisión o radio, o en periódicos o revistas?  
1 \_\_\_ Sí                      2 \_\_\_ No
9. Durante el curso de un día de manejo promedio, cuantos buses de escuela usted se encuentra cuando está embarcando o desembarcando niños?  
1 \_\_\_ Ninguno                      2 \_\_\_ Uno                      3 \_\_\_ Dos                      4 \_\_\_ Tres                      5 \_\_\_ Cuatro o más
10. Usted es...?                      1 \_\_\_ Hombre                      2 \_\_\_ Mujer
11. Su edad es...? \_\_\_\_\_ (Por favor indíquelo con un número)
12. Su herencia étnica es...?                      1 \_\_\_ Blanco                      2 \_\_\_ Negro                      3 \_\_\_ Latino                      4 \_\_\_ Asiático                      5 \_\_\_ Otro
13. Su ingreso anual es...?  
1 \_\_\_ menor de \$5,000                      2 \_\_\_ \$5,000 - \$9,999                      3 \_\_\_ \$10,000 - \$19,999  
4 \_\_\_ \$20,000 - \$29,999                      5 \_\_\_ \$30,000 - \$49,999                      6 \_\_\_ \$50,000 o más
14. El número estimado de millas que usted maneja al año es...?                      1 \_\_\_ menor de 10,000                      2 \_\_\_ 10-20,000                      3 \_\_\_ más de 20,000
15. El más alto nivel de educación formal que usted ha completado es...?  
1 \_\_\_ Menor que High School                      2 \_\_\_ High School/GED                      3 \_\_\_ Escuela Técnica (mayor que high school)                      4 \_\_\_ "College"  
5 \_\_\_ Associate/Bachelor's Degree                      6 \_\_\_ Graduate work or degree                      7 \_\_\_ Professional Degree (Doctor/Abogado/etc.)
16. Que tipo de licencia usted tiene?                      1 \_\_\_ Operador                      2 \_\_\_ Comercial                      3 \_\_\_ Motocicleta                      4 \_\_\_ Aprendiz                      5 \_\_\_ Ninguna
17. Es Español su primer lenguaje?                      1 \_\_\_ Sí                      2 \_\_\_ No
18. Ha revisado recientemente su Manual para Manejar en Florida?                      1 \_\_\_ Sí                      2 \_\_\_ No

**Por favor entregue la encuesta completa en la oficina del examen para la licencia de manejar.**  
**Muchas Gracias por ayudarnos a mejorar la seguridad de niños en paradas de buses de escuela.**

**TABLE 1**  
**STRATIFIED RANDOM SAMPLE OF DRIVER LICENSE**  
**EXAMINING OFFICES**

Field Operation Bureau	Offices in Stratified Sample	County	Response Rate
<b>North Bureau</b>	1 New Smyrna Beach	Volusia	71.00%
	2 Ocala	Marion	32.30%
	3 Jacksonville (7439 Wilson Road)	Duval	90.00%
	4 East Palatka	Putnam	13.30%
	5 Green Cove Springs	Clay	91.90%
	6 Tallahassee (504-A Capital Circle SE)	Leon	51.40%
	7 Pensacola (100 Stumpfield Drive)	Escambia	21.40%
	8 Quincy	Gadsden	63.00%
	9 Crestview	Okaloosa	76.70%
	10 Gainesville (34th Avenue)	Alachua	86.40%
	11 Deland	Volusia	44.50%
<b>Central Bureau</b>	1 Clearwater	Pinellas	84.90%
	2 Wauchula	Hardee	21.90%
	3 Lake Placid	Highlands	40.00%
	4 Inverness	Citrus	83.30%
	5 St. Petersburg (4827 34th Street South)	Pinellas	56.00%
	6 Tampa (2814 East Hillsborough Avenue)	Hillsborough	82.80%
	7 Orlando (2838 Curry Ford Road)	Orange	31.60%
	8 Ocoee	Orange	86.40%
<b>South Bureau</b>	1 Homestead	Dade	28.80%
	2 Clewiston 1	Hendry	—
	3 Ft. Lauderdale (1931 NW 9th Street)	Broward	20.90%
	4 Pahokee	Palm Beach	44.20%
	5 Pompano Beach	Broward	3.20%
	6 West Palm Beach (571 North Military Trail)	Palm Beach	44.90%
	7 Fort Myers	Lee	90.90%
	8 Naples	Collier	59.20%
	9 Miami (4520 Ponce de Leon, Coral Gables)	Dade	35.10%
	10 Miami (15555 Biscayne Blvd., North Miami)	Dade	9.20%
	11 Key West	Monroe	15.30%
<b>Total</b>	30 NA	NA	

<sup>1</sup> The Clewiston office did not return completed surveys for analysis. No explanation was sought.

## VI. DATA ANALYSIS

In all, a total of 4,540 drivers of various ages, driving experience, and occupations that visited the sample of offices during the three-day survey period completed a survey. This total number of returned surveys exceeding the sample quota by 1,540 surveys. Assuming that each person that entered the sampled offices during the three-day period was asked to complete a survey by office staff, the overall response rate for the study is 45.4 percent. Only one of the sampled offices did not return completed surveys for inclusion in the sample, as shown in Table 1. For the remaining

offices, the number of completed surveys returned for analysis ranged from a high of 579 (86.4 percent response rate) for the office located in Gainesville in Alachua County to a low of 18 (3.2 percent response rate) for the office located in Pompano Beach in Broward County. The highest overall response rate of the offices that returned completed surveys for analysis was achieved by the office located in Green Cove Springs in Clay County, with a 91.9 percent response rate. The office located in Pompano Beach had the lowest overall response rate of the offices that returned surveys for analysis. Based on the sample data, the North bureau returned 2,012 surveys, the Central bureau returned 1,678 surveys, and the South bureau returned 850 surveys for analysis. The aggregate number of returned surveys in the sample consisted of 4,319 English language and 221 Spanish language surveys. Finally, 53.8 percent or 119 of the total sample of Spanish language surveys that were returned for analysis were completed in the South bureau, 37.6 percent or 83 surveys were completed in the Central bureau, and 8.6 percent or 18 surveys were completed in the North bureau.

Based on the sampling procedures, careful design of the survey instrument, duration (three days) during which the surveys were administered to customers, and a detailed review of a random sample of returned surveys, the research team concluded that the potential for sample bias was minimal (2 percent, or less at the 95 percent confidence level) and that the responses truly reflect the knowledge of all individuals visiting the offices during the three-day survey period. However, all studies that involve statistics are susceptible to some degree of error, and the sources of error cannot always be accounted for and, subsequently, corrected. In addition, based on comments from the office staff during administration of the survey to customers, factors such as language and literacy were not believed to be a problem thus further reducing the possibility of sample bias. Sampling errors at the 99, 95, and 90 percent confidence levels are shown in Table 2.

**TABLE 2**  
**SAMPLE SIZES FOR VARIOUS DEGREES OF ACCURACY**  
**AND CONFIDENCE LEVELS**

Desired Degree of Accuracy	Confidence Levels and Sample Sizes		
	99%	95%	90%
1%	16,576	9,604	6,765
2%	4,144	2,401	1,691
3%	1,848	1,067	752
5%	663	384	271
20%	41	24	17

Source: O'Sullivan, Elizabethan, and Gary R. Rassel (1989), *Research Methods for Public Administrators*. New York: Longman, p. 131.

In addition to providing the results for each question in the form of simple frequency distributions, the data were also cross-tabulated to isolate important relationships between subsets that may otherwise have been overlooked. The data obtained from the completed surveys were aggregated and analyzed based on the following groupings:

1. Age. Question 11 on the survey was used to determine if there was a significant difference between how individuals of differing ages responded to survey Questions 1 through 6, particularly young adults, older adults, and seniors.
2. Gender. Question 10 on the survey was used to determine if gender affected the responses to survey Questions 1 through 6.
3. Review of Florida Driver's Handbook. Question 18 on the survey was used to determine if recent review of the *Florida Driver's Handbook* (1996) affected the responses to survey Questions 1 through 6.
4. Issuance of Citation. Question 7 on the survey was used to determine if the issuance of a citation for violation of the school bus stop law affected the responses to survey Questions 1 through 6.
5. Exposure. Question 9 on the survey was used to determine if repeated exposure by respondents to school buses while driving affected the responses to survey Questions 1 through 6.
6. Driver Safety Education. Question 8 on the survey was used to determine if previous driver safety education about the school bus stop law affected the responses to survey Questions 1 through 6.
7. Formal Education. Question 15 on the survey was used to determine if different levels of formal education including high school graduate and professional graduate degrees affected the responses to survey Questions 1 through 6.
8. Ethnic Heritage. Question 12 on the survey was used to determine if ethnic heritage affected the responses to survey Questions 1 through 6.
9. Miles Driven per Year. Question 14 on the survey was used to determine if the number of miles driven annually by respondents affected the responses to survey Questions 1 through 6.
10. Annual Household Income. Question 13 on the survey was used to determine if different levels of annual household income affected the responses to survey Questions 1 through 6.
11. Primary Language. Question 17 on the survey was used to ascertain if the primary language spoken by respondents affected the responses to survey Questions 1 through 6.
12. Region of the State. The three DDL Bureaus were used to determine if region of the state affected the responses to survey Questions 1 through 6.

The significant effect of the 12 groupings on the aggregate responses to the six survey questions that measure the level of driver knowledge of the school bus stop law and various school bus signalizations are discussed in Section IV. The Chi-Square statistic with the level of significance set at 0.05 was used to measure the significant effects. SPSS 7.0 for Windows 95 was used to perform all of the statistical tests and other analyses including frequency distributions and crosstabulations of the sample data.

## **VII. SURVEY LIMITATIONS**

The survey methodology used in this study has several limiting factors that should be kept in mind when evaluating the results. Although the 30 offices that were selected as data collection points were ideal venues for enlisting and surveying drivers, at least some of the drivers may have been more prepared than others for answering the questions included on the survey depending on why they were at a particular office during the days on which the survey was administered. From the responses, it was determined that a number of survey respondents were accompanying those individuals who had some type of business at one of the offices. It would be assumed that these individuals would be less prepared to take a driver license examination than individuals that had business at one of the offices. In addition, although the survey response time, in theory, was unlimited, and every measure was taken to ensure that the survey questions were as concise and lucid as possible, some respondents may not have been

able to understand individual questions. Again, every effort, including a pretest of the survey instrument and providing the English language survey instrument in an additional language, was made to ensure that each of the questions on the survey was easily understandable. Further, even though the pretest of the survey did not reveal any significant difficulties in answering questions, the use of the “true or false” format for some of the responses may have also affected the results. Survey questions in an open-ended, multiple-choice, or verbal format may have helped to overcome this possible problem. Last, it should be stressed that the results from the analysis of the surveys completed by customers at the sample of offices revealed information about what they indicated they would do in certain driving situations. Using the information from the sample data, there is no way to conclusively determine how respondents will actually behave when confronted with a comparable situation in the driving environment.

## VIII. REPORTING OF RESULTS

In this section, the aggregate responses to the questions are discussed question-by-question in the order that they appeared on the survey. Each question on the survey is stated, the rationale for including the question on the survey is given, the responses to each question are presented, and any statistically-significant effects, if they exist, as determined by the Chi-Square tests, between the responses to survey Questions 1 through 6 and the 12 groupings are recognized.

On the survey, three multiple-choice answers were provided for Questions 1 through 6: one “correct” response (either true or false), one “incorrect” response (either true or false), and one “I don’t know” response. (The response “I don’t know” technically does not represent an “incorrect” response, per se. However, to simplify the reporting of the descriptive results and to increase the approximation of the Chi-Square tests using the sample data, the lone “incorrect” response and the lone “I don’t know” response were combined to represent a single “incorrect” or “undesirable” response. This methodological treatment should be kept in mind by the reader when interpreting the results related to the six questions that pertain to the school bus stop law and various school bus signalizations.)

### Question 1

*When a school bus stops to unload children on a two-lane roadway, only vehicles traveling in the same direction as the school bus are required to stop.*

True\_\_\_\_      False\_\_\_\_      I Don't Know\_\_\_\_

**Rationale for Question.** The scenario in Question 1 was included on the survey to determine the level of driver knowledge when required to stop for a school bus on a two-lane roadway that is unloading children at a school bus stop and displaying proper signalizations. This scenario represents the most basic of the many possible situations where traffic is required by the school bus stop law to stop for school buses that are loading or unloading children at school bus stops and displaying proper signalizations.

**Responses to Question.** The responses to Question 1 are:

<u>Answer Choice</u>	<u>Percentage</u>
True	13.9%
False	85.6%
I Don't Know	0.5%

According to the school bus stop law and the *Florida Driver's Handbook* (1996), traffic traveling

in both directions on a two-lane roadway must come to a complete standstill for a stopped school bus that is loading or unloading children and displaying proper signalizations. Therefore, the correct answer to Question 1 is “false.” Analysis of the completed surveys showed that 85.6 percent of the respondents answered this question correctly and 14.4 percent provided an incorrect response. The high proportion of incorrect answers suggests that a large portion of drivers in Florida clearly do not understand their responsibilities as defined in the school bus stop law when traveling on a two-lane roadway as described in the scenario in Question 1. Among the six questions that attempted to ascertain the level of driver awareness of the various aspects of the school bus stop law and the meaning of the various school bus signalizations, the scenario in Question 1 generated the least amount of confusion on the part of sample respondents. However, this scenario represents the highest incidence of illegal passes as documented by the aforementioned study. This finding suggests that, while many motorists clearly do not understand the school bus stop law contained in this scenario, many more motorists are, in fact, intentionally illegally passing stopped school buses on two-lane roadways.

**Effect of Groupings on Responses to Question 1.** The effect of the 12 groupings on Question 1 are:

<u>Groupings</u>	<u>X<sup>2</sup> Value (Likelihood Ratio)</u>	<u>df</u>	<u>Significance (2-tailed)</u>	<u>Significant Effect</u>
Age	12.256	2	0.002	
Gender	2.48	1	0.115	--
<i>Florida Driver's Handbook</i>	71.32	1	0.000	
Issuance of Citation	25.903	1	0.000	
Exposure	43.165	4	0.000	
Driver Safety Education	0.002	1	0.961	--
Formal Education	104.527	3	0.000	
Ethnic Heritage	253.989	4	0.000	
Miles Driven per Year	33.687	2	0.000	
Annual Household Income	146.744	1	0.000	
Primary Language	29.935	1	0.000	
Region of the State	37.671	1	0.000	

The significant effect of the 12 groupings on the responses to Question 1 were tested utilizing the Chi-Square statistic with the significance level set at 0.05. As noted above, the tests determined that 10 of the 12 groupings had a significant effect on the responses to Question 1 including recent review of the *Florida Driver's Handbook* (1996), issuance of a citation for violation of the school bus stop law, region of the state, and exposure to driver safety information about the school bus stop law and the intent of the various school bus signalizations. The significant groupings are distinguished with a check mark. Comparatively, gender and exposure to driver safety information about the school bus stop law and various school bus signalizations did not have a bearing on the two responses to Question 1, according to the tests.

The results of cross-tabulated sample data indicate that those respondents least apt to render a correct response to Question 1 were low income Hispanic males age 15 to 24 with less than a high school education who drive less than 10,000 miles in a single year. In addition to these demographic characteristics, these respondents were also least likely to have recently reviewed the *Florida Driver's Handbook* (1996) prior to completing the survey for this study, least likely to have received a citation for violation of the school bus stop law, and had no exposure to driver safety education about the school bus stop law.

## Question 2

When a school bus stops to load children on a four-lane roadway that has a center lane used for left turns by drivers from either direction, vehicles traveling in the opposite direction on the other side of the roadway as the school bus are not required to stop.

True\_\_\_\_\_ False\_\_\_\_\_ I Don't Know\_\_\_\_\_

**Rationale for Question.** This question was included on the survey to determine the level of driver knowledge regarding their responsibilities as defined in the school bus stop law and the *Florida Driver's Handbook* (1996) pertaining to traffic stopping for stopped school buses on four-lane roadways with painted pavement markings indicating a center two-way left-turn lane. In Florida, these types of roadways are commonplace in certain urban areas and are commonly referred to as five-lane roadways.

**Responses to Question.** The responses to Question 2 are:

<u>Answer Choice</u>	<u>Percentage</u>
True	36.3%
False	55.8%
I Don't Know	7.9%

According to Florida law, traffic traveling in both directions on a multi-lane roadway divided by painted pavement markings indicating a center two-way left-turn lane must stop for stopped school buses that are displaying red flashing loading lights and extended stop arms. The *Florida Driver's Handbook* (1996) plainly states that "painted lines or pavement markings are not considered to be barriers." Therefore, the correct answer to the scenario provided in this question is "false." Yet, almost 45 percent of the respondents indicated an incorrect answer to Question 2. However, the results do indicate that 55.8 percent of the respondents are knowledgeable about their driving responsibilities regarding this particular aspect of the school bus stop law. Nevertheless, based on the results as noted above, there is significant lack of knowledge among respondents regarding traffic stopping for stopped school buses on roadways with this particular configuration of thru- and turn-lanes.

### **Effect of Groupings on Responses to Question 2.**

<u>Groupings</u>	<u>X<sup>2</sup> Value (Likelihood Ratio)</u>	<u>df</u>	<u>Significance (2-Tailed)</u>	<u>Significant Effect</u>
Age	7.449	2	0.024	
Gender	3.971	1	0.046	
<i>Florida Driver's Handbook</i>	3.885	1	0.049	
Issuance of Citation	8.256	1	0.004	
Exposure	6.546	4	0.162	--
Driver Safety Education	11.322	1	0.001	
Formal Education	38.815	3	0.000	
Ethnic Heritage	41.877	4	0.000	
Miles Driven per Year	17.927	2	0.000	
Annual Household Income	12.812	2	0.002	
Primary Language	1.247	1	0.264	--
Region of the State	0.699	2	0.705	--

The effect of the 12 groupings on the responses to Question 2 was determined via the Chi-Square statistic with the significance level set at 0.05. The tests revealed that 9 of the 12

groupings had a significant influence on the responses to Question 2 including recent review of the *Florida Driver's Handbook* (1996), gender, and age. Evidently, repeated exposure to school buses in the driving environment, primary language, and region of the state did not have a significant influence on the responses to Question 2.

According to the sample data, high income English speaking professional white males age 25 to 64 years who drive 20,000 miles or more per year were most likely to answer this question correctly. Conversely, low income females with a Learner's Driver License age 15 to 24 who noted "Other" as their ethnic heritage were least apt to provide a correct response to this question.

### Question 3

*When a school bus stops to unload children on a four-lane roadway that is divided by a raised concrete barrier, only vehicles traveling in the same direction as the school bus are required to stop.*

True\_\_\_\_\_ False\_\_\_\_\_ I Don't Know\_\_\_\_\_

**Rationale for Question.** The scenario in Question 3 was included on the survey to determine the level of driver knowledge concerning their responsibilities about when to stop for stopped school buses on a four-lane roadway divided by some type of raised barrier.

**Responses to Question.** The responses to this survey question are:

<u>Answer Choice</u>	<u>Percentage</u>
True	82.2%
False	13.7%
I Don't Know	4.1%

The *Florida Driver's Handbook* (1996) states the following regarding the rules that apply to the school bus stop law and the roadway configuration contained in the scenario in Question 3: "If the highway is divided by a raised barrier or an unpaved median at least five-feet wide, you do not have to stop if you are moving in the opposite direction of the [school] bus." To clarify, only traffic that is traveling in the same direction as the stopped school bus displaying red loading lights and stop signal arms must stop on a roadway divided by a raised concrete barrier, regardless of the number of roadway lanes. Therefore, the answer choice "true" is the correct response to this question.

The results show that just over 82 percent of the respondents correctly answered this question. Further, incorrect responses were given 17.8 percent of the time by respondents to this question. This finding points out that a large segment of motorists in Florida are confused about their responsibilities as defined in the school bus stop law when traveling on roadways that are divided by some type of raised, physical barrier.

**Effect of Groupings on Responses to Question 3.** The effect of the 12 groupings on the responses to Question 3 are:

<u>Groupings</u>	<u>X<sup>2</sup> Value (Likelihood Ratio)</u>	<u>df</u>	<u>Significance (2-Tailed)</u>	<u>Significant Effect</u>
Age	4.920	2	0.083	--
Gender	8.467	1	0.004	
<i>Florida Driver's Handbook</i>	0.018	1	0.893	--
Issuance of Citation	11.659	1	0.001	
Exposure	11.171	4	0.025	
Driver Safety Education	0.128	1	0.721	--
Formal Education	9.007	3	0.029	
Ethnic Heritage	37.939	4	0.000	
Miles Driven per Year	12.958	2	0.002	
Annual Household Income	41.858	2	0.000	
Primary Language	1.590	1	0.207	--
Region of the State	0.539	2	0.764	--

Utilizing the Chi-Square statistic set at the 0.05 level of significance, the effect of the 12 groupings on the responses to Question 3 were tested. Based on the tests using the sample data, it was determined that 7 groupings had an influence on the responses to Question 3 including gender, ethnic heritage, and the number of miles traveled in one year. Five of the groupings were found not to have a significant effect on the responses. These groupings were age, recent review of the *Florida Driver's Handbook* (1996), exposure to safety information pertaining to the school bus stop law and various school bus signalizations, primary language, and region of the state.

Those respondents most apt to provide incorrect responses to this question were low income African-American females age 15 to 24 years who drive less than 10,000 miles per year and had recently reviewed the *Florida Driver's Handbook* (1996) before completing the survey for this study.

## Question 4

*When a school bus stops to load children on a four-lane roadway divided by an unpaved median at least five feet wide, vehicles traveling in the opposite direction on the other side of the roadway as the school bus are not required to stop.*

True\_\_\_\_ False\_\_\_\_ I Don't Know\_\_\_\_

**Rationale for Question.** This question was included on the survey to determine the level of driver knowledge about their driving responsibilities concerning when to stop for stopped school buses on a four-lane roadway divided by an unpaved median at least five feet in width.

**Responses to Question.** The responses to this question are:

<u>Answer Choice</u>	<u>Percentage</u>
True	60.2%
False	30.7%
I Don't Know	9.1%

The findings for this question indicate that almost 40 percent of the respondents are not aware of their driving responsibilities as defined in the school bus stop law when traveling on a

roadway divided by an unpaved (grass in most instances) median at least five feet in width, as stated in the scenario. The *Florida Driver's Handbook* (1996) states that, "If the highway is divided by a raised barrier or an unpaved median at least five-feet wide, you do not have to stop if you are moving in the opposite direction of the [school] bus." To clarify, only traffic that is traveling in the same direction as the stopped school bus on a roadway divided by an unpaved median at least five feet wide is required to stop, regardless of the number of roadway lanes in the direction that the school bus is traveling. Therefore, the answer choice "true" represents the correct response to this particular question.

The sample data show that 39.8 percent of the respondents provided incorrect answers and 60.2 percent provided correct answers to this question. This finding lends further support to the findings from Question 3 that motorists are confused about when to stop on certain roadway configurations, particularly on multi-lane roadways that are divided by an unpaved median at least five-feet in width or by a raised, physical barrier of some type.

**Effect of Groupings on Responses to Question 4.** The influence of the 12 groupings on the responses to Question 4 are:

<u>Groupings</u>	<u>X<sup>2</sup> Value (Likelihood Ratio)</u>	<u>df</u>	<u>Significance (2-Tailed)</u>	<u>Significant Effect</u>
Age	0.735	2	0.692	--
Gender	8.323	1	0.004	
<i>Florida Driver's Handbook</i>	0.777	1	0.378	--
Issuance of Citation	2.273	1	0.132	--
Exposure	13.857	4	0.008	
Driver Safety Education	11.328	1	0.001	
Formal Education	5.870	3	0.118	--
Ethnic Heritage	64.255	4	0.000	
Miles Driven per Year	32.707	2	0.000	
Annual Household Income	28.394	2	0.000	
Primary Language	7.487	1	0.006	
Region of the State	16.653	2	0.000	--

The Chi-Square tests revealed that 7 groupings had a significant influence on the responses to this question. For the tests, the significance level was set at 0.05. The seven significant groupings were gender, repeated exposure of respondents to school buses in the driving environment, exposure to driver safety information pertaining to the school bus stop law and various school bus signalizations, ethnic heritage, miles driven per year, annual household income, and primary language. Seemingly, age, formal education, recent review of the *Florida Driver's Handbook* (1996), issuance of a citation for violation of the school bus stop law, and region of the state did not have a significant bearing on the responses to Question 4.

Based on aggregate sample data, those respondents most likely to give incorrect answers to this question were low income African-American females age 65 years and over with less than a high school education. In comparison, those respondents most likely to respond correctly to this question were high income English-speaking white males with some college education who drive 20,000 miles or more per year and possess a Motorcycle Driver License.

## Question 5

When a school bus stops to load children, all vehicles that are required to stop must remain stopped until all of the children have boarded the school bus.

True\_\_\_\_\_ False\_\_\_\_\_ I Don't Know\_\_\_\_\_

**Rationale for Question.** This scenario in Question 5 was included on the survey to investigate the level of respondent knowledge regarding their driving responsibilities after stopping for a stopped school bus that is displaying red flashing loading lights and extended stop signal arms.

**Responses to Question.** The responses to the scenario in Question 5 are as follows:

<u>Answer Choice</u>	<u>Percentage</u>
True	89.1%
False	9.5%
I Don't Know	1.4%

The *Florida Driver's Handbook* (1996) states that “[drivers] must remain stopped until all children are clear of the roadway and the bus signal has been withdrawn.” The *Handbook* (1996) clearly states that traffic is not to proceed forward until all children are clear of the roadway and the bus signal has been withdrawn. In the paragraph in the *Handbook* (1996), the phrasing “bus signal” refers to the stop signal arm(s) and red flashing loading lights on the front and rear of a school bus. Therefore, the correct answer choice to the scenario provided in Question 5 is “false.”

The results from the returned surveys show that 90.5 percent of the respondents provided incorrect responses and only 9.5 percent provided correct ones. The responses to this question seem to indicate a substantial lack of knowledge on the part of respondents regarding when to proceed forward after coming to a complete stop for a stopped school bus that is in the process of loading children. It should also be pointed out that, if the results of this question are accurate, drivers who have stopped for a school bus might believe that once all of the children that were clearly visible to them have boarded the bus that it is safe to proceed forward, regardless if the red loading lights are still flashing and the stop arm(s) are still extended. However, although the pretest of the survey instrument did not reveal any significant difficulties associated with answering this question, the high percentage of incorrect responses to this question might have been caused by respondents misinterpreting the question's intent, i.e., they assumed that withdrawal of the bus signalizations was implied to have occurred once all of the children had safely boarded the school bus. Therefore, some caution is urged when interpreting the results for this question.

**Effect of Groupings on Responses to Question 5.** The effect of the 12 groupings on Question 5 are:

<u>Groupings</u>	<u>X<sup>2</sup> Value (Likelihood Ratio)</u>	<u>df</u>	<u>Significance (2-Tailed)</u>	<u>Significant Effect</u>
Age	23.626	2	0.000	
Gender	35.062	1	0.000	
<i>Florida Driver's Handbook</i>	13.516	1	0.000	
Issuance of Citation	12.431	1	0.000	
Exposure	6.548	4	0.162	--
Driver Safety Education	0.837	1	0.360	--

Formal Education	3.355	3	0.340	--
Ethnic Heritage	14.101	4	0.007	
Miles Driven per Year	36.202	2	0.000	
Annual Household Income	12.384	2	0.002	
Primary Language	1.173	1	0.279	--
Region of the State	1.483	2	0.476	--

Twelve tests were performed to ascertain the effect of the different groupings on the responses to Question 5. The tests were performed using the Chi-Square statistic at the 0.05 significance level. Based on the sample data, the results show that 7 of the 12 groupings had a significant effect on the responses to Question 5. These groupings include ethnic heritage, gender, and age. Apparently, repeated exposure to school buses in the driving environment, exposure to safety information pertaining to the school bus stop law and various school bus signalizations, level of formal education, primary language, and specific region of the state did not have a significant effect on the two responses to Question 5.

Based on the sample data, Asian females 65 years and older with less than a high school education whose primary language is not English and who have annual household incomes between \$10,000 and \$29,999 were most apt to provide an incorrect response to Question 5. These particular respondents were also most apt not to have reviewed the *Florida Driver's Handbook* (1996) nor been exposed to driver safety education about the school bus stop law and various school bus signalizations prior to completing the survey for this study.

## Question 6

*When a school bus is displaying yellow flashing warning lights, vehicles traveling in both directions on a two-lane roadway are required to stop.*

True\_\_\_\_\_ False\_\_\_\_\_ I Don't Know\_\_\_\_\_

**Rationale for Question.** The scenario in Question 6 was included on the survey to determine the level of driver knowledge regarding the meaning or intent of the yellow flashing warning lights on the front and rear of school buses. According to the DOE, prior to a school bus coming to a complete stop for the express purpose of loading or unloading students at a school bus stop, the operator of the school bus must first activate the front and rear yellow flashing warning lights a certain distance from the approaching school bus stop to signal to motorists that the school bus is about to come to a complete stop. All school bus operators in Florida are required by the DOE to follow this procedure when coming to a complete stop with the express intent of loading or unloading children at a school bus stop.

**Responses to Question.** The responses to Question 6 are:

<u>Answer Choice</u>	<u>Percentage</u>
True	63.4%
False	31.9%
I Don't Know	4.7%

The results indicate that a very high percentage of subjects replied with an incorrect response to Question 6. According to Florida law, traffic is not required to stop for a school bus that is only displaying yellow flashing warning lights, regardless of the roadway configuration or direction of traffic. The strict intent of the yellow flashing warning lights is to warn traffic that a school bus is slowing to make a stop. Therefore, the correct answer choice to the scenario in Question 6 is

“false.” This finding supports the earlier observation that motorists might be confused about the meaning of the various school bus signalizations including the red flashing loading lights and stop signal arms. One issue associated with this finding is that the apparent lack of motorist knowledge regarding the intent of the yellow flashing warning lights might cause some motorists to unnecessarily stop for a school bus displaying this particular signalization. This could lead to problems for other motorists who might not expect the sudden and unnecessary stopping.

The sample data show that 31.9 percent of the respondents provided correct responses and 68.1 percent provided incorrect responses to this question. Again, this finding shows that over two-thirds of the respondents in the sample are confused regarding the intent of the school bus signalization “yellow flashing warning lights.”

**Effect of Groupings on Responses to Question 6.** The effect of the 12 groupings on Question 6 are as follows:

<u>Groupings</u>	<u>X<sup>2</sup> Value (Likelihood Ratio)</u>	<u>df</u>	<u>Significance (2-Tailed)</u>	<u>Significant Effect</u>
Age	13.344	2	0.001	
Gender	29.228	1	0.000	
<i>Florida Driver's Handbook</i>	3.734	1	0.053	--
Issuance of Citation	0.427	1	0.513	--
Exposure	3.089	4	0.543	--
Driver Safety Education	0.224	1	0.636	--
Formal Education	25.174	3	0.000	
Ethnic Heritage	44.581	4	0.000	
Miles Driven per Year	35.578	2	0.000	
Annual Household Income	37.562	2	0.000	
Primary Language	0.991	1	0.319	--
Region of the State	6.289	2	.043	

The results of the Chi-Square tests showed that 7 groupings had an impact on the responses to Question 6 including age, gender, formal education level, miles drive per year, and region of the state. The five insignificant groupings were recent review of the *Florida Driver's Handbook* (1996), the issuance of a citation for violation of the school bus stop law, repeated exposure to school buses in the driving environment, primary language, and exposure to driver safety information pertaining to the school bus stop law and various school bus signalizations.

In the majority of instances, those respondents most apt to provide incorrect responses to this question were low income African-American females age 65 years and over with less than a high school education who drive 10,000 miles or less per year. In addition, this same group of respondents were also most apt to have recently reviewed the *Florida Driver's Handbook* (1996) prior to taking the survey and had not been exposed to driver safety education about the school bus stop law and various school bus signalizations.

## Question 7

*Have you ever been issued a ticket for failing to properly stop for a school bus that was in the process of loading or unloading children?*

Yes\_\_\_\_ No\_\_\_\_

**Rationale for Question.** This question was incorporated into the survey to determine if the issuance of a citation for violation of the school bus stop law influenced the responses to the six survey questions that pertain to driver knowledge of the school bus stop law and various school

bus signalizations.

**Responses to Question.** The responses to Question 7 are:

<u>Answer Choice</u>	<u>Percentage</u>
Yes	2.1%
No	97.9%

**Effect of Groupings on Responses to Question 7.** The two groups of respondents to Question 7 were used to determine if the issuance of a citation for violation of the school bus stop law affected the responses to survey Questions 1 through 6. The responses to the six questions were compared using the two groups for Question 7 by means of the Chi-Square statistic at the 0.05 level. The statistically significant findings, if any, for the comparisons between this question's two response groups and the responses to Questions 1 through 6 are noted under the individual discussions for the six questions that pertain to the school bus stop law and various school bus signalizations.

Based on the sample data, those respondents that were most apt to have received a citation for violation of the school bus stop law were low income Asian males age 15 to 24 years with less than a high school education who possess either a Commercial or Learner's Driver License. High income professional English-speaking white females were least likely to have received a citation for violation of the school bus stop law.

## Question 8

*Have you ever received information about the school bus stop law in a driver's training course, a public service announcement on TV or the radio, or in newspapers or magazines?*

Yes\_\_\_\_ No\_\_\_\_

**Rationale for Question.** This particular question was included on the survey to ascertain if exposure to driver safety information about the school bus stop law and various school bus signalizations was of any benefit to respondents when answering the survey questions that pertain to the school bus stop law and various school bus signalizations.

**Responses to Question.** The responses to Question 8 are as follows:

<u>Answer Choice</u>	<u>Percentage</u>
Yes	38.2%
No	61.8%

**Effect of Groupings on Responses to Question 8.** The two groups of respondents to this question were used to determine the possible benefit associated with exposure to safety information pertaining to the school bus stop law and various school bus signalizations via some form of media. The responses to survey Questions 1 through 6 were analyzed using the two response groups for this question via the Chi-Square statistic set at the 0.05 level. The tests were performed to determine if exposure to safety information made a significant difference in the responses to survey Questions 1 through 6. The statistically-significant findings, if any, for the comparisons between the two groups and the responses to Questions 1 through 6 are noted under the individual discussions for the six questions that pertain to the school bus stop law and various school bus signalizations.

According to the sample data, non-English speaking females age 25 to 64 years who indicated “Other” as their ethnic heritage with an annual household income between \$10,000 and \$29,999 and who possess an Operator Driver License were the least apt to be exposed to driver safety education information about the school bus stop law.

## Question 9

*During the course of an average day of driving, how many school buses do you encounter that are loading or unloading children at school bus stops?*

None\_\_\_\_ One\_\_\_\_ Two\_\_\_\_ Three\_\_\_\_ Four or More\_\_\_\_

**Rationale for Question.** This question was asked on the survey to determine the amount of exposure respondents have to school buses during a typical day in the driving environment. In developing the survey, the team asserted that repeated exposure to school buses in the driving environment by motorists might cause them to have increased knowledge of the specific rules that apply to traffic stopping for school buses under a variety of conditions.

**Responses to Question.** The responses to this question are as follows:

<u>Answer Choice</u>	<u>Percentage</u>
None	19.7%
One	25.4%
Two	26.7%
Three	11.1%
Four or more	17.1%

**Effect of Groupings on Responses to Question 9.** The five groups of respondents to this question were used to determine the possible influence on the responses to survey Questions 1 through 6 that may be associated with repeated exposure to school buses in the driving environment. Chi-Square tests were performed and set at the 0.05 significance level. The findings from the tests, if any, for the comparisons between the five responses to this question and the responses to Questions 1 through 6 are noted under the individual discussions for the six questions that pertain to the school bus stop law and various school bus signalizations.

According to the sample data, white males were the most likely to encounter the greatest number of school buses during a day of typical driving. Further, respondents who indicated driving 20,000 or more miles in a given year were the most apt to encounter 4 or more school buses in a single day of driving. Lastly, respondents with annual household incomes of \$30,000 and greater were most apt to encounter one school bus during a typical day of driving.

## Question 10

*You are...?*

Male\_\_\_\_ Female\_\_\_\_

**Rationale for Question.** Question 10 was asked so that the knowledge of males versus females with regards to the school bus law and various school bus signalizations could be determined for the responses to survey Questions 1 through 6.

**Responses to Question.** The responses to Question 10 on the survey are as follows:

<u>Answer Choice</u>	<u>Percentage</u>
Male	53.8%
Female	46.2%

**Effect of Groupings on Responses to Question 10.** The responses to survey Questions 1 through 6 for males and females were compared using the Chi-Square statistic set at the 0.05 level. The statistically significant findings, if any, between males and females as determined by the tests are noted under the individual discussions for survey Questions 1 through 6 that pertain to driver knowledge of the school bus stop law and various school bus signalizations.

Based on the sample data, male respondents were more apt to be white, less educated, and higher paid than their female counterparts. In addition, male respondents were the most likely to drive a greater number of miles in a given year than the females in the sample. Finally, females in the sample were more likely to possess a Learner's Drivers License than the males in the sample.

## Question 11

*Your age is...?*

*Please indicate with a number\_\_\_\_\_*

**Rationale for Question.** The research team was interested in determining if age affected respondent knowledge of the school bus stop law and various school bus signalizations. Specifically, the study team was interested in ascertaining if the responses of young adult, older adult, and senior drivers affected the responses to the six survey questions that measure driver knowledge of the school bus stop law and various school bus signalizations.

**Responses to Question.** Based on the sample data, the results related to age are as follows:

<u>Answer Choice</u>	<u>Percentage</u>
18 or Less	8.0%
19 - 24	19.5%
25 - 34	28.8%
35 - 44	20.6%
45 - 54	11.4%
55 - 64	6.3%
65 and Older	5.4%

This question asked subjects to indicate their exact age in years. Based on the sample data, the mean age of respondents was calculated to be 35.01 years. In addition, the minimum respondent age was noted as 15 and the maximum age was indicated as 95. To simplify the reporting of descriptive results, the information provided by respondents for age was coded into seven groups, as noted above.

**Effect of Groupings on Responses to Question 11.** To improve the approximation of the Chi-Square tests for the responses to this question, the replies that were provided by respondents for age were re-coded into three groups of "young adults age 15 to 24 years," "older adults age 25 to 64 years," and "seniors age 65 and older." Responses to survey

Questions 1 through 6 were compared utilizing the three groups to determine if age affected the responses to survey Questions 1 through 6 in a significant manner. The Chi-Square tests were performed with the significance level set at 0.05. The statistically significant findings, if any, for comparisons between the three age groups are noted under the individual discussions for survey Questions 1 through 6.

According to the sample data, minority males age 15 to 24 years were the most apt to be the least educated and have annual household incomes of less than \$10,000. In comparison, respondents age 25 to 64 were the most likely to have attained the highest level of formal education, have the highest annual household incomes, and be white males. And, lastly, sample respondents aged 25 to 64 were also the most apt to drive the most miles in a given year.

## Question 12

*Your ethnic heritage is...?*

White\_\_\_\_\_ Black\_\_\_\_\_ Hispanic\_\_\_\_\_ Asian\_\_\_\_\_ Other\_\_\_\_\_

**Rationale for Question.** The research team included this question on the survey to determine if the ethnic heritage of respondents affected the responses to survey Questions 1 through 6 that pertain to the school bus stop law and various school bus signalizations.

**Responses to Question.** The results for this question are as follows:

<u>Answer Choice</u>	<u>Percentage</u>
White	65.9%
Black	17.9%
Hispanic	12.8%
Asian	1.7%
Other	1.7%

**Effect of Groupings on Responses to Question 12.** The responses to survey Questions 1 through 6 for respondents of dissimilar ethnic heritages were compared using the Chi-Square statistic at the 0.05 level. The statistically-significant findings, if any, for the comparisons between respondents of different ethnic heritages, as determined by the Chi-Square tests, are noted under the individual discussions for survey Questions 1 through 6 that pertain to the school bus stop law and various school bus signalizations.

According to the sample data, white and Asian respondents were the most apt to be highly educated professionals and have greater annual household incomes than their African-American and Hispanic counterparts. Male was the dominant gender for all ethnic heritages including "Other." Whites were the most likely to drive the most miles in a given year while African-Americans were the most apt to drive the fewest. Lastly, Hispanic and Asian respondents were the least apt to speak English as their primary language.

## Question 13

*Your total annual household income is...?*

Less than \$5,000\_\_\_\_\_ \$5,000 - \$9,999\_\_\_\_\_ \$10,000 - \$19,999\_\_\_\_\_

\$20,000 - \$29,999\_\_\_\_\_

\$30,000 - \$49,999\_\_\_\_\_

\$50,000 or More\_\_\_\_\_

**Rationale for Question.** This question was included on the survey to determine if the annual household income of respondents affected the responses to the survey questions that pertain to the school bus stop law and various school bus signalizations. Specifically, the research team was interested in determining if respondents with low, average, and above average annual household incomes had significantly different responses to survey Questions 1 through 6 that pertain to the school bus stop law and various school bus signalizations.

**Responses to Question.** The results for respondent annual household income from the survey are as follows:

<u>Answer Choice</u>	<u>Percentage</u>
Less than \$5,000	12.5%
\$5,000 - \$9,999	9.3%
\$10,000 - \$19,999	17.8%
\$20,000 - \$29,999	21.7%
\$30,000 - \$49,999	21.2%
\$50,000 or More	17.5%

**Effect of Groupings on Responses to Question 13.** To improve the approximation of the Chi-Square statistic, the replies that were provided by respondents for annual household income were truncated from the six original annual household income groups listed on the survey into only three groups of “income less than \$10,000,” “income between \$10,000 and \$29,999,” and “income of \$30,000 and greater.” The three groups were compared to survey Questions 1 through 6 to determine if they significantly influenced the responses to the six questions related to driver knowledge of the school bus stop law. Chi-Square tests at the 0.05 significance level were performed to understand the influences of income on driver knowledge of the school bus stop law. The statistically significant findings, if any, for the comparisons between the three income groups and the responses to Questions 1 through 6 as determined by the Chi-Square statistic are noted under the individual discussions for the six questions.

According to the sample data, English-speaking African-American males age 15 to 24 years who drive less than 10,000 miles per year were most apt to have a combined annual household income of less than \$10,000. These same respondents were also most apt to have reviewed the *Florida Driver's Handbook* (1996) shortly before completing the survey for this study. In comparison, professional English-speaking white males were the most apt to make in excess of \$30,000 per year in annual household income.

## Question 14

*The estimated number of miles you drive per year is...?*

Less than 10,000\_\_\_\_\_

10 - 20,000\_\_\_\_\_

More than 20,000\_\_\_\_\_

**Rationale for Question.** This question was included on the survey to determine the number of miles that respondents drive per annum. At the outset of the study, the research team hypothesized that the number of miles an individual drives in a single year might have some bearing on their knowledge of the rules that apply to traffic stopping for a stopped school bus as outlined in the school bus stop law and the *Florida Driver's Handbook* (1996).

**Responses to Question.** The responses to Question 14 consisted of the following:

<u>Answer Choice</u>	<u>Percentage</u>
Less than 10,000 Miles	38.6%
10,000 - 20,000 Miles	43.1%
20,000 or More Miles	18.3%

**Effect of Groupings on Responses to Question 14.** The three groups of respondents to this question were used to determine the possible effect of driving a certain number of miles per year on the responses to survey Questions 1 through 6. The Chi-Square statistic at the 0.05 level was used to perform the significance test. The statistically-significant findings, if any, for the comparisons between the three groups and survey Questions 1 through 6, as determined by the Chi-Square statistic, are noted under the individual discussions for the six questions that pertain to the school bus stop law and various school bus signalizations.

The respondents who indicated driving less than 10,000 miles in a single year were most apt to be low income Asian females age 65 years or older with less than a high school education. In addition, these same respondents were also most apt not to speak English as their primary language. Those respondents who indicated driving 20,000 miles or more per year were most likely to be high income English-speaking white males with some college education who possess a CDL.

## Question 15

*The highest level of formal education that you have completed is...?*

Less than High School\_\_\_\_      High School/GED\_\_\_\_      Technical School\_\_\_\_  
 Attended College\_\_\_\_      Assoc./Bach. Degree\_\_\_\_      Graduate Work or Degree\_\_\_\_  
 Professional Degree\_\_\_\_

**Rationale for Question.** This question was asked on the survey in order for the research team to assess if the level of formal education of respondents significantly affected the responses to Questions 1 through 6. Questions 1 through 6 measured the level of motorist knowledge of the school bus stop law and various school bus signalizations.

**Responses to Question.** The results to Question 15 are as follows:

<u>Answer Choice</u>	<u>Percentage</u>
Less than High School	13.4%
High School/GED	36.8%
Technical School (beyond high school)	8.7%
Attended College	15.1%
Associate/Bachelor's Degree	15.4%
Graduate Work or Degree	7.6%
Professional Degree (doctor/lawyer/etc.)	3.0%

**Effect of Groupings on Responses to Question 15.** To improve the approximation of the Chi-Square tests, the replies that were provided by respondents for this question were collapsed from the original seven groups listed on the survey into four groups of "less than high school," "high school/GED and technical school," "attended college and bachelor's/associate's degree," and "graduate work and professional degree." The research team examined the effect of the 4 groups on the responses to survey Questions 1 through 6 that pertained to the school bus stop law and various school bus signalizations. The research team employed the Chi-Square

statistic at the 0.05 level to gauge the effects of formal education on the responses to the six questions. The statistically-significant findings, if any, are reported under the individual discussions for the six questions that pertain to the school bus stop law and various school bus signalizations.

According to the sample data, those respondents who indicated having attained the highest level of formal education were most apt to be high income Asian males age 25 to 64 years whose primary language is not English. Also, these same respondents were the least likely to have reviewed the *Florida Driver's Handbook* (1996) before completing the survey for this study. In comparison, those respondents that indicated having less than a high school education were most apt to be low income Hispanic males age 15 to 24 years whose primary language is not English and possess a Learner's Driver License. Unlike their highly-educated counterparts, these respondents with less than a high school education were the most likely to have reviewed the *Florida Driver's Handbook* (1996) before taking the survey for this study.

## Question 16

*What type of license do you have?*

Operator\_\_\_\_ Commercial\_\_\_\_ Motorcycle\_\_\_\_ Learner's\_\_\_\_ None\_\_\_\_

**Rationale for Question.** This question was included on the survey to determine what type of driver license that individuals in the sample possess. This information was primarily inquired about on the survey for the purpose of compiling additional demographic characteristics about respondents.

**Responses to Question.** The responses to this question are:

<u>Answer Choice</u>	<u>Percentage</u>
Operator	77.9%
Commercial	8.4%
Motorcycle	0.5%
Learner's	3.9%
None	9.3%

**Effect of Groupings on Responses to Question 16.** There was no test for significant differences in the responses to survey Questions 1 through 6 that pertain to the school bus stop law and various school bus signalizations utilizing the responses to Question 16.

The respondents who indicated possessing a CDL were most likely African-American male high school graduates with annual household incomes between \$10,000 and \$29,999 who drive 20,000 or more miles per year. In addition, based on the sample data, males were over four times more likely to possess a CDL than females.

## Question 17

Is English your primary language?

Yes \_\_\_\_\_ No \_\_\_\_\_

**Rationale for Question.** Question 17 was included on the survey to determine if the primary language spoken by respondents significantly affected the responses to survey Questions 1 through 6 that pertained to the school bus stop law.

**Responses to Question.** The responses to Question 17 are the following:

<u>Answer Choice</u>	<u>Percentage</u>
Yes	92.9%
No	7.1%

**Effect of Groupings on Responses to Question 17.** The research team used the two groups of responses to Question 17 in order to determine if the primary language spoken by subjects made any significant differences in the responses to survey Questions 1 through 6. In this instance, the primary languages spoken are the English and Spanish languages. The Chi-Square statistic at the 0.05 level was used to perform the tests. The statistically-significant differences, if any, in the responses to survey Questions 1 through 6 that may have been caused by the responses to this question are noted under the individual discussions for each question in the appropriate sections.

The respondents who indicated English as their primary language were most likely high income white female high school graduates that drive 20,000 or more miles per year and who hold an Operator Driver License. In addition, they were not likely to have reviewed the *Florida Driver's Handbook* (1996) before taking the survey for this study, but were most likely to have been exposed to driver safety education about the school bus stop law and the meaning of the various school bus signalizations.

## Question 18

Have you recently reviewed your *Florida Driver's Handbook*?

Yes \_\_\_\_\_ No \_\_\_\_\_

**Rationale for Question.** This question was included on the survey to determine if recent review of the *Florida Driver's Handbook* (1996) by subjects affected the responses to survey Questions 1 through 6 in a significant manner. Questions 1 through 6 pertain to driver knowledge of the school bus stop law and various school bus signalizations.

**Responses to Question.** The responses to Question 18 are:

<u>Answer Choice</u>	<u>Percentage</u>
Yes	35.4%
No	64.6%

***Effect of Groupings on Responses to Question 18.*** The research team examined the two groups of respondents to survey Questions 1 through 6 to determine the possible benefit associated with reviewing the state's driver's handbook. The proportion of responses to survey Questions 1 through 6 were compared with the two groups to Question 18 using the Chi-Square statistic at the 0.05 level. The statistically-significant findings, if any, are noted under the individual discussions for the six questions that pertain to the school bus stop law and various school bus signalizations.

Based on the sample data, low income African-American males age 15 to 24 years with less than a high school education who drive less than 10,000 miles per year and possess a Learner's Driver License were the most apt to have recently reviewed the *Florida Driver's Handbook* (1996) shortly before taking the survey for this study. Conversely, high income white females age 25 to 64 years who drive between 10,000 and 20,000 miles per year were most likely not to have recently studied the *Handbook* (1996) before completing a survey for this study.

## **IX. SUMMARY OF FINDINGS**

In sum, this study described the results of a statewide survey of licensed drivers designed to gauge their level of comprehension of the various aspects of the school bus stop law and various school bus signalizations that attempt to signal to them the actions that a school bus is undertaking in certain driving situations. The survey, which included 6 questions pertaining to the school bus stop law and various school bus signalizations and 12 questions inquiring about a host of respondent information such as age, gender, and annual household income, was administered to a diverse cross-section of licensed drivers. The sample included 4,540 drivers of various ages, ethnic heritages, educational backgrounds, and levels of driving experience. Thirty driver license examining offices in both urban and rural areas across the state were used as data collection points for the study. Staff at the offices administered the surveys to drivers entering their office during a three-day survey period. In addition, the staff at the offices gathered the completed surveys and returned them to CUTR for analysis.

Based on the sample data, the study found significant confusion on the part of respondents regarding their driving responsibilities as defined in the school bus stop law as well as significant confusion on the part of respondents regarding the intent of the various school bus signalizations. The amount of respondent confusion, as determined by the percent of incorrect responses to the six survey questions that measured driver knowledge about the school bus stop law and various school bus signalizations, ranged from a low of 14.4 percent for Question 1 to a high of 90.5 percent for Question 5. The results indicate that there are certain driving situations involving whether or not to stop for school buses that present more of a problem for respondents than other situations. The scenario that reads "*when a school bus stops to unload children on a two-lane roadway, only vehicles traveling in the same direction as the school bus are required to stop*" elicited the least amount of confusion on the part of individuals in the sample. This scenario represents the most basic situation that drivers are likely to encounter in the driving environment involving school buses that are in the process of loading or unloading children and displaying proper signalization at school bus stops. Nevertheless, 14.4 percent of the respondents answered the scenario in Question 1 incorrectly. According to the sample data, low income Hispanic males age 15 to 24 years with less than a high school education and who drive less than 10,000 miles in a given year are the most apt to be confused when confronted with a comparable scenario in the driving environment. Three factors, recent review of the *Florida Driver's Handbook* (1996), issuance of a citation for violation of the school bus stop law, and the number of miles driven by individuals in the sample, significantly affected the

responses to this scenario, as determined by the Chi-Square tests. Apparently, gender and exposure to driver safety education about the school bus stop law and various school bus signalizations had no significant effects, either positive or negative, on the responses to this scenario.

In comparison, the scenario in survey Question 5 evoked the most confusion by respondents in the sample. The scenario in Question 5 reads, “*When a school bus stops to load children, all vehicles that are required to stop must remain stopped until all of the children have boarded the school bus.*” Regarding appropriate driver action in this scenario, the *Florida Driver’s Handbook* (1996) states that, “[drivers] must remain stopped until all children are clear of the roadway and the bus signal has been withdrawn.” The *Handbook* (1996) clearly states that traffic is not allowed to proceed forward until all children are clear of the roadway and the bus signals have been withdrawn. However, 90.5 percent of the respondents are confused about when to proceed after all children that were visible to them have boarded the school bus. Although the pretest of the survey instrument did not reveal any significant difficulties associated with answering this question, the high percentage of incorrect responses to this question might have been caused by respondents misinterpreting the question’s intent. Specifically, the wording of this question may have implied that the bus signals were withdrawn simultaneously with the last student boarding the school bus. Therefore, some caution is urged when interpreting the results for this question. Based on the sample data, Asian females 65 years and older with less than a high school education whose primary language is not English and who have annual household incomes between \$10,000 and \$29,999 were most apt to exhibit confusion about when to proceed forward. These particular respondents were also most apt not to have reviewed the *Florida Driver’s Handbook* (1996) nor to have been exposed to driver safety education about the school bus stop law and various school bus signalizations prior to completing the survey for this study. Chi-Square tests revealed that age, gender, recent review of the *Florida Driver’s Handbook* (1996), and the number of miles driven in a given year affected the responses to this scenario, according to the sample data. The tests also revealed that level of formal education, repeated exposure to school buses in the driving environment, and exposure to safety information about the school bus stop law and various school bus signalizations had no bearing on the responses to the scenario contained in survey Question 5.

Other driving situations that involved stopping for school buses also evoked significant confusion on the part of sample respondents. The scenarios in survey Questions 2, 3, and 4 that required traffic to stop for school buses on multi-lane roadways divided by either painted pavement markings indicating a two-way center left-turn lane (Question 2) or some form of physical separation between travel lanes such as a concrete separator (Question 3) or an unpaved median at least five feet in width (Question 4) confused respondents regarding exactly what is the proper action on their part when confronted with a comparable situation in the driving environment. Regarding proper driver action for the scenario in Question 2, the *Florida Driver’s Handbook* (1996) states, “Painted lines or pavement markings are not considered to be barriers.” In addition, regarding proper driver action for the scenarios in Questions 3 and 4, it also states, “If the highway is divided by a raised barrier or an unpaved median at least five feet wide, you do not have to stop if you are moving in the opposite direction of the [school] bus.” Based on the sample data, about 45 percent of the respondents displayed confusion about their driving responsibilities when confronted by a stopped school bus while traveling in the opposite direction on a multi-lane roadway that has painted pavement markings indicating a two-way center left-turn lane. Further, the scenarios in survey Questions 3 and 4 indicated that 17.8 percent of the individuals in the sample are confused about whether or not to stop for a school bus that is stopped on a multi-lane roadway separated by some type of raised barrier and 39.8 percent are confused about whether or not to stop for a school bus that is stopped on a multi-

lane roadway separated by an unpaved median at least five feet wide, as specified in the *Handbook* (1996), respectively. Apparently, based on the sample data, unpaved medians that are at least five feet wide confound drivers more whether they are required to stop or not for a school bus (traveling in the opposite direction as the school bus) that has stopped to load or unload children than some type of physical separation between opposing travel lanes such as a concrete separator. Lastly, according to the Chi-Square tests, gender, ethnic heritage, the number of miles driven in a given year, and annual household income of respondents all had a significant effect on the responses to Questions 2, 3, and 4. Only region of the state did not significantly effect the responses to Questions 2, 3, and 4.

The results suggest that, in general, the knowledge of drivers in Florida regarding their responsibilities as defined in the school bus stop law is significantly lacking. The study team recommends that any program to increase the knowledge of drivers in Florida about the school bus stop law should focus on education first, enforcement second, and to a lesser degree, engineering countermeasures. A key direction for improving driver knowledge of the school bus stop law and the meaning of the various school bus signalizations is driver education. Driver education about the school bus stop law can take many forms, including Public Service Announcements (PSA) and other forms of message reinforcement including placing information in automobile license tag renewal notices and rental car contract signoffs and on billboards.

Another key avenue for improving driver knowledge of the school bus law is through enforcement. Efforts should be made to amend the school bus stop law to include tougher penalties for violation, including increased points and fines and the possibility of performing community service and/or serving jail time for repeat offenders. In addition, steps should be taken to promote the need for targeted enforcement throughout the statewide law enforcement community to include periodic "enforcement blitzes" and other enforcement strategies.

In the area of engineering, the Florida Department of Transportation should provide highway signage at areas around school bus stops that advise local traffic that school buses make frequent stops in the area and that they are required, by law, to stop for school buses.

Last, it should be stressed that the results reported in this study revealed information about what respondents indicated they would do in certain driving situations involving stopped school buses. Using the information from the sample data, there is no way to conclusively determine how respondents will actually behave when confronted with a comparable situation in the driving environment.

## **X. REFERENCES**

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