THE CHARACTERISTICS OF EXPATRIATE CHAUFFEURS AND EVALUATION OF DRIVING SCHOOLS IN SAUDI ARABIA

BY

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I dedicate this research to my mother and father who are always my supporters. Also, I dedicate this research to my wife, Suha, as without her support it would not be possible for me to do this study. Lastly, I dedicate this research to my friends Mr. Alshahrani, Mr. Aljalal, Mr. Albabtain and Mr. Alhazza.

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ABSTRACT

Full Name : Ibrahim Yousif Saleh Alsghan

Thesis Title : THE CHARACTERISTICS OF EXPATRIATE CHAUFFEURS AND EVALUATION OF DRIVING SCHOOLS IN SAUDI ARABIA

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This study is addressed to study characteristics of expatriate chauffeurs in Saudi Arabia. The study mainly focused on the Eastern Province, Makkah and Riyadh regions. The reason for selecting these three regions is that the traffic accidents in these regions account to 78.26% of the total accidents in Saudi Arabia, and it is expected that there is no difference between these regions and other parts of the country. This study aimed to study the socioeconomic characteristics of expatriate chauffeurs who are involved in traffic accidents and evaluate the effectiveness of the driving schools in enhancing the safe driving capabilities of the drivers in general and of the expatriate chauffeurs in particular. The results will lead to a better understanding of expatriate chauffeurs and suggest ways to reduce their involvement in accidents.

ملخص الرسالة

الاسم الكامل: ابراهيم يوسف صالح الصقهان

عنوان الرسالة: خصائص السائق الوافد و تقييم مدارس تعليم القيادة في المملكة العربية السعودية

التخصص: الهندسة المدنية

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يتناول هذا البحث دراسة خصائص السائقين الأجانب في المملكة العربية السعودية. البحث يركز بشكل رئيسي على المنطقة الشرقية و منطقة مكة المكرمة ومنطقة الرياض. السبب لاختيار هذه المناطق الثلاث هو أن حوادث السير في هذه المناطق تشكل إلى 78.26% من مجموع الحوادث في المملكة العربية السعودية و أفترض أنه لا تجود فروقات بين هذه المناطق و بين باقي المناطق بالمملكة. كما يهدف هذا البحث إلى دراسة الخصائص الاجتماعية والاقتصادية للسائقين الأجانب الذين يشتركون في الحوادث المرورية و أيضاً تقييم فعالية المدارس القيادة في تعزيز قدرات القيادة الآمنة للسائقين بشكل عام والسائقين المغتربين الممتهنين للقيادة على وجه الخصوص. و قد تنتج من هذه الدراسة فهم أعمق للسائقين المغتربين و من ثم اقتراح وسائل تساهم في الحد من مشاركتهم في الحوادث.

CHAPTER 1

INTRODUCTION

Globally, injuries and deaths resulting from traffic accidents are a major and growing public health problem. In Saudi Arabia, the number of traffic accidents has reached a very high and alarming level which necessitates studying this problem extensively to find all possible solutions. According to World Health Organization report (WHO, 2004), the economic cost of traffic accidents and injuries is estimated to be 1% of the gross national product (GNP) in low-income countries, 1.5% in middle-income countries, and 2% in high-income countries. The global cost is estimated to be US$ 518 billion per year. Low-income and middle-income countries account for US$ 65 billion, which is more than the amount that they receive in development support. According to this report also, WHO suggests to invest more money in preventing traffic accidents. The global study and development funding for traffic accidents is between 24 and 33 US$ million while it is between 919 and 985 US$ million for AIDS.

Expatriate drivers come from different social backgrounds. Most of the expatriate drivers are either from South Asian countries or Southeast Asian countries which are right-hand driving countries. According to some studies, foreign drivers bring their culture and practices to different environments and have high potential to be involved in accidents.

This study is addressed to study characteristics of expatriate chauffeurs in Saudi Arabia. The study mainly focused on the Eastern Province, Makkah and Riyadh regions. The reason for selecting these three regions is that the traffic accidents in these three regions which account to 78.26% of the total accidents in Saudi Arabia, and it is expected that there is no difference between these regions and other parts of the country. This study aimed to study the socioeconomic characteristics of expatriate chauffeurs who are involved in traffic accidents and evaluate the effectiveness of the driving schools in enhancing the safe driving capabilities of the drivers in general and of the expatriate chauffeurs in particular. The results will lead to a better understanding of expatriate chauffeurs and suggest ways to reduce their involvement in accidents.

CHAPTER 2

OBJECTIVES

The main objective of this study was to help reduce the traffic accidents in Saudi Arabia in general by studying the human factors of expatriate chauffeurs and their potential to be involved in accidents. The specific objectives of this study were:

1. Study the socioeconomic characteristics of drivers in general and of the expatriate chauffeurs in particular who are involved in traffic accidents.
2. Evaluate the expatriate chauffeurs in the local traffic signs and lane marks.
3. Evaluate the effectiveness of the driving schools in enhancing the safe driving capabilities of the drivers in general and of the expatriate chauffeurs in particular.

CHAPTER 3

LITERATURE REVIEW

3.1. Traffic Accidents

3.1.1. Traffic Accidents in Saudi Arabia

According to statistics from the Ministry of Health in Saudi Arabia, road accident is the most common cause of death among humans. Based on the traffic accident statistics in Kingdom (Ministry of Interior, 1432H), the number of traffic accidents in 1432 H is 544,179 accidents, the number of injuries is 39,160, and the number of deaths is 7,153. The number of accidents in Riyadh region represents 29.82%, Makkah region represents 22.21% and Eastern Province represents 26.23% of the total accidents. These three regions represent 78.26% of the total accidents in Saudi Arabia. Unfortunately, the number of traffic accidents increases every year. Figures 3-1 to 3-3 show the rapid increase in the number of traffic accidents, number of injuries and number of deaths in the last four years.

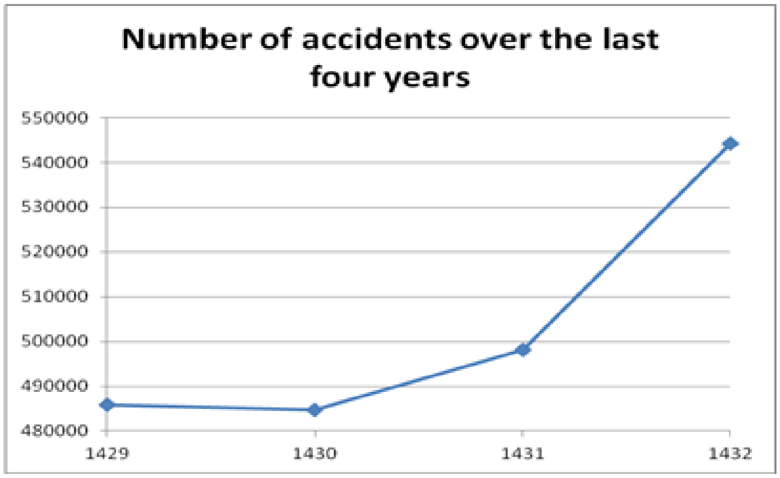

Figure 3-1: Number of accidents over the last four years (1429H-1432H)

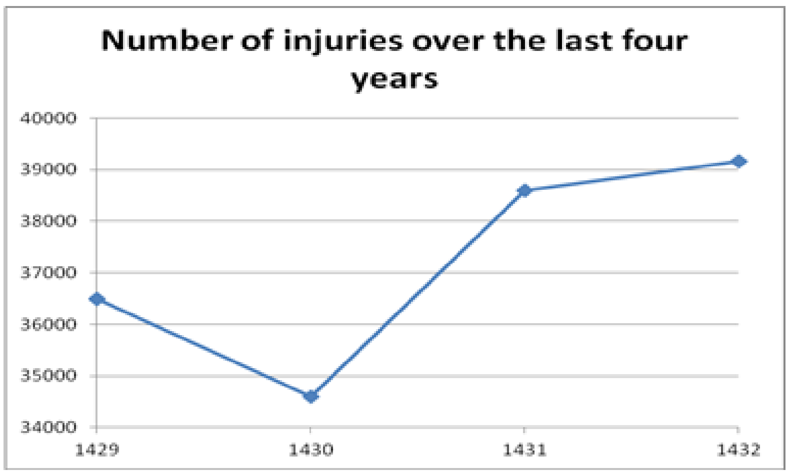

Figure 3-2: Number of injuries over the last four years (1429H-1432H)

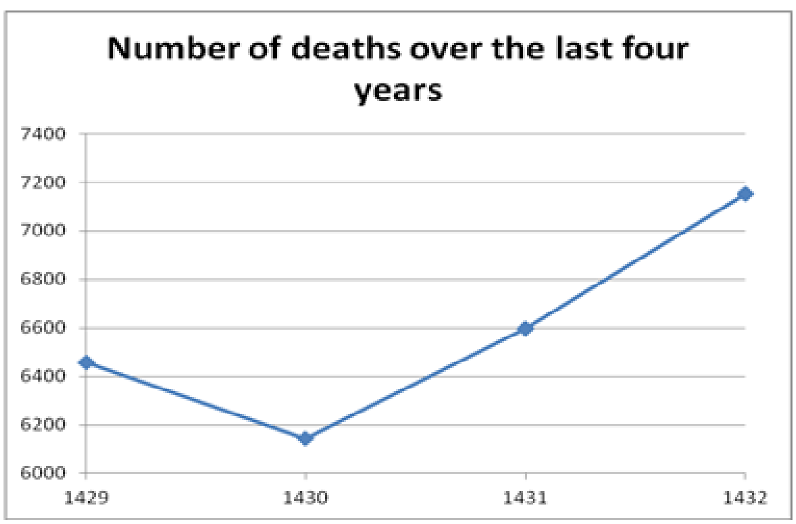

Figure 3-3: Number of deaths over the last four years (1429H-1432H)

According to traffic accident statistical study by Abuamh (1432H), it is expected that the traffic accidents will reach up to 561,070 accidents, 51,107 injuries and 11,613 deaths in 1450H. The recorded number of accidents last year (1432H), which is 544,179, is almost reaching the predicted number of accidents in 1450H which is 561,070. The accident rate in Saudi Arabia is higher than most countries of the world, such as North America, South Korea, Thailand, Singapore and Japan (Al-Ghamdi, 1420H). Although some European and North American countries have met their intermediate goals to zero death, traffic accidents in Saudi Arabia still continue to increase annually.

In a study by Al-Saif (1433H), the number of deaths in Saudi Arabia resulting from traffic accidents, which is 7153 deaths, represents 0.55% of the total deaths in the world, 2.1% in the Arab countries and 72.9% in GCC (Gulf Cooperation Council) countries. At this rate, the number of deaths per 100 traffic accidents is 1.314, 20 deaths per day or one death every one hour and fifteen minutes. The number of injuries in Saudi Arabia, which is 39,160, represents 0.1% of the total injuries in the world, 15.4% in Arab countries and 60.1 % in GCC countries (Al-Saif, 1433H). At this rate, the number of injuries per 100 traffic accidents is 7.19 or 104 per day. According to the same study, the total population in Saudi Arabia is 27.1 million and the number of vehicles is 7.4 million vehicles. This means the number of traffic accidents per hundred thousand people in Saudi Arabia is 2008 or 36.4 deaths per hundred thousand of the population.

Al-Tuwaijri (1433H) found out that traffic safety on the roads in Riyadh city has been affected by several factorsm such as increased car ownership, increased migration to Riyadh, high daily trips, high income, low cost of gasoline, drivers from different nationalities, young drivers, and population growth. The study shows also that the as the age of a saudi driver increases and the driver is a Saudi, the risk of a fatal accident increases. Also, the study found that foreign drivers are more prone to injury accidents.

According to a study which analyzed traffic accidents in Jeddah-Medina highway (Albar, 1419H), there is a relationship between the mechanical status and age of the vehicles and the probability of occurrence of traffic accidents. It was found that as the technical condition of the vehicle becomes worse, the probability of accidents increases. It was also found that as the age of the vehicle increases, the probability of accidents increases. It showed also that small vehicles are more exposed to occurrence of traffic accidents than other vehicles.

According to the traffic accident statistics in Saudi Arabia (Ministry of Interior , 1429H), the number of expatriate drivers involved in traffic accidents in 1429H is 408,789 drivers, which represents 45.3% of the total number of drivers involved in accidents. The number of traffic violations committed by foreign drivers is 3,245,348, which represents 36.2% of the total traffic violations committed in Saudi Arabia.

By comparing the above statistics with the number of driver licenses of foreigners in Saudi Arabia, which is 4,939,559 licenses and is about 55.80% of the total number of licenses in the Kingdom, and by applying the risk index for a group. The risk index is equal to the percentage of traffic accidents for the group divided by the percentage of the group in the population in Figure 3-4 (Al-Ghamdi, 1420H). The percentage of foreigners' population in Saudi Arabia is 27%. The percentage of foreigners' driver's licenses is more accurate and a better indicator of the population of the drivers in Saudi Arabia than the percentage of foreigners' population.

$$Risk\ index = \frac{\text{The percentage of traffic accidents for the group}}{\text{The percentage of the group in the population}}$$

Figure 3-4: The risk index formula

$$Risk\ index\ for\ foreigners = \frac{45.3}{55.80} = 0.81$$

$$Risk\ index\ for\ Saudis = \frac{54.7}{44.2} = 1.24$$

The risk index for foreign drivers is 0.81 while the risk index for Saudi drivers is 1.24. This means that Saudi drivers are more prone to accidents.

3.1.2. Process of Documenting Traffic Accidents in Saudi Arabia

In general, the Traffic Department in Saudi Arabia documents all traffic accidents either property damage only, injury or death. However, a new company has been introduced which is called Najem Company and is owned by 26 insurance licensed firms in Saudi Arabia (Najem Insurance Services, 2011). Najem has changed the documenting process of traffic accidents in Saudi Arabia. The company documents property only damage accidents and only if the parties involved in the accidents have insurances on their vehicles in 22 cities around the Kingdom.

The Traffic Department and Najem document accidents by using the accident sketch and data check. The traffic planning paper includes date of accident, accident planning paper number and the names of the drivers involved, their nationalities, ID numbers, place of residence, type of car, plate number, type of accident and the percentage of involvement (Ministry of Interior, 1433H). This information was not enough to find out the socioeconomic characteristics of the expatriate drivers; therefore, a questionnaire was prepared which includes more information.

3.1.3. Human Factors in Traffic Accidents

There are three causes of traffic accidents, which are human factor, road, and environment (Al-Ghamdi, 1420H). Human factor is the main cause of accidents. While it is at a rate of 60% to 80% in developing countries, it is 50% in industrialized countries (Al-Ghamdi, 1420H). The direct causes of accidents in many countries of the world are divided into two types, which are physiology and psychology (Al-Ghamdi, 1420H). Physiology is related to the senses such as sight, hearing and sense of movement and balance, and the nervous system of man. Psychological includes experience, learning and incitement of escorts or others, passion and maturity and habits (Al-Ghamdi, 1420H).

According to some studies (Al-Nafa, 1408H) approximately 85% of traffic accidents are caused by people who represent a group of psychologically and emotionally unstable which applies in some cases to foreign drivers due to the length of their absence away from their families. According to a study which analyzed psychological and social characteristics of the behavior of drivers in Saudi Arabia (Al-Nafa, 1408H), the group of drivers who have repeated accidents, are involved in accidents because of speeding, not giving priority to other vehicles, not driving within road lanes, not giving enough space between their vehicles and other vehicles, and overestimate of the physical and mechanical ability of the vehicle. This study sets some recommendations for drivers to follow in order to increase their awareness in traffic safety and reduce traffic accidents. These recommendations are:

1- Drivers must not think that they are better than other drivers.

2- There is a need for vigilance during driving.

3- Drivers must be defensive drivers, which mean that they are driving to save lives, time, and money, in spite of the conditions around them and the actions of others.

4- Drivers must have self-control and anger management.

Human factors in driving are composed of two components, which are driving skill and driving style (Türker, 2006). The definition of driving skill is "information processing and motor skills, which improve with practice and training". Driving style is defined as "the ways drivers choose to drive or habitually drive (e.g., the choice of driving speed)."

Some studies have shown that driving skills and safety skills are related to traffic violations and speeding (Lajunen, 1998b). It was found that as the driving skills increase, the number of traffic accidents, traffic violations and speeding increase. It was also found that as the safety skills increase, the number of traffic accidents, traffic violations and speeding decrease. According to Näätänen and Summala (1976), as the driving experience and level of exposure to traffic increase, the driving skills increase. In turn, it decreases the sense of risk and concern for safety aspects while driving.

According to Drummond (1989), driving task can be defined as: "collecting data from the environment, processing of these data, decision making and continuous monitoring of performance".

Smith (2001) gave a wider explanation of the driving task and split it into two categories which are:

- **Basic driving skills**: these involve the basic driving skills that the driver needs to have, such as starting, breaking, keeping the vehicle between the lines and not running over or hitting anything.

- **Safe driving skills**: these skills are needed by a learner driver to decrease the rate of accidents. These skills need high order of cognitive skills, such as perception, recognition, decision making, task initiation, and attention. The safe driving skills are as follows: search, communication, speed, space management, risk management and preparing to drive.

According to a study which analyzed the psychological and social characteristics of the behavior of drivers in Saudi Arabia (Al-Nafa, 1408H), it was found that as the age and level of educational of the driver decrease, the driving behavior of the driver becomes more dangerous and he has a high risk to be involved in accidents. The main cause of traffic accidents is the driving style which is based on driver's personality and his traffic knowledge. Also, driving behavior is gained through simulation until it becomes a habit or practice.

3.2.Drivers

In the new era of Saudi Arabia, the evolution of employing Saudi women can be noticed in various areas of life. With the continued increase in job opportunities for Saudi women and banning them from driving, they have to find ways to be transported to and from their place of work. As a result of the inability of a male family member to transport them or the lack of a male family member, recruiting expatriate chauffeurs becomes necessary to transport these women to their jobs and reach any point in the city without the need for a male family member.

According to Al-Otaibi (1423H), the factors that led to recruit expatriate chauffeurs are as follows:

1- Females are not allowed to drive a car in Saudi Arabia.
2- High income of the family as a result of women working and their participation in the family budget.
3- High standard of living of the family.
4- Society`s need for women to contribute to development.
5- Increased number of female graduates from universities in all disciplines.

3.2.1. Foreign Drivers

Foreign (expatriate) drivers come from different social backgrounds. A study shows that drivers from European countries such as Finland and Northland are safer than drivers from developed countries such as Turkey and Iran (Özkan, 2006). Most of the expatriate drivers in Saudi Arabia are either from South Asian countries or Southeastern Asian countries which are right-hand driving countries.

A study in Greece suggested that foreign drivers from the right-hand driving countries are 2.5 times more risky than the drivers from left-hand driving countries (Yannis, 2007). The same study found that Greeks have lower accident risk than all foreign drivers. The study assumed that Greek drivers are more familiar with the different difficulties of the road infrastructure, which is partly due to the diverted Greek belief and partly due to deficiencies of the road infrastructure itself. This natural adaptation helps Greek drivers to have a better reaction to accident risk (Yannis, 2007). This study also assumed that poor knowledge of the road network, lack of driving skills under unknown conditions and lack of understanding of the local traffic rules may result in increased accident rate, severity, and risk of foreign drivers.

According to a research which studied the influence of social and cultural characteristics on motor vehicle accidents (Roni, 2007), "Driving involves a high level of coordination, decision making and a certain level of skill. It includes interaction and communication between drivers and is based on trust". Possibility of drivers from different cultures, different points of view and types of behavior may increase the risk of traffic accidents. These differences in culture can be between nations or within the nation itself, such as young drivers and older drivers, income groups, education groups, and men and women. This can cause mis-communication between drivers, which can lead to conflicting decisions and increase the risk of traffic accidents.

According to a study which analyzed traffic accidents in Jeddah-Medina Highway (Albar,1419H), the percentage of foreign drivers who are involved in traffic accidents, is higher than the percentage of Saudi drivers. The study assumed the road that connects the two holy cities which are Makkah and Medina. Also, the study assumed the results of previous studies that most of the road users are not familiar with the highway and are not used to drive on the road. The study shows that the main causes of accidents are high speeding, fatigue, sleeping and not applying traffic laws.

According to some studies (Al-Nafa, 1408H), approximately 85% of traffic accidents are caused by people who represent a group of psychologically and emotionally unstable which applies in some cases to foreign drivers due to the length of their absence from their families.

Another study in Spain found the same results. It was found that the effect of driver nationality on the risk of causing a collision was notably lower for Spanish drivers than for foreign drivers (Lardelli Claret, 2002). The study found that the rate of involvement in traffic accidents of foreign drivers is 55% higher than the rate of local drivers. The British were followed by Moroccans drivers who are most foreign drivers involved in accidents. Another study explored the behavior of American drivers in Europe resulting from the different signing policies at uncontrolled intersections (Lardelli Claret, et al, 2002). It concluded that due to the different signing policies and priority rules between the United States and Europe, it was found that American drivers are likely to have more risk-taking crossing behavior.

A study in GCC by Al-Madani (2002) found that nationality showed to be significantly related to drivers' comprehension of sign. In particular, American and European drivers are better than other nationalities. When at least 10 years of experience was considered, American and European drivers scored significantly better than all the other nationalities. The study also found that less experienced American and European drivers are significantly better than Arab drivers including drivers from the Gulf countries. The study assumed that these results are possibly due to improved licensing programs of these countries, since American and European countries started their driving licensing more early compared to others.

An Australian study found that international drivers are significantly over-represented in crashes involving driver fatigue's and ‘failure to keep left’. Although not reported, a similar result was found for crashes where the police judged ‘inexperience or lack of expertise’ to be a factor (Watson, 2009).

According to a study in southeastern Finland (Levia, 1998), the rate of accidents of foreign drivers, which the majority of them are Russians, is more than the rate of local drivers. The previous studies assumed that the reasons for these results are the lack of knowledge in the regulations of traffic, different geography and climate, and lack of awareness in traffic safety.

Another study in Saudi Arabia found that the driver's language has a significant effect on the detection of traffic signs (Algadh, 1994). It showed that the detection rate of non-Arabic speaking drivers is significantly lower than that of the Arabic speaking drivers. The study assumed that inattention and lack of training are the reasons for the poor rate of detection of non-Arabic speaking drivers. This study found also that age has a significant effect on detection of traffic signs. It showed that increase in age results in decrease in driver's detection rate. According to a study which examined driving habits in Britain and India (Edensor, 2004), it was found that driving is culture-dependent.

Speeding, committing other driving violations and lack of attention constitute a more hazardous driving environment. According to a study, there is no relationship between the risk of traffic accident and self-reported errors while driving which are defined as driving mistakes such as forgetting to check the left view mirror while overtaking (Reason, 1991;West, 1991).

Lack of familiarity of road networks, and lack of full understanding of local traffic laws increase the rate and severity of accidents of foreign drivers. Many studies have shown the validity of this assumption that foreign drivers drive according to what they used to do in their countries of origin. Foreign drivers have some certain characteristics and qualities that make them the top most group among population causing accidents.

3.2.2. Chauffeurs

Chauffeurs (professional drivers) are truck driver, bus driver, taxi driver and family driver whose career is to become a driver in a vehicle for working purposes unlike the other road users because they drive for a living (Tova, 2011). They differ from non-professional drivers in many respects, such as higher annual mileage, longer working hours, and more demanding driving tasks (Tova, 2011). Professional drivers are more exposed to traffic for long hours, which may make them more exposed to fatigue and aggression (Tova, 2011). Aggressive drivers tend to choose higher speeds on city roads and are involved in a higher number of accidents than nonaggressive drivers (Tova, 2011). After many years of professional driving, drivers seem to develop higher mastery of both vehicle and road use and therefore allow themselves to take more risks. In case of accidents while working, chauffeurs have the highest rate of accidents compared to other drivers (Tova, 2011).

Work-related drivers are those who drive at least once a week for work-related purposes (Haworth et al., 2000). In France, work-related road safety and risk management have received increasing attention in recent years (Sharon, 2011). The main cause of work-related injury, death and absence in a number of countries is road crashes. Work-related vehicles create about 30% of registered vehicles in Australia and contribute up to half of the traffic stream. In France, the federal government enforces industry by-laws and regulations to establish safety managements in transportation firms. According to a research in the United Kingdom (Sharon, 2011), work-related drivers have crash frequencies above average compared to non-work-related drivers in personal vehicles.

Maycock et al. (1996) found that company car drivers reported 20% more crashes than the drivers of privately owned cars in a sample of 12,500 drivers. According to a study in Australia, work-related drivers reported higher crash involvement rates in their work vehicles than their own vehicles, even after controlling the kilometers driven (Newnam et al., 2002). According to available statistics in the United States, work-related drivers accounted for the highest number of fatal work injuries from a total of 4547 work-related fatalities, 968 were traffic accidents (Bureau of Labor Statistics, 2010).

Minibus drivers and taxi drivers tend to be more violent than private drivers. They are usually exposed to more tension and stress caused by the traffic. Because they intensively experience risky situations on the road, they get into the habit of having risks in traffic and see certain traffic situations as less risky. In turn, these chauffeurs become "desensitized" to traffic hazards and this results an increase in the frequency of speeding of taxi and minibus drivers on the highways (Tova, 2011).

3.2.2.1.Truck drivers

Truck drivers are involved excessively in a high number of traffic accidents (Tova, 2011). When traffic accidents occur in which truck drivers are involved, the traffic accidents are most often due to committing error in operating the truck which is related to the truck's physical and operational characteristics. These truck's physical and operational characteristics are size, weight, breaking distance, blind spot and turning radii (Tova, 2011).

Truck drivers frequently have health problems such as smoking, being overweight and have high blood pressure. According to a study on truck driver's fatigue, half of the drivers have a body mass index (BMI) in overweight range, which is nearly double the fatness in the common population (Tova, 2011).

The size of the truck has a big impact on the rate of involvement in accidents; a study shows that large trucks are overrepresented in a number of fatal accidents with either passenger vehicles or other vehicles. Injury claim rates of trucks which are involved in accidents are higher during the evening than the morning hours which have the lowest rate and least severe injuries (in terms of claim cost) (Tova, 2011).

There are some differences between most frequent types of accidents for light and heavy vehicles. Late breaking for stopping which represents 41.3%, lane change without enough gap which represents 21.7% and aborted lane change which represents 8% are the most frequent types of accidents for light vehicles, while lane change without enough gap which represents 26.6% and left turn without clearance which represents 13.9%, are the most frequent types of accidents for heavy vehicles (Tova, 2011).

Speeding is the most aberrant driving behavior of truck drivers, which leads them to be involved in accidents. The two most frequent errors associated with truck drivers are hitting objects or someone while reversing that could not been seen previously due to the blind spots of truck drivers and almost hitting a cyclist coming up on turning left. Failure to detect rules of intersections and changing lanes with incorrect maneuvers are the most common causes of accidents between trucks and other vehicles (Tova, 2011).

3.2.2.2.Bus drivers

Bus drivers are driving under a heavy psychosocial demand because they have to be on time, drive safely and do their job professionally. The main cause of traffic accidents of buses is human errors and not necessarily because of violation of laws. The human errors which are committed by bus drivers involved in accidents are misjudgment, distraction and rush (Tova, 2011).

The risk of bus drivers being involved in accidents is correlated to driver's age, driving experience, previous accidents and their severity, working conditions, and type of bus (minibus, school bus, charter bus, light or public bus) (Tova, 2011).

3.2.2.3.Taxi drivers

Because of many risks involved, taxi driving is the most dangerous profession. These risks are physical, environmental and health-related risks. Taxi drivers are victims of nonsexual robbery at higher rate than the average community .They tend to drive in extreme speed and change lanes carelessly due to their high risk personalities. When taxi drivers are carrying passengers, they are less prone to accidents than they drive without passengers. The study assumed that taxi drivers tend to speed up and drive at risk because they try to rush to a waiting passenger for pickup (Tova, 2011).

Driving at night shift makes taxi drivers highly prone to accidents than driving at morning shift. The familiarity of area for taxi drivers has a big role in involvement in accidents. The studies show that the less taxi drivers are familiar with the area, the more they are at high risk. Another study shows that GPS devices are not making the taxi drivers more efficient but it reduces their stress (Tova, 2011).

According to a study on taxi drivers' accidents in Canada (Urs Maag, 1997), the average accident per taxi driver per year is 0.252 while the average accident per all drivers per year is 0.07. According to an international research, taxi drivers represent a high safety risk on the road (Boufous and Williamson, 2009).

In Saudi Arabia from 1408 AH to 1413 AH (Al-Ghamdi, 1420H), the number of taxi companies increased at the rate of 170% from 125 to 327 company. But, the taxi services have a negative impact on traffic safety. According to a study conducted on 314 accidents involving taxis, the rate of taxi involvement in fatal accidents is two times higher than the rate of private vehicles and the rate of taxi involvement in property damage only accidents is four times higher than the rate of private vehicles. The study assumed it is due to a lack of traffic awareness of expatriate drivers.

3.2.2.4.Family chauffeurs

In Saudi Arabia, there are a huge number of expatriate family drivers and they represent a great percentage of the total population in Saudi Arabia because women are banned to drive in the Kingdom. This phenomenon is unique in the world. There has not been any international research about expatriate chauffeurs. Researches are either about foreign drivers or professional drivers. The only research conducted is a local research which studied the expatriate chauffeurs arrested in the Traffic Department in Riyadh (Al-Otaibi, 1423H). It studied the relationships between the rate of involvement in accidents and traffic violations and their characteristics. It was found that:

- 90.7% of expatriate chauffeurs admitted that the difference in traffic pattern between their home countries and Saudi Arabia led them to get involved in accidents and traffic violations.
- The study found also that expatriate chauffeurs face some difficulty in driving on bridges and in tunnels, which increase their potential to be involved in accidents.
- The study found a relationship between supervising the driver during trips by family members, regardless of who is the supervisor from the member of the family, and the number of accidents and traffic violations. It shows that as the degree of supervision increases, the rate of involvement in accidents increases because it increases stress on the chauffeur which in turn makes him loss control of the vehicle. Chauffeurs are involved in a higher rate of accidents if they are being supervised by family members.

- The study found that drivers who have committed traffic violations are mostly not satisfied with their salary and there is a direct correlation between satisfaction with the salary received and the rate of accidents and traffic violations.
- The study found that as the number of passengers being transported daily by chauffeur increase, the rate of involvement in accidents increases.
- The study found a relationship between firm employers and chauffeurs' degree of involvement in accidents. It was found that the chauffeurs, whose employers are firm, were involved in lower rate of accidents than chauffeurs whose employers are fair with them.
- The study found that drivers, whose violations were deducted from their salaries, had lower rate of involvement in accidents and violations. The reason for this is that deducting the violations from salary of the chauffeurs makes them more careful and to give more attention to accident risks.
- The study found that chauffeur's experience in his home country is correlated with the rate of involvement in accidents and violations. As the chauffeur's experience in his home country increases, the rate of involvement in accidents decreases.
- It found that the chauffeurs who got their license in Saudi Arabia have higher rate of involvement in accidents and violations than the chauffeurs who got their license in their home country.
- The study found that there is a relationship between the size of the vehicle and rate of involvement in accidents. As the size of the vehicle increases, the vehicle becomes more difficult to be controlled and in turn increases the rate of involvement in accidents.

- The study found that the chauffeurs, who face difficulties in driving vehicles with tanned windows, are more prone to accidents and traffic violations and vice versa.
- The drivers, who face some difficulty in controlling the vehicle because of the driving behavior of other drivers, are more prone to accidents and traffic violations.

3.3. Driving Schools

3.3.1. Introduction

Motor vehicles were introduced in the early 20th century (Daniel, 2012). Driver education in the early stage was only the basic instructions that the new owners needed to use their vehicles (Daniel, 2012). The first driver license was issued in 1899 in Chicago to operate a steam engine vehicle (Daniel, 2012). In the early stage of driving licensing, there was no basic fundamental of education to be based on to educate and license drivers. It was only a source of revenue and means to identify drivers (Daniel, 2012). Due to the increased number of traffic accidents, driver education became as society-regulated activity that has possibilities to increase traffic safety (Esko, 2011). Nowadays, driving education becomes more formal and is offered by professional driving schools. Driver education includes in-class training and in-vehicle training (Esko, 2011).

A study on the driving school in Dammam found that age has no statistical impact on how much knowledge the student gains from the driving school (Ratrout, 1997). Also, it was found that driving school has a significant impact on improving the knowledge of the student on traffic rules and traffic signs, but its impact on improving driving skills is limited (Ratrout, 1997). The same study also found that the younger age group (less than 22 years old) did not demonstrate statistically significant benefit from this school (Ratrout, 1997).

According to a study on driving school in Saudi Arabia, driving schools should address the wrong behavioral habits of drivers in order to raise awareness of these drivers and ensure that they do not repeat these behavioral habits (Al-Saif, 1414H).

According to a study of the Driving Schools Programs and their role in raising traffic awareness in Saudi Arabia (Al-Hazza, 1425H), it was found that there are some errors in these programs because these programs do not affect the behavior of drivers in order to improve their defensive driving and not to commit driving mistakes which lead them to be involved in accidents. This explains the occurrence of some accidents to drivers who have studied and graduated from the driving schools. The study concluded that although driving schools are designed on the right basis, it failed to increase traffic awareness because of the lack of objectives in these programs and the need for preliminary studies. Also, the study found that increasing the level of attention of the drivers will reduce the risk of involvement in accidents.

3.3.2. Types of Driving Education

Driving licensing system is varied from country to country. These differences are in licensing age, required education, curriculum, single- or multiphase education, professional and nonprofessional education. The different driving licensing systems are as follows (Esko, 2011):

3.3.2.1. Driving School System

It is the system which is used here in Saudi Arabia and in Europe for professional drivers. It is required for all the pre-drivers by enrolling in driving schools which provide professional driver education (Esko, 2011). The main concept of this system is that the professional trainer provides efficiently the knowledge and skills needed for driving a vehicle, and the theory and practical training (Esko, 2011). Professional training is for a short training period. It ranges from one week to months. Education is controlled by the authorities and organized according to a syllabus (Esko, 2011).

3.3.2.2. Graduate Driver Licensing

The main idea of Graduate Driver Licensing (GDL) is to provide the pre-drivers with experience while driving in a safe controlled environment (Esko, 2011). This system is designed to allow a learner driver to drive under supervision with restrictions that limit and control known high-risk practices (Allan, 2010). Another idea of it is to increase the age of a newly full licensed driver by making the learning period longer. The first country which introduced GDL was New Zealand in 1987 (Bridie, 2011). It was introduced in USA in mid-1990s as a replacement of the system that allows full privilege-driving easily (Allan, 2010).

The concept of GDL is to control and restrict some parameters which increase rate of involvement in traffic accidents. These parameters are:

- **Driving alone:**

According to some researches which were based on data collection before implementing GDL (McCartt, 2003; Mathew, 2003), the first month of independent driving is extremely a high-risk period. This high risk drops after several months of driving.

- **Driving during night period:**

A study proved the need for night restriction for reducing the risk of fatal accidents for a new driver (McCartt, 2011). Also, it was found that each additional hour of night restriction reduced the fatal crash rate. According to a previous study, when nighttime restrictions started at 9 p.m., the traffic accidents reduced by 18% compared with no nighttime restriction. Whereas, when the night restrictions started at 1 a.m., traffic accidents reduced by 9% compared with no restrictions.

According to a study which reviewed 27 evaluations on GDL system (Shope, 2007), GDL reduced accident involvement by 20 to 40%. The reasons for this reduction are:

- When the drivers feel that they are independent and have grown up and they want to satisfy their motives, they start to test their abilities, for example, by speeding. But, GDL reduces the motives at the beginning of solo driving by a set of some restrictions.
- Age of new drivers after licensing and experience is higher than that of the drivers who graduated from other systems.

Since 1st of July 2007, some modifications have been made to the GDL program in Australia (Bridie, 2011). These modifications were mainly on the restrictions at the learner licensing period. Previously, the restrictions were:

- Minimum age is 16.5 years.
- The license must be held at least 6 months.
- Zero alcohol limit if under 25 years of age.
- Must display L plates on the vehicle.
- Must drive under the direction of a person who holds or has held an open driving license for that class of vehicle for at least 1 year.

Now, the restrictions are:

- Minimum age is 16 years.
- The license must be held at least 12 months.
- Zero alcohol limit if under 25 years of age.
- Must display L plates on the vehicle.
- Must drive under the direction of a person who holds or has held an open driving license for that class of vehicle for at least 1 year.
- Including 10 hours of driving at night, 100 hours of certified supervised driving experience must be recorded in a logbook.
- Use of mobile phones is not allowed at any form.
- Passengers are not allowed to use mobile phones on loud-speaker.

GDL is a method for improving the skills of drivers by increasing the amount of training. But the amount of training is not related to the quality of the training. According to some research which studied the principle of spaced training versus massed training, learning results are better when the practice is spaced. Doing training over a longer period enables better processing and gaining of experience (Esko, 2011).

3.3.2.3. Lay instruction

Lay instruction (nonprofessional instruction) is a system wherein the role of a professional instructor is to teach the basics of driving skills and the lay instructors go along with the students while driving. Lay instructors are responsible for preparing and training the pre-drivers for the driving test. This system is widely used in Sweden, Norway, Germany, Austria, UK and France. The role of the professional instructor is varied from country to country (Esko, 2011).

In the beginning of the lay instruction system, the concept was the pre-drivers learn from the professional instructors to provide them with the knowledge of risks caused by them or the traffic. Some countries have started extending the learning period by allowing the leaner to start early at the age of 16 years, but it does not have the same concept of GDL. Training environment has a big role in effecting the learning and what kind of skills the pre-drivers learn. Practicing driving in urban areas makes the pre-drivers feel more comfortable and easier. In France, Sweden and Finland, learners are also allowed to drive in rural roads (Esko, 2011).

The disadvantage of this system is what kind of environment the pre-drivers practice in. If the pre-drivers do not have experience in difficult conditions such as night time, rush hour and when raining, the learners will not get enough experience to gain skills. It may happen that the lay instructors might avoid challenging situations for their own safety.

3.3.3. Driving Education in Saudi Arabia

3.3.3.1. Introduction

Driving schools in Saudi Arabia are operated by the private sector under the supervision of traffic departments (Ministry of Interior, 1403H). According to the regulations of the driving schools in Saudi Arabia, the school must be equipped with training field, at least there kinds of training vehicles of different sizes, driving simulator for training purposes, the manager of the school should be a Saudi and instructors should be qualified from certified scientific institutes with experience of at least one year. According to the regulations, the practical test should be conducted outside the school (Ministry of Interior, 1403H).

3.3.3.2. The Processes in Obtaining a License for a Foreign Driver

The processes in obtaining a license for a foreign driver are as follows:

- If the driver has a license from western countries or GCC, he can exchange his license with a Saudi license.

- If the driver has a license from his country, he will take the practical test and written test through one of the options available in the eleven languages which are Arabic, English, Indian, Indian Kerala, Bengali, Turkish, Urdu, Sri Lanka Tamil, Sri Lanka Sinhalese, Filipino and Indonesia. If he passes it, he will be given a license. But if he fails, he has to study in the school for a period ranging between one week and one month.
- If the driver does not have a license, he has to study in the school for a period ranging between one week and one month. Then he will take the vision, written and practical tests.

The students are required to pass the vision, written and practical tests to obtain a driving license. The written test is on traffic rules, road signs, and principles of traffic safety. The practical driving test gives the student the opportunity to prove his ability to drive safely with the traffic officer. When the student needs to take the written test, he can take this test in any of the eleven languages. The practical test is conducted inside the driving school.

3.3.3.3. Driving Manual

After visiting the driving school in Al-Khobar, some points have been noticed. The driver's manual is issued in many languages. This manual is issued by the National Committee for Traffic Safety, King Abdul-Aziz City for Science and Technology. The traffic signs manual is issued in eleven languages which are Arabic, English, Indian, Indian Kerala, Bengali, Turkish, Urdu, Sri Lanka Tamil, Sri Lanka Sinhalese, Filipino and Indonesia.

CHAPTER 4

METHODOLOGY

In order to study the characteristics of expatriate chauffeurs and to judge whether expatriate chauffeurs in Saudi Arabia are dangerous or not, the work was divided into two steps. The first step was data collection. In this step, traffic accidents data were collected in three major regions which are Eastern Province, Riyadh and Jeddah regions. For driving schools data collection, surveys were done in three major regions, which are Eastern Province, Riyadh and Jeddah regions, selecting randomly pre-drivers before enrollment to driving schools and another random group was tested after graduation. The second step was analyzing the collected data. The collected data were statistically analyzed by setting several hypotheses. These hypotheses were based on the characteristics of the drivers in general and chauffeurs in particular who were involved in traffic accidents. Also, they were based on finding whether the driving schools were efficient or not in providing knowledge and skills to pre-drivers.

4.1. First Step: Data Collection

The data collection was divided into two parts. The first part was accident data collection. In this part, a questionnaire was designed to study the characteristics of the drivers who were involved in traffic accidents. The second part was the driving schools investigation. According to previous studies, the driving schools in Saudi Arabia are not efficient. So, to make the right judgment, a knowledge test questionnaire was made to test the performance of the driving schools in delivering knowledge to the drivers. This test was done by measuring the traffic knowledge of the drivers before enrollment and after graduation from the driving schools.

4.1.1. First Part: Traffic Accident Data Collection

4.1.1.1.Introduction

The information contained in the Traffic Department and Najem Company documents were not enough to study the characteristics of expatriate chauffeurs. The questionnaire was designed in eleven different languages. These languages are Arabic, Bengali, Chinese, English, Filipino Indian, Turkish, Urdu, Indonesian, Tamil, and Malayalam. Each driver involved in traffic accidents was asked to fill the questionnaire (See Appendix for the Arabic and English versions of the questionnaire). The next sections will discuss the methodology which was used to collect traffic accidents data.

4.1.1.2. The Questionnaire

4.1.1.2.1. Introduction

Data collection was conducted in cooperation with the Traffic Department and Najem Company simultaneously. In the traffic department, the data collection was conducted in the accident subdivision. While the drivers involved in traffic accidents were arriving at the traffic department to get the decision on their responsibility in the traffic accidents, the surveyor was questioning the drivers and at the same time giving them the questionnaire. In Najem Company, the surveyor was with the Najem employee who documented the traffic accidents in the sites of the accidents. While the Najem employee was documenting the traffic accidents, the surveyor was questioning the drivers involved in traffic accidents and at the same time giving them the questionnaire. These surveys were conducted in the traffic departments and Najem Company simultaneously on all drivers involved in traffic accidents until the number of accidents reached the sample size of the experiment (see section 4.1.1.4). The questionnaire has three sections, which were designed to link the characteristics of the drivers to their degree of involvement in traffic accidents. These three sections are giving below

4.1.1.2.2. General Information and Accident Information

In this section (see Appendix), the driver was asked to provide general information about his name, nationality, age, ID number, address and phone number. Also, the driver was asked to provide accident information, such as date of accident, location and type of accident (property damage only, minor injury, serious injury, death or disability), percentage of the responsibility of the driver in the accident, cause of the traffic accident (human factor, road, vehicle or other) and type of the vehicle (sedan, minibus, bus, light truck or heavy vehicle). These questions are required to all drivers involved in traffic accidents.

4.1.1.2.3. Chauffeurs Information

Questions about chauffeurs information were required only to chauffeurs (see Appendix). These information include years of experience as a driver outside Saudi Arabia, years of experience as a driver inside Saudi Arabia, where the driver got his first license from, if the driver got his license from Saudi Arabia, to what extent did he benefit from the driving school, how far is the driver`s residence from his workplace, how many kilometers the driver drives approximately per day, how many hours the driver spends in driving per day, does the driver read and understand traffic signs written in Arabic and English language, what kind of driver he is: taxi driver, family driver, company driver, government driver or other, is the driver satisfied with his work, and is his salary commensurate to his work hours.

4.1.1.2.4. Traffic Sign Knowledge Test

Traffic sign knowledge is required only from chauffeurs (see Appendix). Traffic sign knowledge test has five questions about famous traffic signs in Saudi Arabia. These traffic signs are speed limit, no entry, no overtaking, stop, and roundabout.

4.1.1.3. Locations of Surveys

The surveys were conducted in the three main regions of Saudi Arabia which are as follow:

4.1.1.3.1. Eastern region

In eastern region, the survey was held in Dammam Municipality zone which includes Dammam, Khobar, Qatif and Dhahran. The survey was conducted in each traffic department and in each Najem Company branch located in the above cities, at the same time for four days .

4.1.1.3.2. Riyadh region

In Riyadh region, the surveys were conducted in Riyadh city. In Riyadh, there are four traffic departments. The main traffic department is Nasiriya traffic department, which covers about one-third of Riyadh area, and three small traffic departments which are eastern, northern and western traffic departments. The eastern traffic department is the second largest traffic department in Riyadh. So, the surveys were conducted in Nasiriya and eastern traffic departments. Najem Company in Riyadh has only one branch which covers all the areas in Riyadh. The surveys in Riyadh were done in seven days.

4.1.1.3.3. Makkah region

In Makkah region, the surveys were conducted in Jeddah city. Najem Company covers only 60% of the total area of Jeddah. It does not cover the old Jeddah and south of Jeddah areas. To overcome this problem and to ensure a wide range of study, the surveys were conducted in three traffic departments which are eastern, western and central traffic departments. So, the surveys were conducted in the above three traffic departments and in Najem Company.

4.1.1.4. Sample Size of traffic accidents

The sample size was based on the assumption that 50% of the parties involved in traffic accidents during a year are expatriate chauffeurs because there is no statistical information about the number of expatriate chauffeurs involved in traffic accidents and to get the maximum sample size. So, p = q = 0.5, where the degree of confidence was 95% and the allowable error was ±2.5%. This gave the largest sample size.

$$\boldsymbol{N = q * p * \left(\frac{Z_{\alpha/2}}{d}\right)}$$

Figure 4-1: The formula of the sample size for the traffic accidents data collection (Douglas, 2009)

So, N = 0.5 * 0.5 * $(1.96/0.025)^2$ = 1536

Thus, examining 1536 traffic accidents will estimate the percentage of expatriate chauffeurs with percentage of error ±2.5% at 95% confidence. Since the chauffeurs were interviewed for more information, more accident data (chauffeur information) was needed. The questionnaire includes 22 questions, each of which consists of four possible answers. To ensure that there were enough answers for each possible answer, and assuming that for all possible answers have equal probability of being selected by any chauffeurs, the accidents data were increased by 22 questions * 4 possible answers = 88 accident data. To be more conservative, it was decided to collect five data points for each possible answer of every question. So, the total data point is 88*5 = 440. Thus, the total sample size was decided to be 2000 accidents which is 1536+440 = 1976 rounded to 2000 accidents. The sample size was divided according to the density of the population. The sample size for Dammam municipality is 320 accidents, Jeddah city is 680 accidents, and Riyadh city is 1000 accidents.

4.1.2. Second Part: Driving School Investigation

4.1.2.1. Introduction

In order to evaluate the driving schools on a scientific analysis basis, the guidelines for evaluating the driving school program manual were used to set up the procedures for the evaluation of driving schools (Clinton, 2006). According to these procedures, a knowledge test was prepared which was explained next.

4.1.2.2. Evaluation and questionnaire

In this study, the evaluation was focused on the subgroups who are the expatriate chauffeurs. It was a summative second level evaluation on all drivers. It was based on qualitative method and on knowing the mean difference of knowledge for drivers before enrollment and after graduation and how effective is the driving schools. As the test was directly based on the knowledge areas of the program's curriculum, a questionnaire was prepared and divided into six areas subjects (see Appendix). These areas are:

- Driver's characteristics, such as nationality, native language, age, years of experience as a driver outside Saudi Arabia, level of education, does he read and understand traffic signs written in Arabic and English language?, and what type of driver is he?
- Knowledge based on the curriculum of the Saudi driving manual.
- Traffic signs.
- Knowledge based on the curriculum of the California driving manual.
- Right of way at signalized intersection: a picture of the top view of signalized intersection was presented in the questionnaire and the student was asked about the right of way for five lanes at the intersection.
- Satisfaction of the driver about the driving school.

Then, the knowledge test was graded for one score for each question. The total number of questions in the test was thirty questions.

4.1.2.3. Sample size

Initial sample was taken, and its mean and stander division were found. The mean of the scores before enrollment ($\mu 2$) = 17.44 the mean of the scores after graduation $\mu 1$ = 16.44 and the stander division (δ) = 5. It was based on assumption that the significance level (α) = 0.05, $Z\alpha/2$ = 1.645, and by using following formula in figure 4-2.

$$N1=\left(\frac{Z_{\alpha/2}\times\sigma}{(\mu_2-\mu_{1)}}\right)^2$$

$$= 67.65$$

$$\approx 68$$

Figure 4-2: The formula of the sample size for the driving schools data collection (Douglas, 2009)

Thus, examining 68 drivers will examine the means for one driving school with percentage of error ±2.5% at 95% confidence. Since the drivers were interviewed before and after graduation from driving school for five different driving schools. Thus, the total sample size was decided to be 680 drivers which is 68*2*5 = 680. So, 68 drivers where selected randomly and tested before enrollment to the driving schools. 68 graduates where selected randomly and tested for each driving school.

4.1.2.4. Locations of the survey

The surveys were conducted in three regions. In eastern region, the surveys were conducted in Dammam, Khobar and Jubail. In Riyadh region, the surveys were conducted in northern Riyadh driving school. In Makkah region, the surveys were conducted in Dalah driving school in Jeddah city.

4.2. Second Step: Processing and Analysis of the Data

4.2.1. Introduction

After obtaining the data from the questionnaires on traffic accidents and the questionnaires on evaluation of driving schools, these data were verified, validated and coded. Then, they were entered into the database by using Excel. The data were analyzed statistically using the Minitab statistical package. The collected data were analyzed statistically by setting up several hypotheses. These hypotheses were based on the characteristics of the drivers in general and chauffeurs in particular who were involved in traffic accidents. Also, another set of hypotheses was based on finding whether the driving school is efficient in providing knowledge and skills to the drivers.

4.2.2. Methodology for Analyzing Traffic Accidents

As mentioned previously, the surveys were conducted on the drivers who were involved in traffic accidents, based on the prepared questionnaire. The questionnaire was analyzed based on some hypotheses. These hypotheses are testing relationship between some variables and percentage of the responsibility of the driver in the accident by using a contingency table. These variables are nationality, age, type of accident, cause of traffic accident, type of vehicle, number of years of experience inside and outside Saudi Arabia, number of drivers who got first driving license from Saudi Arabia, benefit from the driving school, distance of residence from workplace, kilometer of driving per day, hour of driving per day, understanding traffic signs in Arabic and English languages, type of driver, satisfaction with salary, and total scores in traffic sign test.

In case the hypothesis of relationship is rejected, the variable level and percentage of involvement in traffic accidents were dependent on each other. These hypotheses were rejected if the value of χ^2 calculated is greater than $\chi^2_{\alpha,v}$, where $\alpha = 0.1$ and v = degree of freedom or the P-value is less than 0.1. Also, the contribution to chi-square for each cell was checked to find which variable level has the biggest contribution to the percentage of involvement in traffic accidents.

The analysis was done in two groups. The first group is the expatriate chauffeurs who were involved in traffic accidents. The second group refers to all the drivers involved in traffic accidents.

4.2.3. Methodology for Analyzing Driving Schools

The traffic knowledge test was taken by randomly selecting sixty students before enrollment to driving schools and another sixty after graduation in each driving school. The tests were scored. The hypotheses were based on the scores of the drivers. These hypotheses are given below

4.2.3.1. Testing if there is a difference in the mean scores before enrollment and after graduation from driving schools

This test was used to check the effectiveness of the performance of the driving schools in delivering traffic knowledge by using a two sample t-test. The hypotheses were based on the assumption that the mean scores before enrollment to driving schools are equal to the mean scores after graduation. Also, it was based on the assumption that the variance is not known.

4.2.3.2. Testing the relationship between mean scores and the level of some variables

This test was used to study the relationship between the mean scores of pre-drivers before enrollment to driving schools and pre-drivers after graduation, and the level of some variables of interest. These variables are nationality, native language, age, years of experience, level of education, reading and understanding traffic signs written in Arabic and English languages, and type of driver he is.

Multiple comparisons were done to compare each level of the variables by using the Tukey method. This method provides grouping information. Grouping information tables are based on the confidence intervals and summarize the significant and non-significant comparisons for each selected multiple comparison method. The table contains columns of letters that group the factor levels. Levels that share a letter are not significantly different. The means are significantly different if they do not share the same letter. This testing was done for drivers before enrollment and after graduation from each driving school.

4.3. Limitations of Surveys

Most important limitations (problems) faced by the research team during surveys were logistical problems and coordination beyond the control of the team. These limitations are as follows:

- **Lack of cooperation:** Some Saudi citizens, especially the elderly, were not cooperating with the research team. This problem was solved by cooperating with the traffic man which was agreed upon by the traffic departments. The traffic man, who was responsible for documenting accidents, clarified to the drivers involved in accidents the importance of the research. If the driver insisted not to cooperate, information was taken from the traffic department.
- **The questionnaires were only in Arabic:** At the beginning of the survey, it was noticed that there was a significant proportion of nationalities other than Arabic speaking drivers. So, the questionnaire was translated to ten languages: Bengali, Chinese, English, Filipino, Indian, Turkish, Urdu, Indonesian, Tamil and Malayalam.

- **Lack of surveyors:** There was difficulty in providing a sufficient number of surveyors to cover all the traffic accidents at the traffic departments and Najem Company in each zone simultaneously. Another problem was switching shifts between surveyors because the shifts were twenty-four hours. To overcome this problem, a number of supervisors were added and their mission was to monitor the distribution of the surveyors and shifts switching. Also, an additional number of students were on standby to cover any emergency situation during the process of collecting data.
- **Injuries and deadly accidents:** Injuries and deadly accidents were not fully documented on the same day of the accidents, and the processes of documenting such accidents took from days to weeks. Once these types of accidents happened, the injured and the dead were taken to the hospital directly. Then, the injured were investigated once they recovered. Due to this, it was difficult for the research team to ask the drivers. Instead, the research team was allowed to look into the traffic accident documentations. In the traffic accident documentations, it was noticed that injuries and deadly accidents contribute to about eight to ten percent of the total accidents in eastern, Riyadh and Makkah regions. So, the research team documented the traffic accidents which were documented by the traffic departments. Also from the traffic accident documentations, it was noticed that the number of accidents collected is less than the actual number of accidents documented during the survey periods. Therefore, the sample size of the injuries and deadly accidents is a proportion of the actual number of injuries and deadly accidents and the number of accidents collected to the actual number of traffic accidents.

CHAPTER 5

RESULTS AND DISCUSSION

In this section, the results of analyzing the questionnaire given to the drivers involved in traffic accidents are shown. In addition, the results of analyzing the collected data from driving schools are also shown. The first subsection shows the results of analyzing the questionnaire to the drivers involved in traffic accidents. The second subsection shows the results of analyzing the questionnaire given to the drivers who enrolled and graduated from the driving schools.

5.1. Analyzing Traffic Accidents Data

As mentioned previously in the methodology, a questionnaire was given to the drivers who were involved in traffic accidents. The questionnaires were analyzed descriptively and analytically based on some hypotheses. These hypotheses are testing relationship between some variables and involvement of the drivers in traffic accidents by using a contingency table. The analyses were done in two groups. The first group is for all the drivers involved in traffic accidents while the second group is for the chauffeurs involved in traffic accidents.

5.1.1. Descriptive Analysis of Traffic Accidents Data

In this subsection, the questions in the questionnaire were analyzed descriptively. The analysis was done in two groups. The first group is for all the drivers who were involved in traffic accidents. The second group is for the chauffeurs who were involved in traffic accidents.

5.1.1.1. All Drivers who were Involved in Traffic Accidents

As mentioned previously, this subsection is the descriptive analysis of all the drivers in all selected cities who were involved in traffic accidents. The descriptive analysis of the questions which were asked is as follows:

1- The location of the accident

The purpose of this analysis was to find the number and percentage of drivers who were involved in traffic accidents in each city. The results of the analysis are shown in Table 5-1 and Figure 5-1.

Table 5-1: The number and percentage of drivers in each city

City	Number	Percentage
Khobar	554	16.04
Dammam	317	9.18
Qatif	98	2.84
Dhahran	114	3.30
Riyadh	1473	42.65
Jeddah	883	25.56
Missing	15	0.43
Total	3454	100

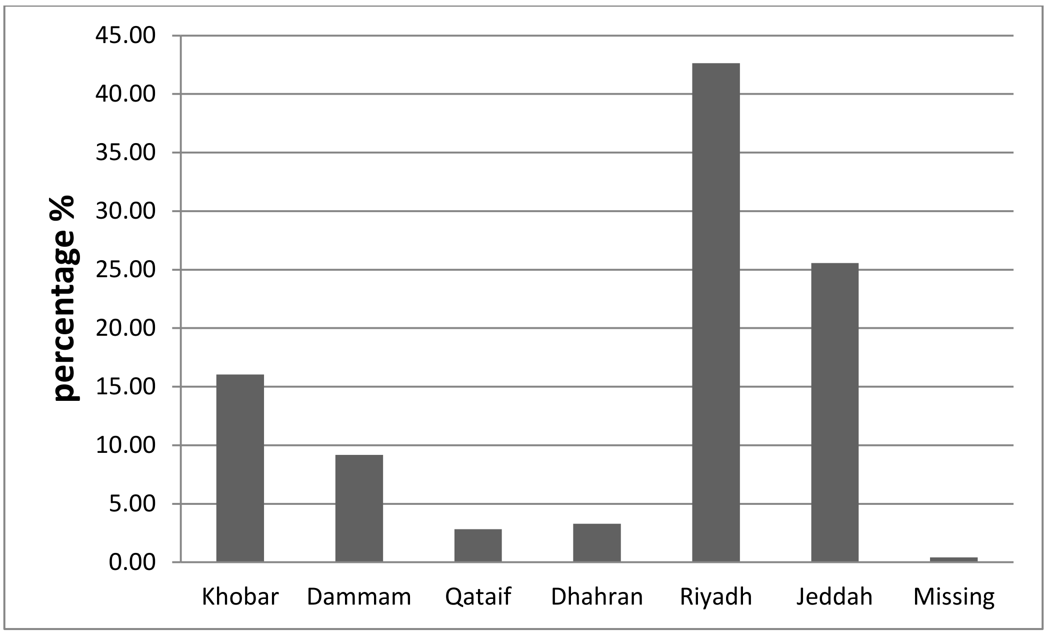

Figure 5-1: The percentage of drivers in each city

2- Nationality of the driver

The purpose of this analysis was to find the number and percentage of the drivers who were involved in traffic accidents per nationality. The results of the analysis are shown in Table 5-2 and Figure 5-2.

Table 5-2: The number and percentage of the nationality of the drivers

Nationality	Number	Percentage
Saudi	1393	40.33
GCC	6	0.17
Arabian	904	26.17
Indian	329	9.53
Pakistani	424	12.28
Bengali	125	3.62
Afghan	16	0.46
Indonesian	28	0.81
Filipino	58	1.68
Nepalese	21	0.61
Other	101	2.92
Missing	49	1.42
Total	3454	100

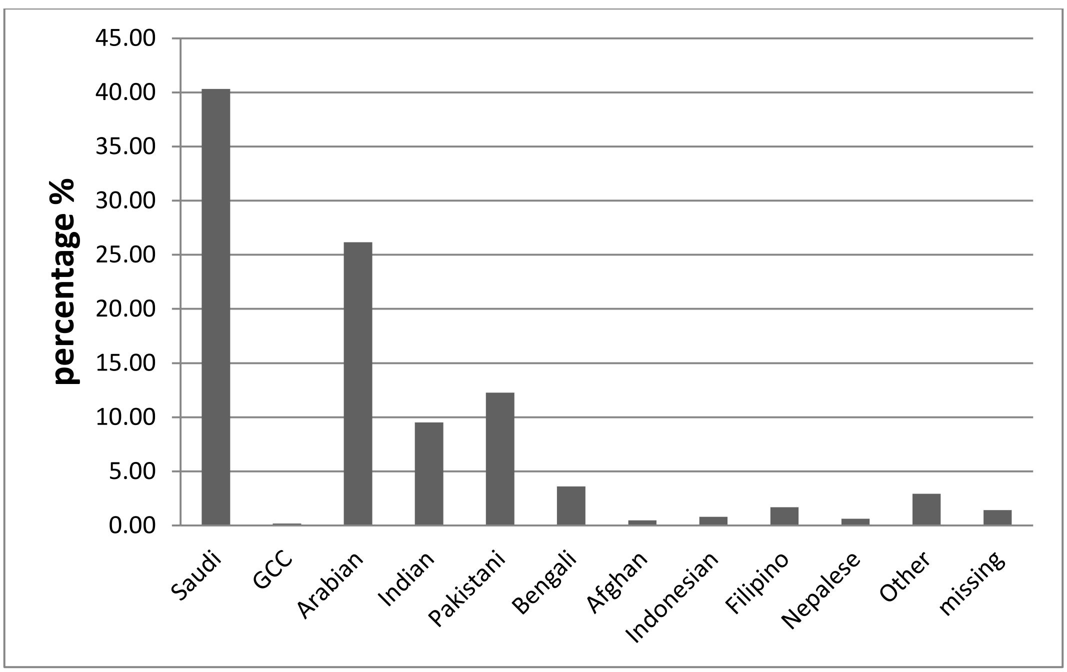

Figure 5-2: The percentage of nationality of the drivers

3- Type of accident

The purpose of this analysis was to find the number and percentage of traffic accidents per its type. The results of the analysis are shown in Table 5-3 and Figure 5-3.

Table 5-3: The number and the percentage of traffic accidents per its type

Type of Accident	Number	Percentage
Property Damage Only	3292	95.31
Minor Injuries	141	4.08
Major Injuries	18	0.52
Deaths	3	0.09
Missing	0	0.00
Total	3454	100

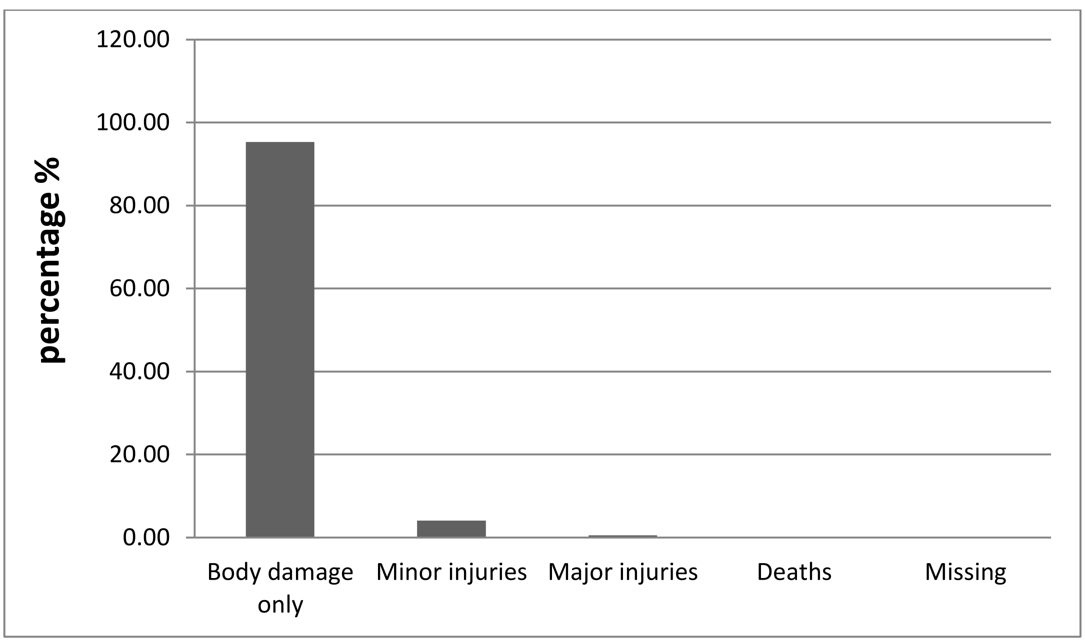

Figure 5-3: The percentage of traffic accidents per its type

4- The main cause of accidents

The purpose of this analysis was to find the number and percentage of traffic accidents per its main cause. The results of the analysis are shown in Table 5-4 and Figure 5-4.

Table 5-4: The number and percentage of traffic accidents per its main cause

Main cause of the accidents	Number	Percentage
Human factor	2604	75.39
Vehicle	660	19.11
Road	109	3.16
Other	58	1.68
Missing	23	0.67
Total	3454	100

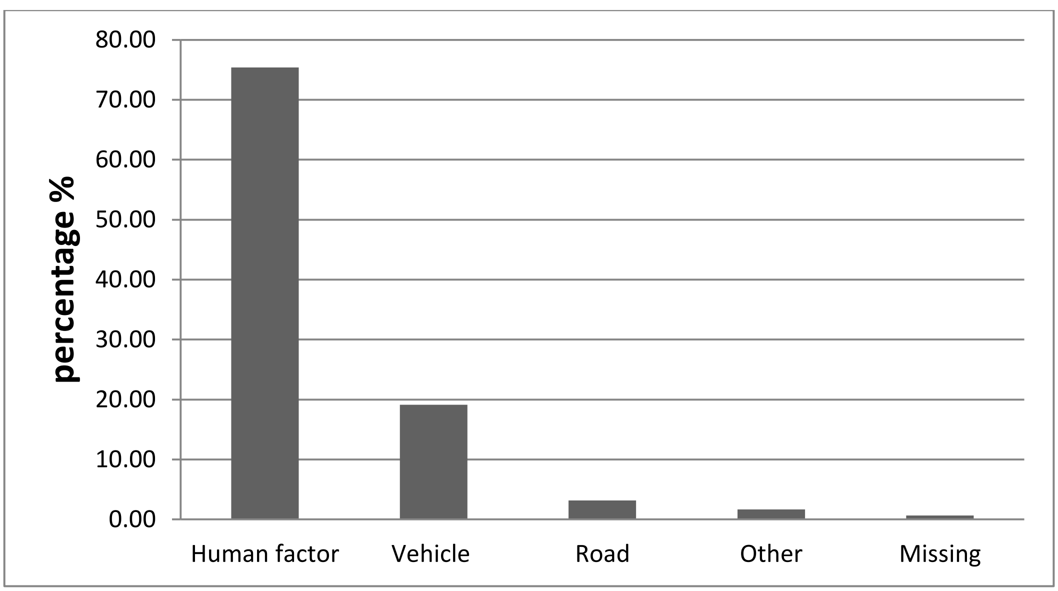

Figure 5-4: The number and percentage of traffic accidents per its main cause

5- Type of vehicle

The purpose of this analysis was to find the number and percentage of type of vehicles involved in traffic accidents per its type. The results of the analysis are shown in Table 5-5 and Figure 5-5.

Table 5-5: The number and percentage of type of vehicles involved in traffic accidents

Type of Vehicle	Number	Percentage
Sedan	2672	77.36
Minibus	267	7.73
Bus	48	1.39
Light truck	270	7.82
Heavy truck	153	4.43
Missing	44	1.27
Total	3454	

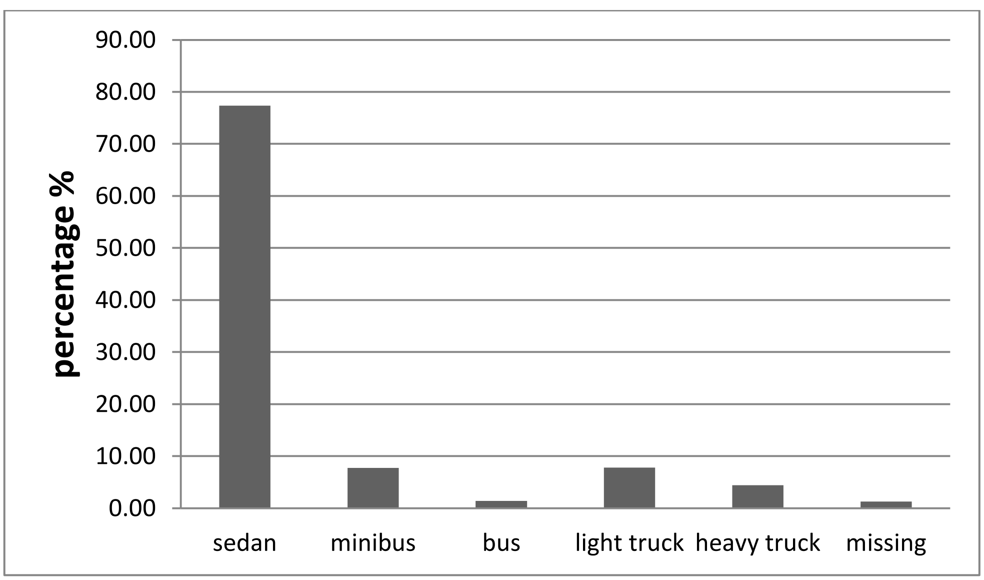

Figure 5-5: The percentage of type of vehicles involved in traffic accidents

6- Age of drivers

The purpose of this analysis was to find the number and percentage of age of drivers who were involved in traffic accidents. The results of the analysis are shown in Table 5-6 and Figure 5-6.

Table 5-6: The number and percentage of the age of drivers involved in traffic accidents

Age	Number	Percentage
<30	1191	34.48
30-40	957	27.71
40-50	554	16.04
>50	277	8.02
Missing	475	13.75
Total	3454	

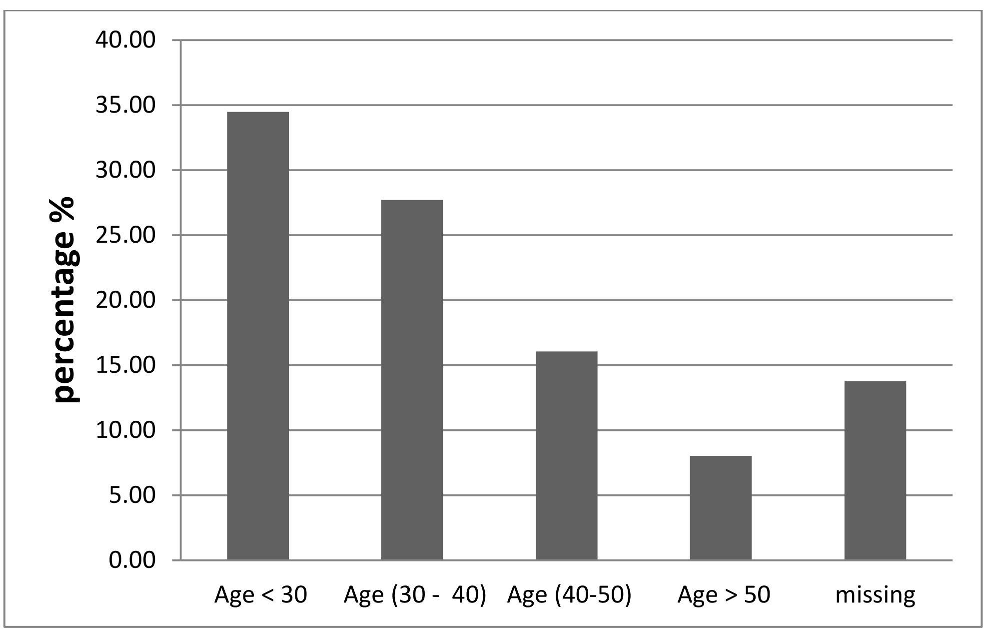

Figure 5-6: The percentage of the age of drivers involved in traffic accidents

5.1.1.2. Chauffeurs Who were Involved in Traffic Accidents

As mentioned previously, this subsection is the descriptive analysis of the chauffeurs who were involved in traffic accidents. The descriptive analysis of the questions which were asked is as follows:

1- Nationality of the chauffeur

The purpose of this analysis was to find the number and percentage of the chauffeurs who were involved in traffic accidents per nationality. The results of the analysis are shown in Table 5-7 and Figure 5-7.

Table 5-7: The number and percentage of the chauffeurs involved in traffic accidents per nationality

Nationality	Number	Percentage
Saudi	35	4.21
Arabian	173	20.82
Indian	200	24.07
Pakistani	233	28.04
Bengali	72	8.66
Afghan	8	0.96
Indonesian	23	2.77
Filipino	30	3.61
Nepalese	15	1.81
Other	39	4.69
Missing	3	0.36
Total	831	

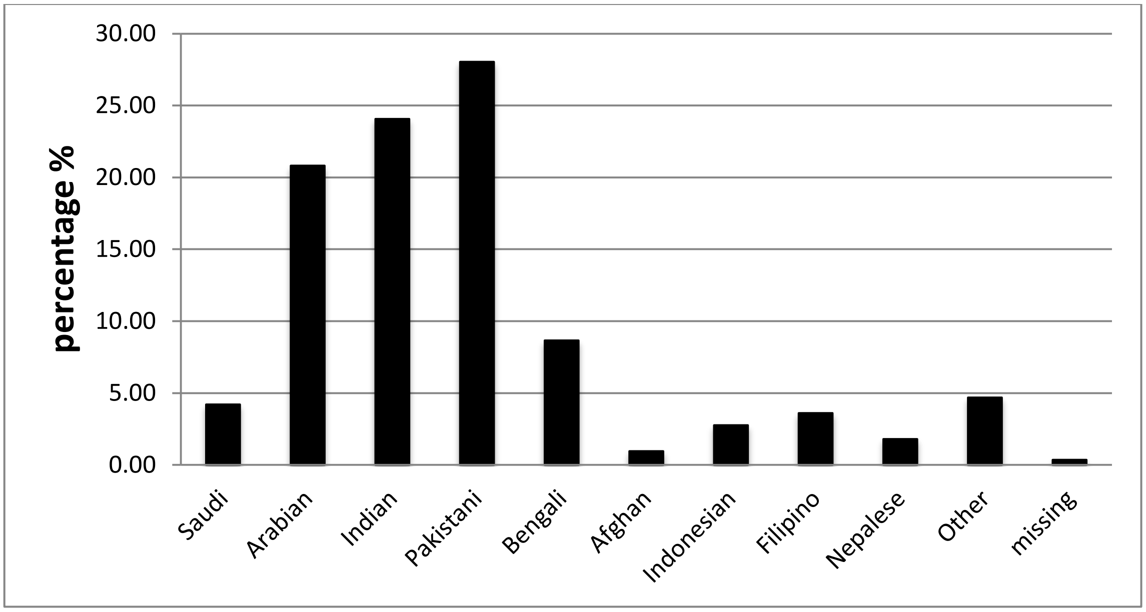

Figure 5-7: The percentage of the chauffeurs involved in traffic accidents per nationality

2- Age of chauffeurs

The purpose of this analysis was to find the number and percentage of the age of chauffeurs who were involved in traffic accidents. The results of the analysis are shown in Table 5-8 and Figure 5-8.

Table 5-8: The number and percentage of the age of chauffeurs who were involved in traffic accidents

Age	Number	Percentage
Age < 30	206	24.79
Age (30-40)	314	37.79
Age (40-50)	192	23.10
Age > 50	80	9.63
Missing	39	4.69
Total	831	100

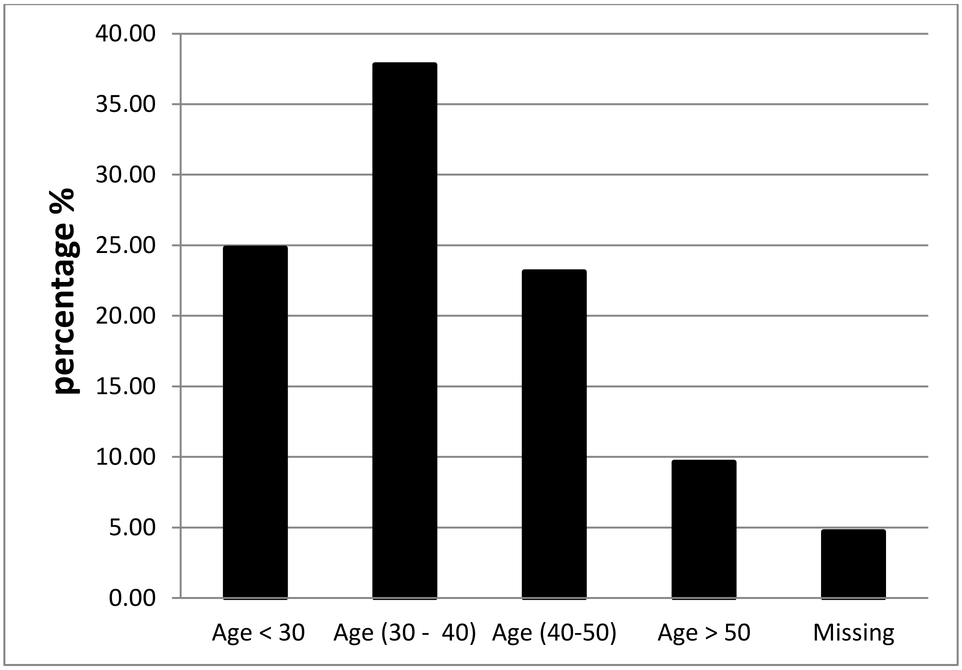

Figure 5-8: The percentage of the age of chauffeurs who were involved in traffic accidents

3- Type of accident

The purpose of this analysis was to find the number and percentage of traffic accidents per its type. The results of the analysis are shown in Table 5-9 and Figure 5-9.

Table 5-9: The number and percentage of traffic accidents per its type for chauffeurs

Type of accident	Number	Percentage
Property damage only	802	96.51
Minor injuries	28	3.37
Major injuries	1	0.12
Missing	0	0.00
Total	831	100

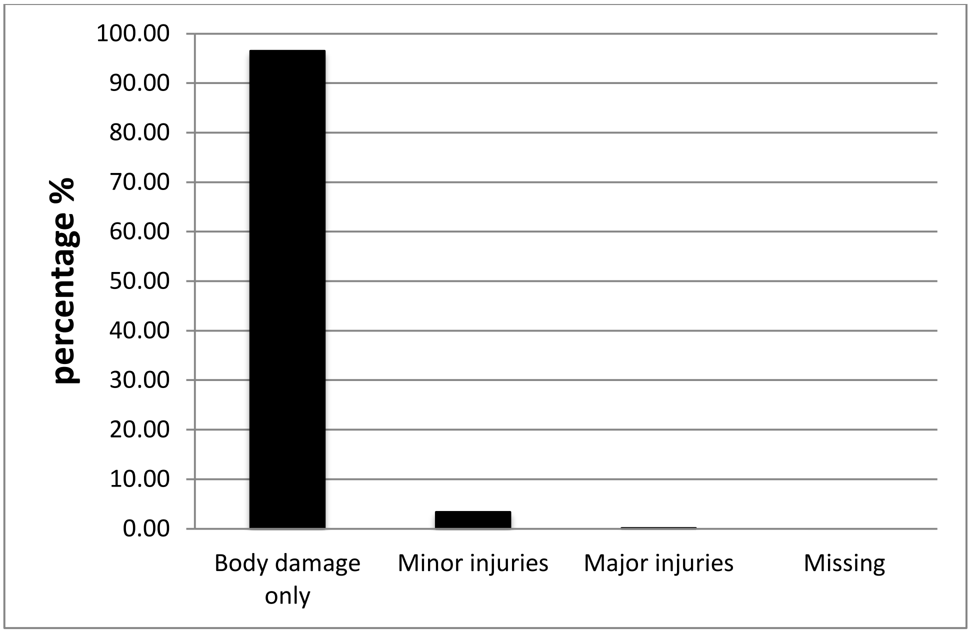

Figure 5-9: The percentage of traffic accidents per its type for chauffeurs

4- The main cause of accidents

The purpose of this analysis was to find the number and percentage of traffic accidents per its main cause. The results of the analysis are shown in Table 5-10 and Figure 5-10.

Table 5-10: The number and percentage of traffic accidents per its main cause for chauffeurs

Main cause of accidents	Number	Percentage
Human factor	627	75.45
Vehicle	163	19.61
Road	22	2.65
Other	10	1.20
Missing	9	1.08
Total	831	100

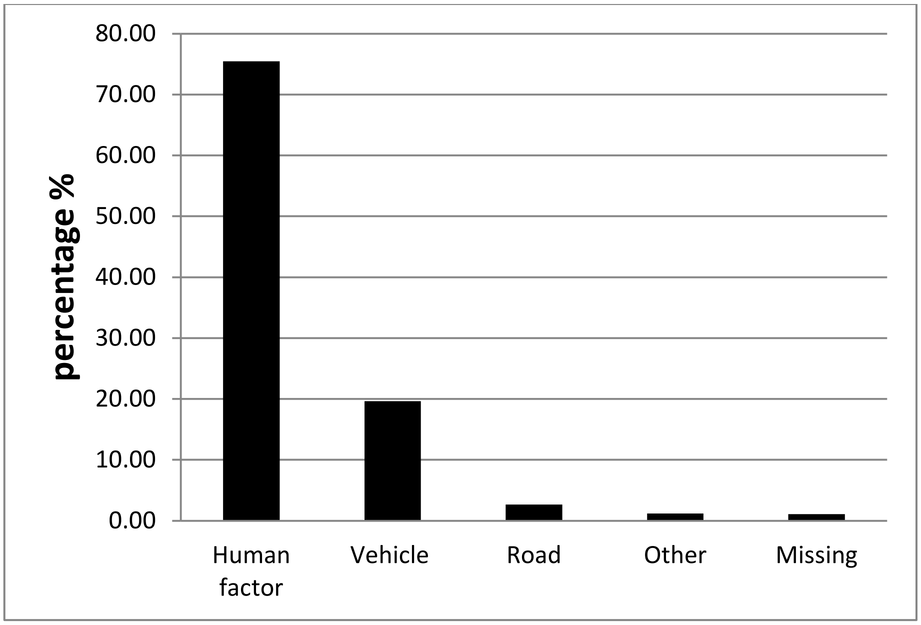

Figure 5-10: The percentage of traffic accidents per its main cause for chauffeurs

5- Type of vehicles

The purpose of this analysis was to find the number and percentage of vehicles involved in traffic accidents per its type. The results of the analysis are shown in Table 5-11 and Figure 5-11.

Table 5-11: The number and percentage of vehicles involved in traffic accidents per its type for chauffeurs

Type of Vehicle	Number	Percentage
Sedan	481	57.88
Minibus	94	11.31
Bus	39	4.69
Light Truck	72	8.66
Heavy Truck	132	15.88
Missing	13	1.56
Total	831	100

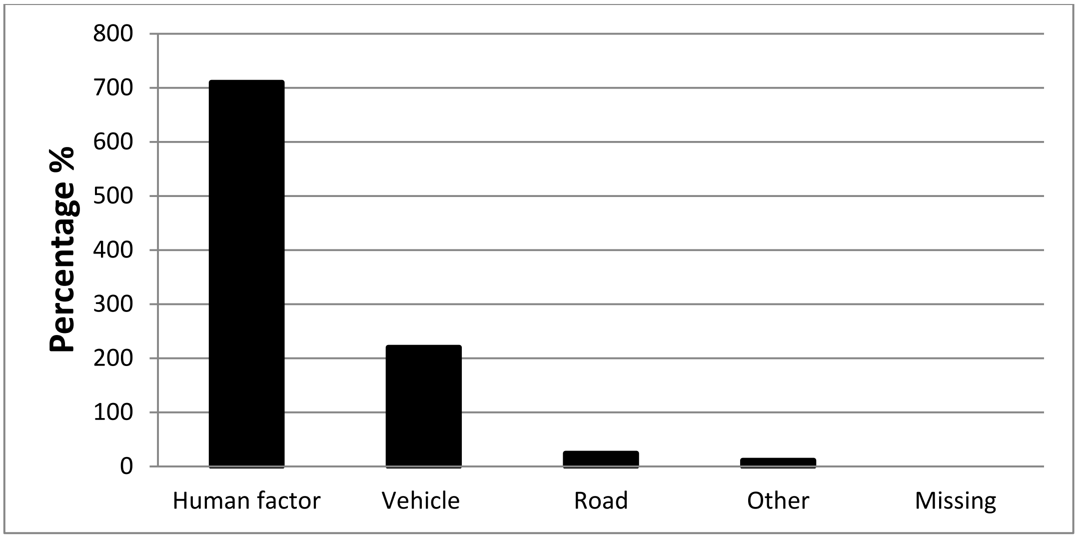

Figure 5-11: The percentage of vehicles involved in traffic accidents per its type for chauffeurs

6- Years of experience as a driver outside Saudi Arabia

The purpose of this analysis was to find the number and percentage of years of experience as a driver outside Saudi Arabia. The results of the analysis are shown in Table 5-12 and Figure 5-12.

Table 5-12: The number and percentage of years of experience as a driver outside Saudi Arabia for chauffeurs

Years of experience as a driver outside Saudi Arabia	Number	Percentage
No experience	84	10.11
1-2 years	83	9.99
3-5 years	157	18.89
More than 5 years	423	50.90
Missing	84	10.11
Total	831	100

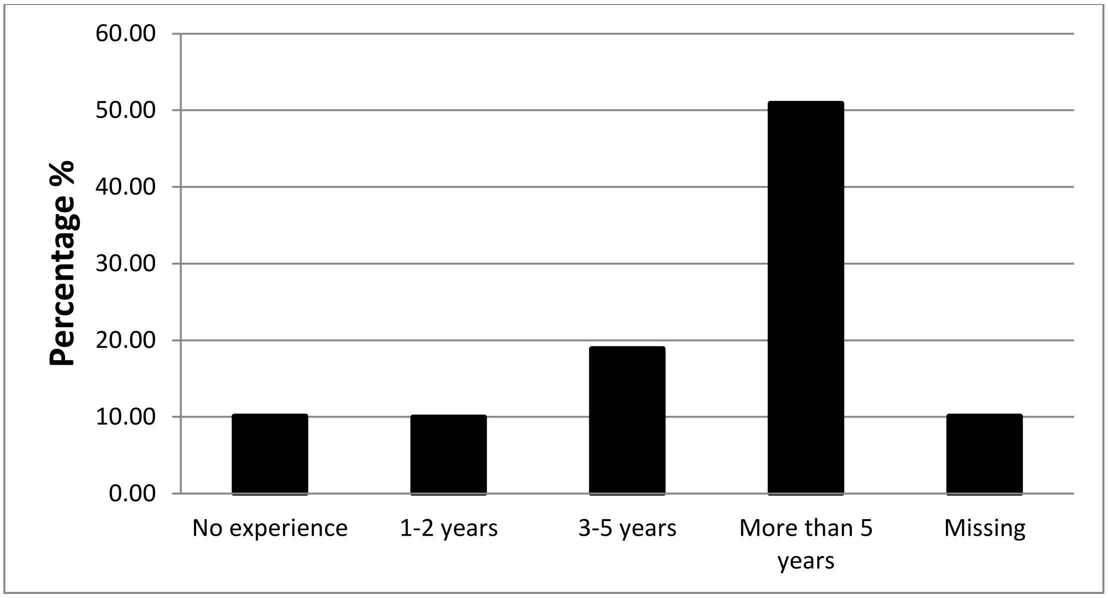

Figure 5-12: The percentage of years of experience as a driver outside Saudi Arabia for chauffeurs

7- Years of experience as a driver inside Saudi Arabia

The purpose of this analysis was to find the number and percentage of years of experience as a driver inside Saudi Arabia. The results of the analysis are shown in Table 5-13 and Figure 5-13.

Table 5-13: The number and percentage of years of experience as a driver inside Saudi Arabia for chauffeurs

Years of experience as a driver inside Saudi Arabia	Number	Percentage
No experience	75	9.03
1-2 years	169	20.34
3-5 years	162	19.49
More than 5 years	354	42.60
Missing	71	8.54
Total	831	100

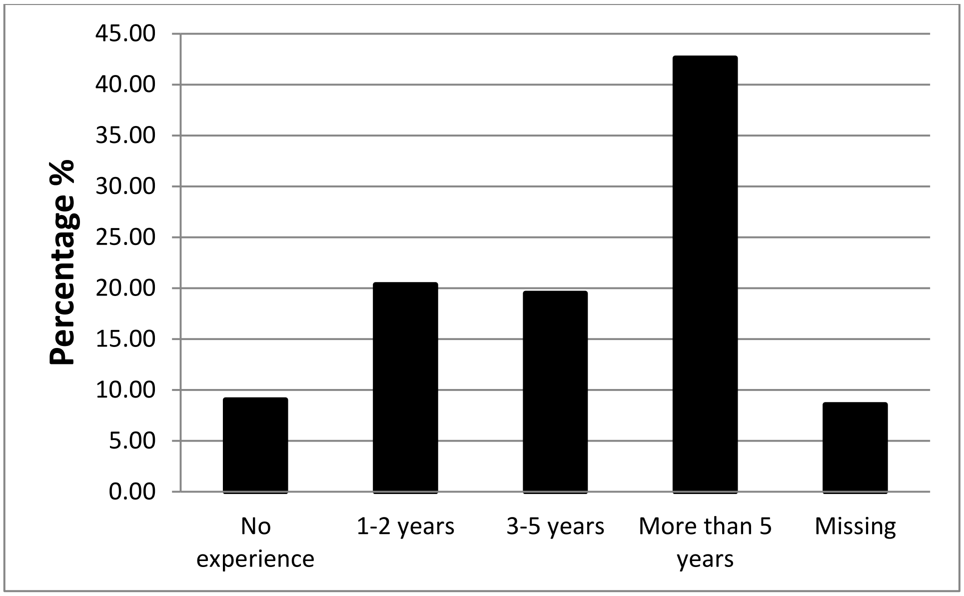

Figure 5-13: The percentage of years of experience as a driver inside Saudi Arabia for chauffeurs

8- Where did the chauffeurs get their first driving license

The purpose of this analysis was to find the number and percentage of chauffeurs who got their first driving license from Saudi Arabia or outside Saudi Arabia. The results of the analysis are shown in Table 5-14 and Figure 5-14.

Table 5-14: The number and percentage of chauffeurs who got their first driving license from Saudi Arabia or outside Saudi Arabia

Where did the chauffeurs get their first license	Number	Percentage
Saudi Arabia	304	36.58
Outside Saudi Arabia	440	52.95
Missing	87	10.47
Total	831	100

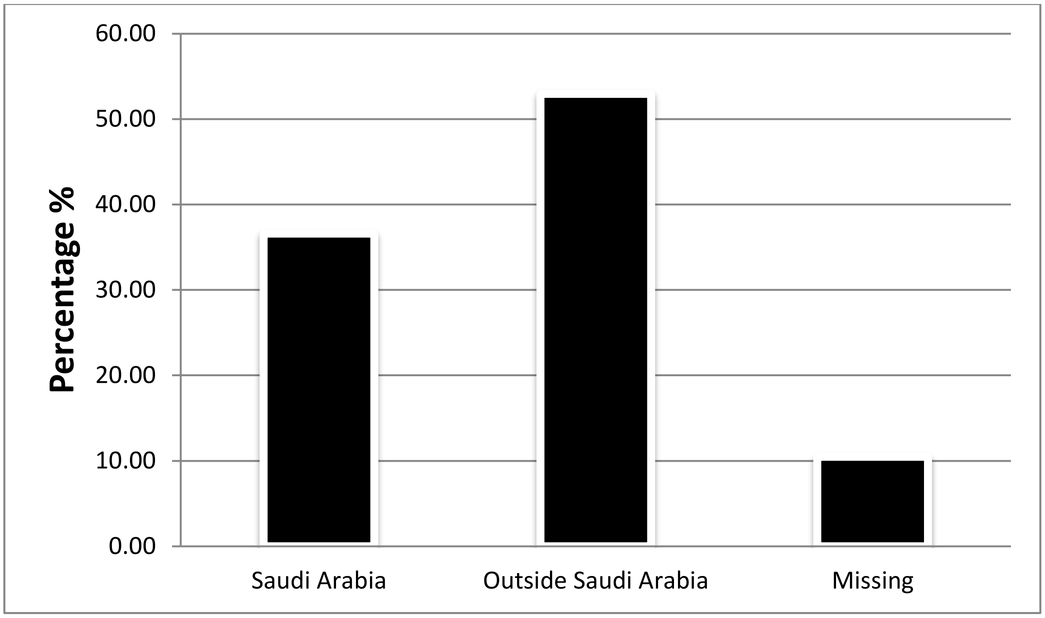

Figure 5-14: The percentage of chauffeurs who got their first driving license from Saudi Arabia or outside Saudi Arabia

9- The benefit from the driving school

The purpose of this analysis was to find the number and percentage of the categories of benefit of chauffeurs from the driving school. The results of the analysis are shown in Table 5-15 and Figure 5-15.

Table 5-15: The number and percentage of the categories of benefit of chauffeurs from driving school

The benefit from the Driving School	Number	Percentage
Very good	304	40.70
Good	437	58.50
Weak	3	0.40
Very weak	0	0.00
Missing	87	11.65
Total	831	100

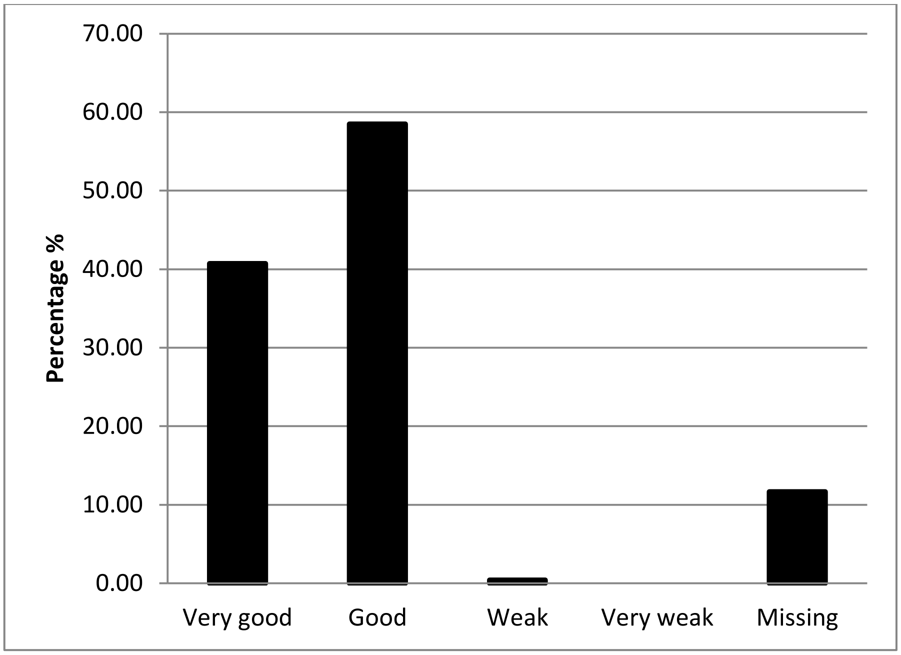

Figure 5-15: The percentage of the categories of benefit of chauffeurs from driving school

10- The types of chauffeur

The purpose of this analysis was to find the number and percentage of chauffeurs per their type. The results of the analysis are shown in Table 5-16 and Figure 5-16.

Table 5-16: The number and percentage of chauffeurs per their type

Types of chauffeur	Number	Percentage
Taxi Driver	181	21.78
Family Driver	164	19.74
Company Driver	334	40.19
Governmental Driver	11	1.32
Non-chauffeur	67	8.06
Missing	74	8.90
total	831	100

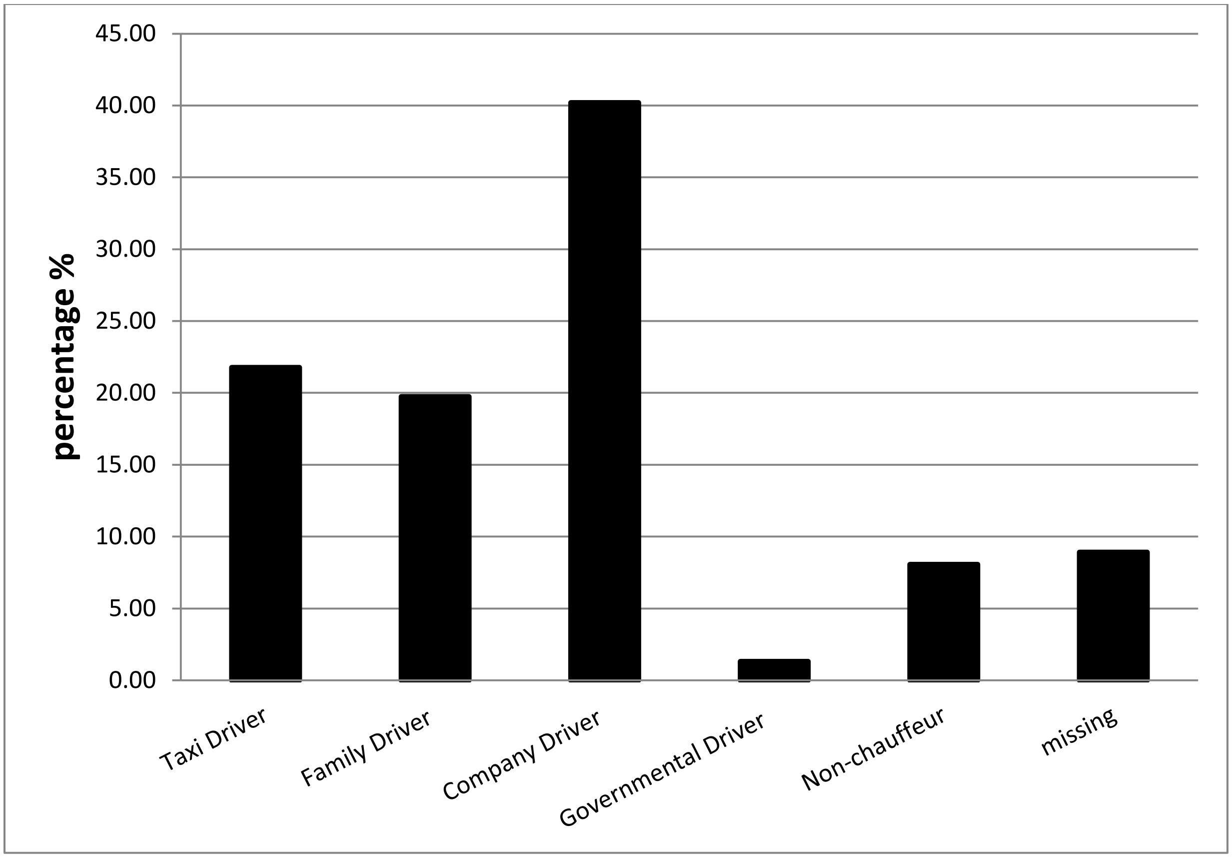

Figure 5-16: The percentage of chauffeurs per their type

11- The degree of reading and understanding of traffic signs in Arabic language

The purpose of this analysis was to find the number and percentage of the degree of reading and understanding of traffic signs in Arabic language. The results of the analysis are shown in Table 5-17 and Figure 5-17.

Table 5-17: The number and percentage of the degree of reading and understanding of traffic signs in Arabic language

Degree of reading and understanding of traffic signs in Arabic language	Number	Percentage
Yes	511	61.49
With difficulty	127	15.28
No	117	14.08
Missing	76	9.15
Total	831	100

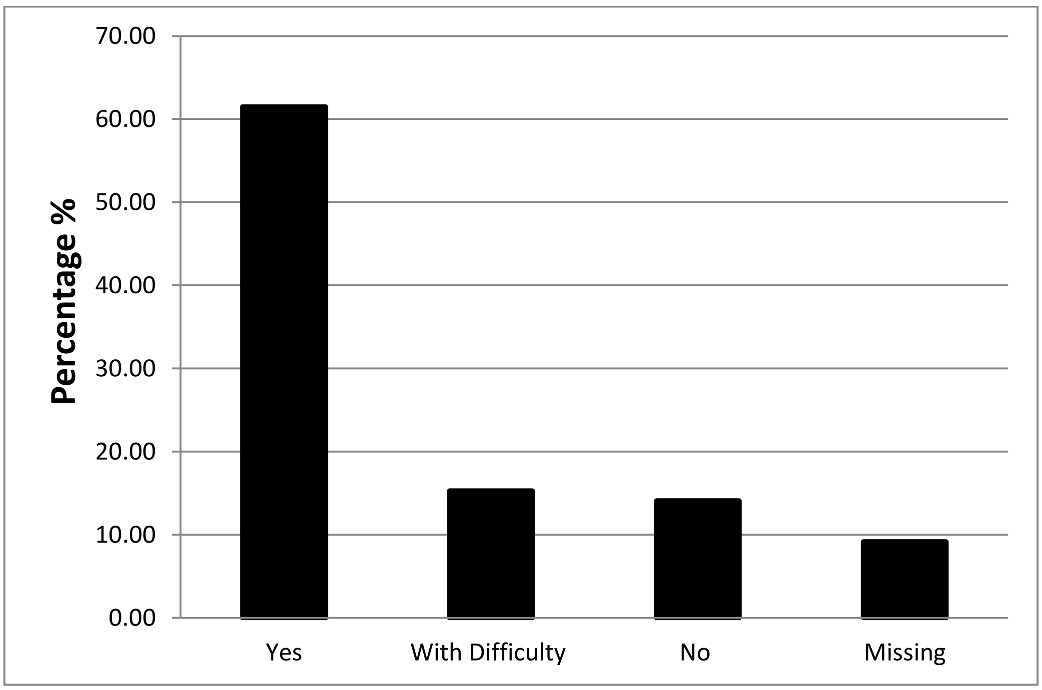

Figure 5-17: The percentage of the degree of reading and understanding of traffic signs in Arabic language

12- The degree of reading and understanding of traffic signs in English language

The purpose of this analysis was to find the number and percentage of the degree of reading and understanding of traffic signs in English language. The results of the analysis are shown in Table 5-18 and Figure 5-18.

Table 5-18: The number and percentage of the degree of reading and understanding of traffic signs in English language

Degree of reading and understanding of traffic signs in English language	Number	Percentage
Yes	478	57.52
With difficulty	131	15.76
No	153	18.41
Missing	69	8.30
Total	831	100

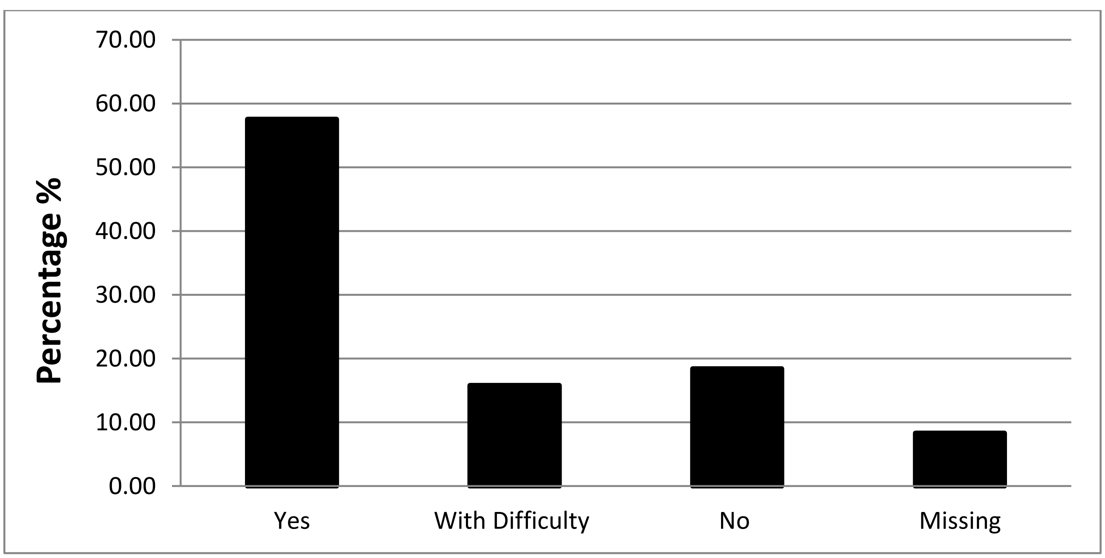

Figure 5-18: The percentage of the degree of reading and understanding of traffic signs in English language

13- Satisfaction of the chauffeurs with their work

The purpose of this analysis was to find the number and percentage of the degree of satisfaction of the chauffeurs with their work. The results of the analysis are shown in Table 5-19 and Figure 5-19.

Table 5-19: The number and percentage of the degree of satisfaction of the chauffeurs with their work

Satisfaction of the chauffeurs with their work	Number	Percentage
Yes	719	86.52
No	44	5.29
Missing	68	8.18
Total	831	100

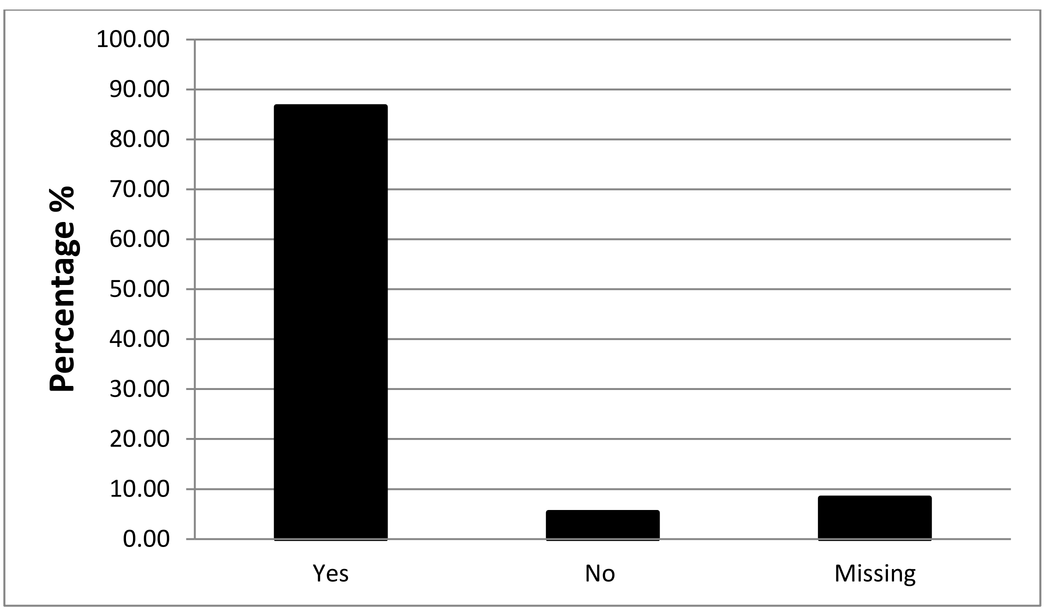

Figure 5-19: The percentage of the degree of satisfaction of the chauffeurs with their work

14- Appropriation of salary of chauffeurs to their working hours

The purpose of this analysis was to find the number and percentage of the degree of appropriation of salary of chauffeurs to their working hours. The results of the analysis are shown in Table 5-20 and Figure 5-20.

Table 5-20: The number and percentage of the degree of satisfaction of the chauffeurs to their working hours

Appropriation of salary of chauffeurs to their working hours	Number	Percentage
Yes	678	81.59
No	81	9.75
Missing	72	8.66
Total	831	100

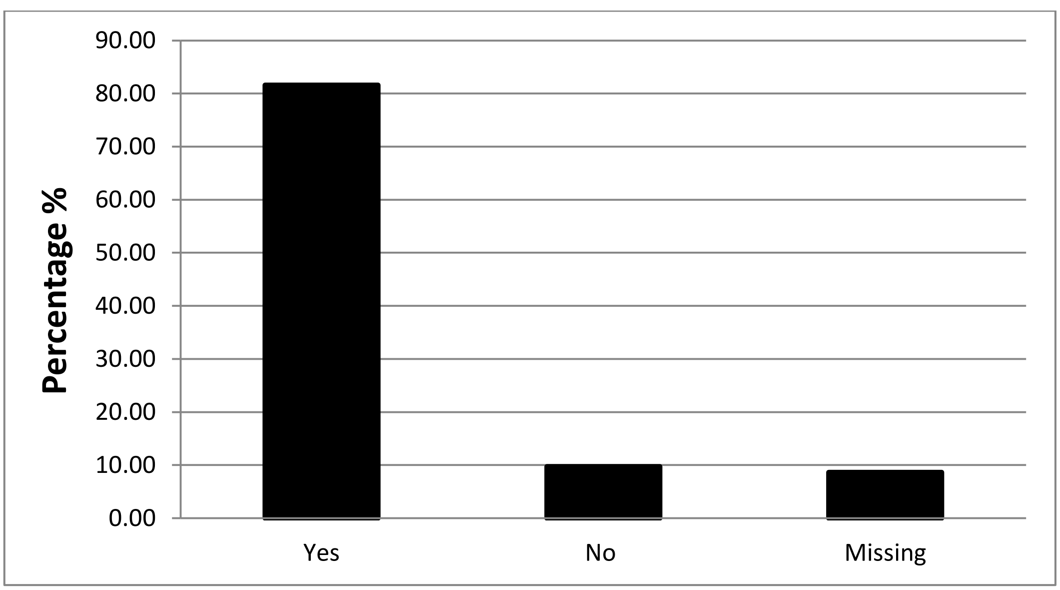

Figure 5-20: The percentage of the degree of satisfaction of the chauffeurs to their working hours

15- The health condition of the chauffeurs

The purpose of this analysis was to find the number and percentage of the health condition of the chauffeurs. The results of the analysis are shown in Table 5-21 and Figure 5-21.

Table 5-21: The number and percentage of the health condition of the chauffeurs

Health condition of the chauffeurs	Number	Percentage
Good	751	90.37
Not good	13	1.56
Missing	67	8.06
Total	831	100

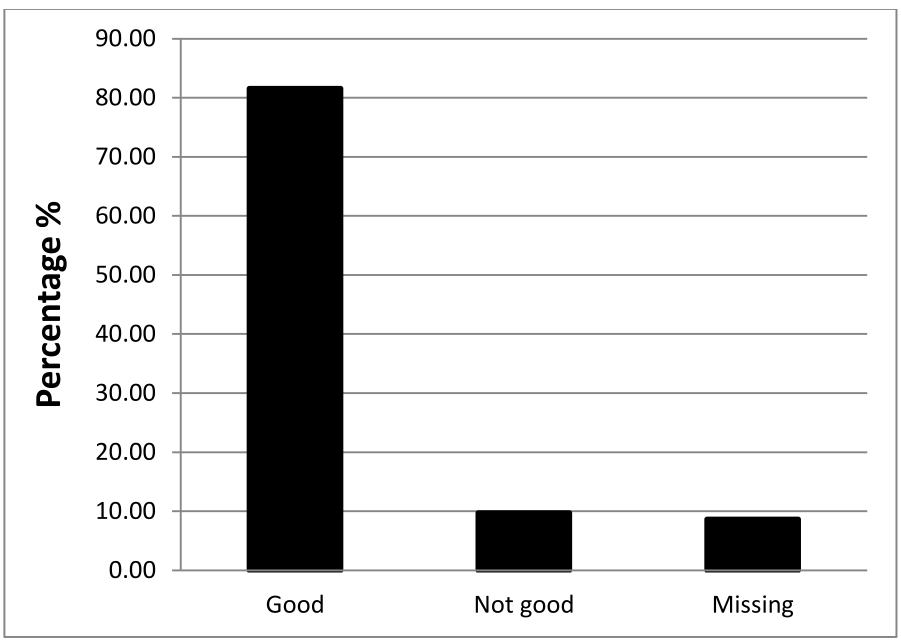

Figure 5-21: The percentage of the health condition of the chauffeurs

16- The total scores of understanding the meaning of traffic signs

The purpose of this analysis was to find the number and percentage of the total scores of understanding the traffic signs by the chauffeurs who answered the traffic signs questions. The results of the analysis are shown in Table 5-22 and Figure 5-22. In the questionnaire, there are five questions about traffic signs.

Table 5-22: The number and percentage of the total scores of understanding traffic signs by the chauffeurs who answered the traffic signs questions

Total scores of understanding the meaning of traffic signs	Number	Percentage
Zero	109	13.12
One	13	1.56
Two	34	4.09
Three	89	10.71
Four	188	22.62
Five	389	46.81
Missing	9	1.08
Total	831	100

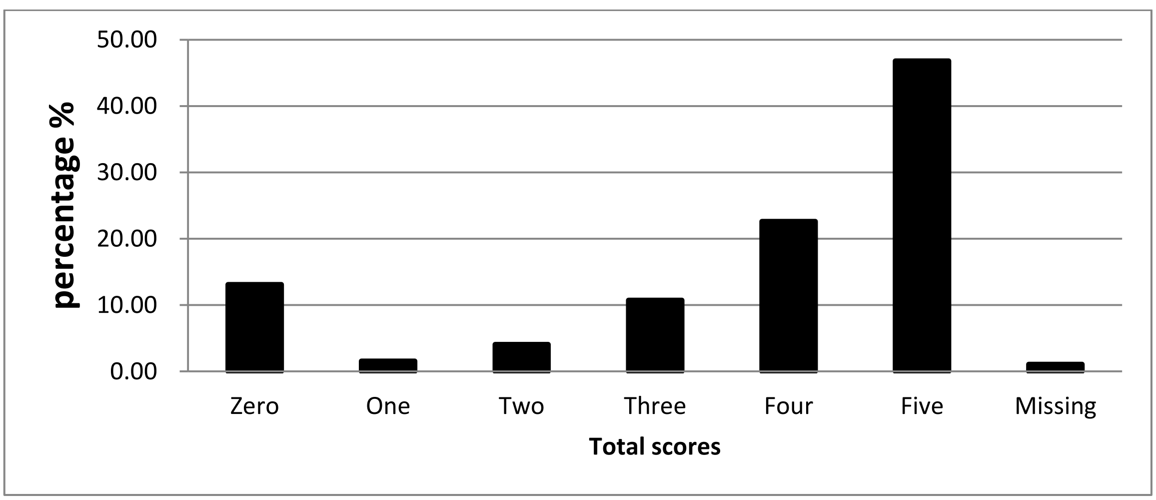

Figure 5-22: The percentage of total scores of understanding traffic sign by the chauffeurs who answered the traffic signs questions

17- Understanding the meaning of traffic sign

The purpose of this analysis was to find the number and percentage of chauffeurs who understand the meaning of traffic sign shown in Figure 5-23. The results of the analysis are shown in Table 5-23 and Figure 5-24.

Figure 5-23: The traffic sign

Table 5-23: The number and percentage of chauffeurs who understand traffic sign

Understanding the meaning of traffic sign in Figure 5-23	Number	Percentage
Not correct	86	10.35
Correct	643	77.38
Missing	102	12.27
Total	831	100

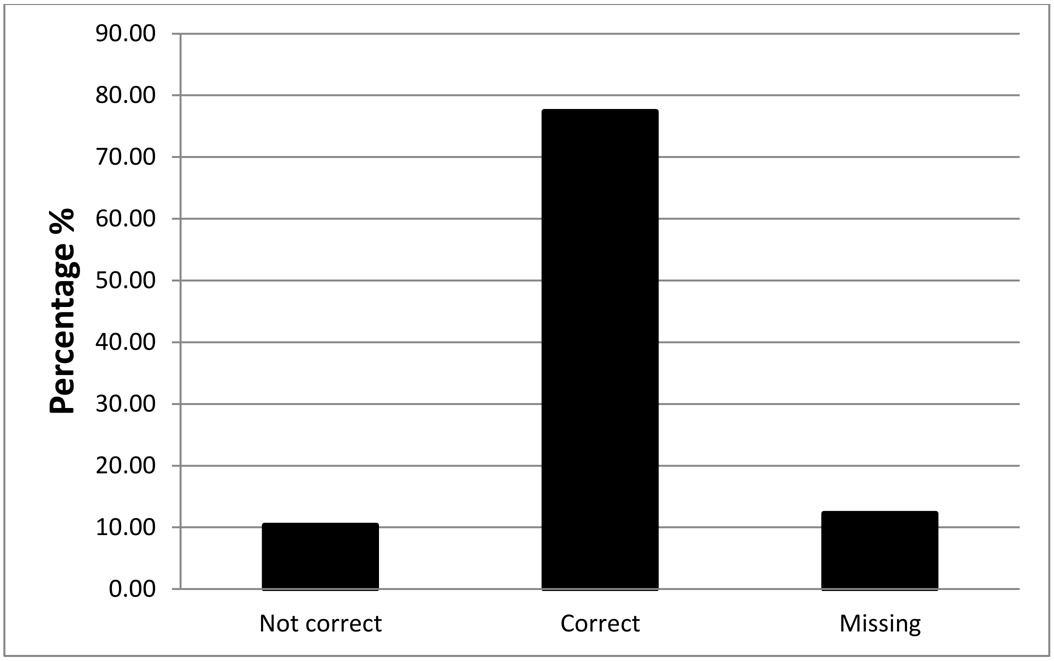

Figure 5-24: The percentage of chauffeurs who understand traffic sign

18- Understanding the meaning of traffic sign

The purpose of this analysis was to find the number and percentage of chauffeurs who understand the meaning of traffic sign shown in Figure 5-25. The results of the analysis are shown in Table 5-24 and Figure 5-26.

Figure 5-25: The traffic sign

Table 5-24: The number and percentage of chauffeurs who understand traffic sign

Understanding the meaning of traffic sign in Figure 5-25	Number	Percentage
Not correct	174	20.94
Correct	556	66.91
Missing	101	12.15
Total	831	100

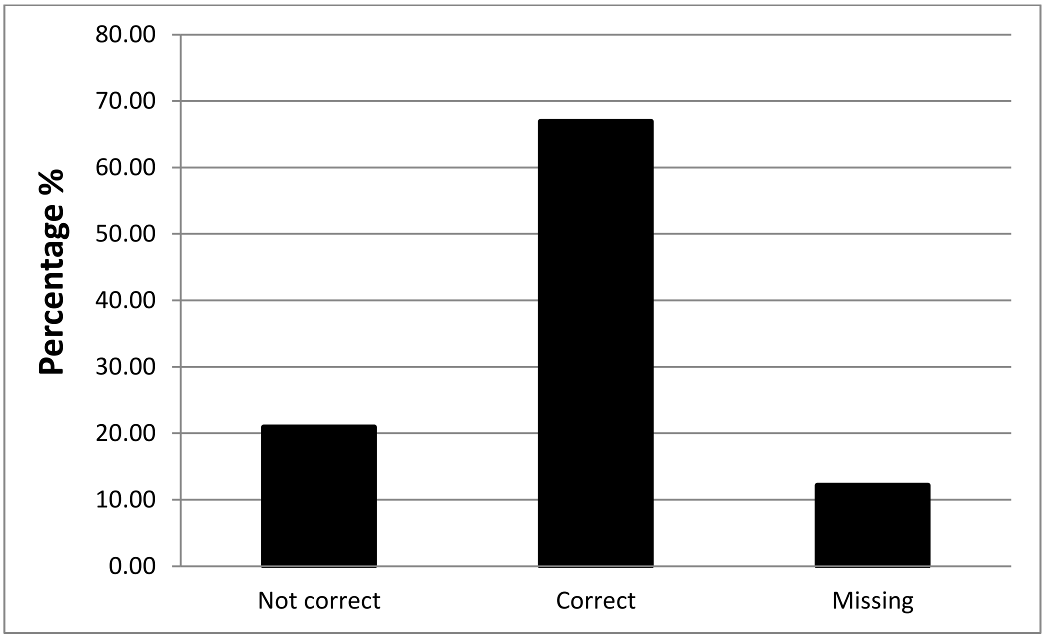

Figure 5-26: The percentage of chauffeurs who understand traffic sign

19- Understanding the meaning of traffic sign

The purpose of this analysis was to find the number and percentage of chauffeurs who understand the meaning of traffic sign shown in Figure 5-27. The results of the analysis are shown in Table 5-25 and Figure 5-28.

Figure 5-27: The traffic sign

Table 5-25: The number and percentage of chauffeurs who understand traffic sign

Understanding the meaning of traffic sign in Figure 5-27	Number	Percentage
Not correct	117	14.08
Correct	608	73.16
Missing	106	12.76
Total	831	100

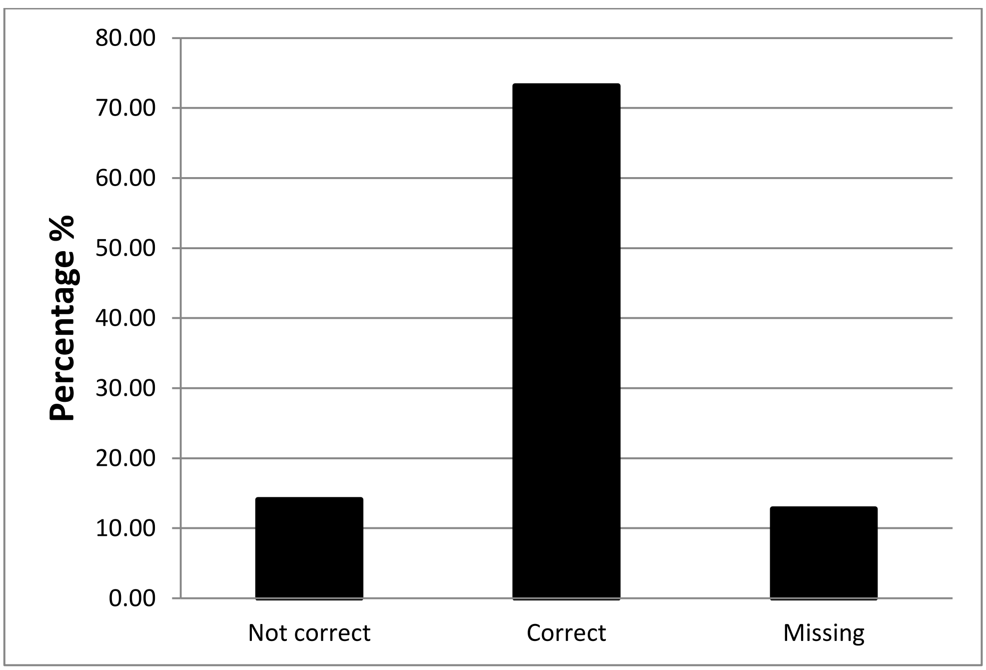

Figure 5-28: The percentage of chauffeurs who understand traffic sign

20- Understanding the meaning of traffic sign:

The purpose of this analysis was to find the number and percentage of chauffeurs who understand the meaning of traffic sign shown in Figure 5-29. The results of the analysis are shown in Table 5-26 and Figure 5-30.

Figure 5-29: The traffic sign

Table 5-26: The number and percentage of chauffeurs who understand traffic sign

Understanding the meaning of traffic sign in Figure 5-29	Number	Percentage
Not correct	73	8.78
Correct	655	78.82
Missing	103	12.39
Total	831	100

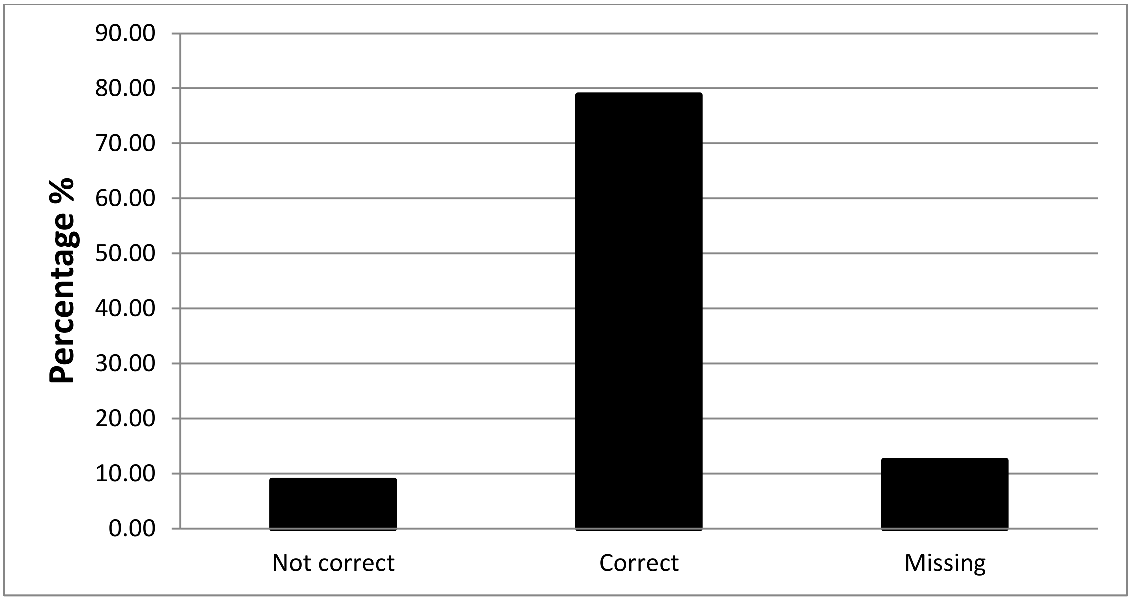

Figure 5-30: The percentage of chauffeurs who understand traffic sign

21- Understanding the meaning of traffic sign:

The purpose of analysis was to find the number and percentage of chauffers who understand the meaning of traffic sign shown in Figure 5-31. The results of the analysis are shown in Table 5-27 and Figure 5-32.

Figure 5-31: The traffic sign

Table 5-27: The number and percentage of chauffeurs who understand traffic sign

Understanding the meaning of traffic sign in Figure 5-31	Number	Percentage
Not correct	99	11.91
Correct	627	75.45
Missing	105	12.64
Total	831	100

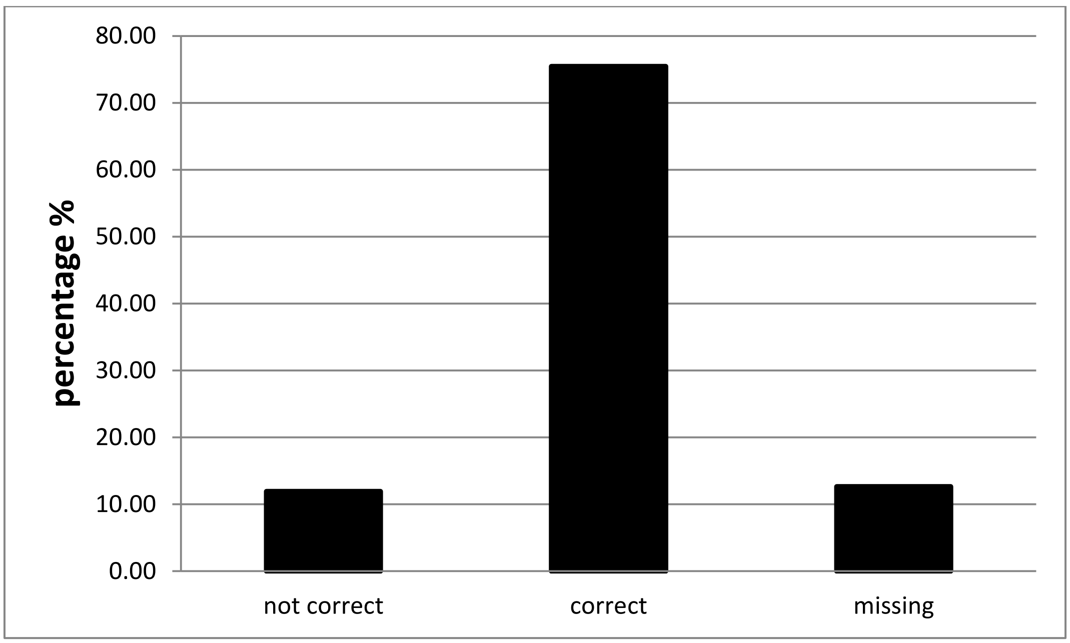

Figure 5-32: The percentage of chauffeurs who understand traffic sign

5.1.2. Analyzing Traffic Accidents

As mentioned previously in the methodology, questionnaires were given to drivers who were involved in traffic accidents. The questionnaires were analyzed statistically based on some hypotheses. These hypotheses are testing relationship between some variables and the involvement of the drivers in traffic accidents by using a contingency table. The analyses were done in two groups. The first group refers to all the drivers involved in traffic accidents while the second group refers to the chauffeurs involved in the traffic accidents.

5.1.2.1. Analyzing Traffic Accidents for All Drivers

This subsection is for all the drivers who were involved in traffic accidents. The questionnaires were analyzed statistically based on some hypotheses. These hypotheses are testing relationship between some variables and the involvement of the drivers in traffic accidents by using a contingency table. The analyses were done in two groups. Some relationships were rejected at 0.1 level of significance and concluded that there is no relationship between them. These relationships are:

1- The age and the involvement in traffic accidents.

2- The type of driver and the involvement in traffic accidents.

3- The nationality and the involvement in traffic accidents.

4- The main cause of the accidents and the involvement in traffic accidents.

5- The type of driver and the main cause of the traffic accidents.

6- The nationality and the type of accident.

7- The nationality and the main cause of the accidents.

8- The nationality and the type of vehicles.

9- The age and the type of accident.

10- The age and the main cause of the accidents.

11- The age and the type of vehicles.

5.1.2.1.1. Testing the relationship between the nationality and type of driver

The hypothesis was set to test the relationship between the nationality and type of driver involved in traffic accidents, which is:

H_0: There is no relationship between the nationality and type of driver.

H_1: There is a relationship between the nationality and type of driver.

Table 5-28 shows the count, expected count and contribution to chi-square for each nationality and type of driver.

Table 5-28: The minitab output for testing the relationship between the nationality and type of driver

Type of driver	nationality						
	Arabic	Bengali	Filipino	Indian	other	Pakistani	Saudi
Chauffeur							
Count	172	73	31	196	84	232	32
Exp count	213.6	30.7	14.4	78.7	50.2	99.5	332.9
Contri to χ^2	8.10	58.32	19.30	174.79	22.68	176.45	271.98
Non- Chauffeur							
Count	691	51	27	122	119	170	1313
Exp count	649.4	93.3	43.6	239.3	152.8	302.5	1012.1
Contri to χ^2	2.66	19.18	6.35	57.49	7.46	58.04	89.46

Pearson Chi-Square = 972.263, DF = 6, P-Value = 0.000

The P-value = 0.000 < 0.1. So, reject the null hypothesis and conclude that there is a relationship between the nationality and type of driver involved in traffic accidents. From Table 5-28, all chauffeurs except Saudi and Arabian chauffeurs show high contributions negatively to chi-square value. Also, Saudi and Arabian non-chauffeurs show high contributions negatively to chi-square. A negative contribution to chi-square means the number of involved drivers in traffic accidents are more than what was expected. There is no good explanation for the results except that the involvement to traffic accidents is related to other characteristics rather than the nationality.

5.1.2.1.2. Testing the relationship between the type of accident and type of driver

The hypothesis was set to test the relationship between the type of accident and type of driver, which is:

H_0: There is no relationship between the type of accident and the type of driver.

H_1: There is a relationship between the type of accident and the type of driver.

Table 5-29 shows the count, expected count and contribution to chi-square for each type of accident and for each type of driver.

Table 5-29: The minitab output for testing the relationship between the type of accident and the type of driver

Type of driver	type of accident	
	Property damage only	**minor injuries and major injuries or death**
Chauffeur		
Count	791	29
Exp count	780.89	39.11
Contri to χ^2	0.1308	2.6134
Non- Chauffeur		
Count	2364	129
Exp count	2374.11	118.89
Contri to χ^2	0.0430	0.8597

Pearson Chi-Square = 3.645; DF = 1; P-Value = 0.056

The P-value = 0.056 < 0.1. So, reject the null hypothesis and conclude that there is a relationship between the type of accident and the type of driver involved in traffic accidents. As can be seen, non-chauffeurs are more involved in minor injuries and major injuries or death and chauffeurs are more involved in property damage only. But, the main contributor to the chi-square is the chauffeurs who their type of accident is minor and major injuries or death.

5.1.2.1.3. Testing the relationship between the type of accident and the nationality of the drivers

The hypothesis was set to test the relationship between the type of accident and the nationality of the drivers, which is:

H_0: There is no relationship between the type of accident and the nationality of the drivers.

H_1: There is a relationship between the type of accident and the nationality of the drivers.

Table 5-30 shows the count, expected count and contribution to chi-square for each nationality of the drivers and for each type of accident.

Table 5-30: The minitab output for testing the relationship between the type of accident and the nationality of the drivers

Nationality	type of accident		
	Property damage only	minor injuries	major injuries or death
Non-Saudi			
Count	1890	70	8
Exp count	1874.14	81.38	12.47
Contri to χ^2	0.134	1.592	1.605
Saudi			
Count	1265	67	13
Exp count	1280.86	55.62	8.53
Contri to χ^2	0.1963	2.3289	2.3484

Pearson Chi-Square = 8.204, DF = 2, P-Value = 0.017

The P-value = 0.017 < 0.1. So, reject the null hypothesis and conclude that there is a relationship between the type of accident and the nationality of the drivers. As it can be seen, Saudi drivers have negative contributions in minor and major injuries or death. Non-Saudi drivers have negative contributions in property damage only. Also, it can be noticed that Saudi drivers have higher contribution to the chi-square than the non-Saudi drivers. So, Saudi drivers are more dangerous than non-Saudi drivers.

5.1.2.1.4. Testing the relationship between the cause of accident and the nationality of the drivers

The hypothesis was set to test the relationship between the cause of accident and the nationality of the drivers, which is:

H_0: There is no relationship between the cause of accident and the nationality of the drivers.

H_1: There is a relationship between the cause of accident and the nationality of the drivers.

Table 5-31 shows the count, expected count and contribution to chi-square for each nationality of the drivers and for each cause of the accidents.

Table 5-31: The minitab output for testing the relationship between the cause of accident and the nationality of the drivers

Nationality	**cause of accident**			
	Human	**vehicle**	**road**	**other**
Other nationality				
Count	855	206	22	14
Exp count	828.2	216.6	33.3	19.0
Contri to χ^2	0.8701	0.5192	3.8191	1.3000
Arabian				
Count	654	161	29	14
Exp count	647.7	169.4	26.0	14.8
Contri to χ^2	0.0607	0.4179	0.3404	0.0468
Saudi				
Count	980	284	49	29
Exp count	1013.1	265.0	40.7	23.2
Contri to χ^2	1.0824	1.3651	1.6910	1.4494

Pearson Chi-Square = 12.962, DF = 6, P-Value = 0.044

The P-value = 0.044 < 0.1. So, reject the null hypothesis and conclude that there is a relationship between the cause of accident and the nationality of the drivers. From Table 5-31, it can be noticed that the road factor of other nationality drivers has high positive contributions to chi-square. A positive contribution to chi-square means that their involvement in traffic accidents is less than what was expected.

5.1.2.1.5. Testing the relationship between the type of vehicle and the involvement in traffic accidents

The hypothesis was set to test the relationship between the type of vehicle and the involvement in traffic accidents which is:

H_0: There is no relationship between the type of vehicle and the involvement in traffic accidents.

H_1: There is a relationship between the type of vehicle and the involvement in traffic accidents.

Table 5-32 shows the count, expected count and contribution to chi-square between the type of vehicle and the involvement in traffic accidents.

Table 5-32: The minitab output for testing the relationship between the type of vehicle and the involvement in traffic accidents

Involvement	type of the vehicle				
	Sedan	**minibus**	**bus**	**light truck**	**heavy truck**
Involved					
Count	1054	128	26	128	84
Exp count	1110.4	111.0	19.9	112.7	65.9
Contri to χ^2	2.867	2.604	1.838	2.068	4.968
Neutral					
Count	216	8	5	20	16
Exp count	207.2	20.7	3.7	21.0	12.3
Contri to χ^2	0.371	7.804	0.439	0.051	1.114
Not involved					
Count	1291	120	15	112	52
Exp count	1243.4	124.3	22.3	126.2	73.8
Contri to χ^2	1.826	0.148	2.408	1.604	6.437

Pearson Chi-Square = 36.546, DF = 8, P-Value = 0.000

Likelihood Ratio Chi-Square = 39.188, DF = 8, P-Value = 0.000

The P-value = 0 < 0.1. So, reject the null hypothesis and conclude that there is a relationship between the type of vehicle and the involvement in traffic accidents. The involved drivers are the drivers whose percentages of involvement in accidents are 100% and 75%. The neutral drivers are the drivers whose percentage of involvement in accidents is 50%. The non-involved drivers are the drivers whose percentages of involvement in accidents are 0% and 25%.

From Table 5-32, it can be noticed that the heavy trucks which are involved in traffic accidents, have high negative contribution to chi-square value. Also, it can be seen that the heavy trucks which are not involved in traffic accidents, have high positive contribution to chi-square value. In addition, it can be noticed that the minibus, which is neutral in traffic accidents, has high positive contribution to chi-square value. So, trucks are mainly involved in traffic accidents.

5.1.2.1.6. Testing the relationship between the age and nationality of the drivers involved in traffic accidents

A hypothesis was set to test the relationship between the age and nationality of the drivers involved in traffic accidents, whose percentages of involvement in the traffic accident are 75% and 100%, which is:

H_0: There is no relationship between the age and nationality of the drivers involved in traffic accidents.

H_1: There is a relationship between the age and nationality of the drivers involved in traffic accidents.

Table 5-33 shows the count, expected count and contribution to chi-square for each nationality and for each type of driver.

Table 5-33: The minitab output for testing the relationship between the age and nationality of the drivers involved in traffic accidents

Age		nationality				
	Saudi	Arabic	Indian	Pakistani	Pilipino	other
< 30						
Count	284	137	31	49	4	32
Exp count	215.12	141.80	51.56	70.10	10.88	47.54
Contri to χ^2	22.053	0.163	8.202	6.349	4.348	5.078
30-40						
Count	145	106	58	70	10	50
Exp count	175.86	115.92	42.15	57.30	8.89	38.86
Contri to χ^2	5.416	0.850	5.956	2.813	0.138	3.193
40-50						
Count	66	75	30	42	4	25
Exp count	96.95	63.90	23.24	31.59	4.90	21.42
Contri to χ^2	9.878	1.927	1.968	3.431	0.166	0.597
> 50						
Count	39	34	9	13	9	11
Exp count	46.07	30.37	11.04	15.01	2.33	10.18
Contri to χ^2	1.085	0.434	0.378	0.269	19.103	0.066

Pearson Chi-Square = 103.861; DF = 15; P-Value = 0.000

The P-value = 0 < 0.1. So, reject the null hypothesis and conclude that there is a relationship between the age and nationality of the drivers involved in traffic accidents. From Table 5-33, it can be noticed that Saudi drivers who are younger than thirty years, have high negative contributions to chi-square value. On the other hand, Saudi drivers older than thirty years and younger than fifty years, have high positive contributions to chi-square value. So, Saudi drivers younger than thirty years are more dangerous than Saudi drivers older than thirty years and younger than fifty years.

It can be noticed that Indian drivers who are younger than thirty years, have high positive contributions to chi-square value. On the other hand, Indian drivers older than thirty years and younger than forty years have high negative contributions to chi-square value. So, Indian drivers younger than thirty years are less dangerous than Indian drivers older than thirty years and younger than forty years.

It can be noticed that Pakistani drivers who are younger than thirty years old, have high positive contributions to chi-square value. On the other hand, Pakistani drivers who are older than thirty years and younger than fifty years, have high negative contributions to chi-square value. So, Pakistani drivers younger than thirty years are less dangerous than Pakistani drivers older than thirty years and younger than fifty years.

It can be noticed that Filipino drivers who are younger than thirty years old, have high positive contributions to chi-square value. On the other hand, Filipino drivers who are older than fifty years, have high negative contributions to chi-square value. So, Filipino drivers younger than thirty years are less dangerous than Filipino drivers older than fifty years.

Also, other nationality drivers who are younger than thirty years old have high positive contributions to chi-square value. On the other hand, other nationality drivers who are older than thirty and younger than forty years, have high negative contributions to chi-square value. So, other nationality drivers younger than thirty years are less dangerous than other nationality drivers older than thirty years and younger than forty years.

5.1.2.1.7. Testing the relationship between the age and type of drivers involved in traffic accidents

A hypothesis was set to test the relationship between the age and type of drivers involved in traffic accidents, which is:

H_0: There is no relationship between the age and type of drivers involved in traffic accidents.

H_1: There is a relationship between the age and type of drivers involved in traffic accidents.

Table 5-34 shows the count, expected count and contribution to chi-square for each age and for each type of driver.

Table 5-34: The minitab output for testing the relationship between the age and type of drivers involved in traffic accidents

Age	Chauffeur	not Chauffeur
< 30		
Count	95	445
Exp count	145.1	394.9
Contri to χ^2	17.302	6.358
30-40		
Count	131	262
Exp count	105.6	287.4
Contri to χ^2	6.107	2.244
40-50		
Count	80	151
Exp count	62.1	168.9
Contri to χ^2	5.177	1.902
> 50		
Count	35	70
Exp count	28.2	76.8
Contri to χ^2	1.632	0.600

Likelihood Ratio Chi-Square = 42.664; DF = 3; P-Value = 0.000

The P-value = 0 < 0.1. So, reject the null hypothesis and conclude that there is a relationship between the age and type of drivers involved in traffic accidents. From Table 5-34, it can be noticed that chauffeurs who are younger than thirty years old, have high positive contributions to chi-square value. On the other hand, chauffeurs who are older than thirty years and younger than fifty years, have high negative contributions to chi-square value. So, chauffeurs younger than thirty years are less dangerous than chauffeurs older than thirty years and younger than fifty years.

It can be noticed that non-chauffeurs who are younger than thirty years old, have high negative contributions to chi-square value. On the other hand, non-chauffeurs who are older than thirty years, have high positive contributions to chi-square value. So, non-chauffeurs younger than thirty years are more dangerous than non-chauffeurs older than thirty years.

5.1.2.1.8. Summary

Based on the analysis of the traffic accidents for all drivers, the following summaries are drawn:

1- There is a relationship between the nationality and the type of drivers involved in traffic accidents. All chauffeurs except Saudi and Arabian chauffeurs have high negative contribution to chi-square. Also, Saudi and Arabian non-chauffeurs have high negative contribution to chi-square. On the other hand, Saudi and Arabic non-chauffeurs are more dangerous than other non-chauffeurs.

2- There is a relationship between the type of accident and the type of drivers involved in traffic accidents. The main contributor to the chi-square value was the chauffeurs whose type of accident was minor and major injuries or death.

3- There is a relationship between the type of accident and the nationality of the driver involved in traffic accidents. Non-Saudi drivers have negative contributions in minor injuries and major injuries or death. Saudi drivers have negative contributions except non-chauffeurs in property damage only. Also, it can be noticed that the Saudi drivers have higher contribution to the chi-square value than the non-Saudi drivers. So, Saudi drivers are more dangerous than non-Saudi drivers.

4- There is a relationship between the cause of accident and the nationality of drivers involved in traffic accidents. The road factor of the other nationality drivers, who are non-Saudi and non-Arabic drivers, is overrepresented statistically.

5- There is a relationship between the type of vehicle and the involvement in traffic accidents. Heavy trucks, which are involved in traffic accidents and whose percentages of involvement in accidents are 100% and 75%, are overrepresented statistically.

6- There is a relationship between the age and nationality of the drivers involved in the traffic accidents, whose percentages of involvement in accidents are 100% and 75%. Some points were noticed:

- Saudi drivers younger than thirty years are more dangerous than Saudi drivers older than thirty years and younger than fifty years.
- Indian drivers younger than thirty years are less dangerous than Indian drivers older than thirty years and younger than forty years.
- Pakistani drivers younger than thirty years are less dangerous than Pakistani drivers older than thirty years and younger than fifty years.
- Filipino drivers younger than thirty years are less dangerous than Filipino drivers older than fifty years.
- Other nationality drivers younger than thirty years are less dangerous than other nationality drivers older than thirty years and younger than forty years.

7- There is a relationship between the age and type of drivers whose percentages of involvement in accidents are 100% and 75%. Chauffeurs younger than thirty years are less dangerous than chauffeurs older than thirty years and younger than fifty years.

5.1.2.2. Analyzing traffic accidents of chauffeurs

This subsection is for chauffeurs who were involved in traffic accidents. The questionnaires were analyzed statistically based on some hypotheses. These hypotheses are testing the relationship between some variables and the involvement of chauffeurs in traffic accidents by using a contingency table. The analyses were done in two groups. Some relationships were rejected at 0.1 level of significance and it was concluded that there is no relationship between them. These relationships are

1- The age and the involvement in traffic accidents.
2- The nationality and the involvement in traffic accidents.
3- The type of accident and the involvement in traffic accidents.
4- The main cause of the accidents and the involvement in traffic accidents.
5- The years of experience as a driver outside Saudi Arabia and the involvement in traffic accidents.
6- The years of experience as a driver inside Saudi Arabia and the involvement in traffic accidents.
7- Where did the chauffeur get his first driving license and the involvement in traffic accidents.
8- The distance between the residence and the workplace, and the involvement in traffic accidents.
9- The kilometers the chauffeur drives per day and the involvement in traffic accidents.

10- The number of hours the chauffeur drives per day and the involvement in traffic accidents.

5.1.2.2.1. Testing the relationship between the type of chauffeur and the involvement in traffic accidents

The hypothesis was set to test the relationship between the type of chauffeur and the involvement in traffic accidents, which is:

H_0: There is no relationship between the type of chauffeur and the involvement in traffic accidents.

H_1: There is a relationship between the type of chauffeur and the involvement in traffic accidents.

Table 5-35 shows the count, expected count and contribution to chi-square for each type of involvement in traffic accidents and for each type of chauffeur.

Table 5-35: The minitab output for testing the relationship between type of chauffeur and the involvement in the traffic accidents

Involvement	type of chauffeur			
	Taxi	**family**	**company**	**government**
Involved				
Count	68	62	160	42
Exp count	79.32	71.30	146.17	35.21
Contri to χ^2	1.616	1.214	1.309	1.311
Neutral				
Count	14	9	25	4
Exp count	12.42	11.17	22.89	5.51
Contri to χ^2	0.200	0.421	0.194	0.416
Not involved				
Count	96	89	143	33
Exp count	86.25	77.53	158.94	38.28
Contri to χ^2	1.102	1.697	1.598	0.728

Pearson Chi-Square = 11.805, DF = 6, P-Value = 0.066

The P-value = 0.066 < 0.1. So, the null hypothesis was rejected and it was concluded that there is a relationship between the type of chauffeur and the involvement in traffic accidents. The company and government chauffeurs who were involved in traffic accidents, have negative contribution to chi-square value. The taxi and government chauffeurs who were neutral in traffic accidents, have negative contribution to chi-square value. The taxi and family chauffeurs who were not involved in traffic accidents, have negative contribution to chi-square value. The results show that the taxi and family chauffeurs are better than the other chauffeurs.

5.1.2.2.2. Testing the relationship between the type of vehicle and the involvement in traffic accidents

The hypothesis was set to test the relationship between the type of vehicle and the involvement in the traffic accidents, which is:

H_0: There is no relationship between the type of vehicle and the involvement in traffic accidents.

H_1: There is a relationship between the type of vehicle and the involvement in traffic accidents.

Table 5-36 shows the count, expected count and contribution to chi-square for each type of involvement in traffic accidents and for each type of vehicle.

Table 5-36: The minitab output for testing the relationship between the type of vehicle and the involvement in traffic accidents for chauffeurs

Involvement	type of the vehicle				
	Sedan	**minibus**	**bus**	**light truck**	**heavy truck**
Involved					
Count	183	45	23	35	73
Exp count	211.57	40.98	17.37	30.73	58.35
Contri to χ^2	3.8579	0.3948	1.8241	0.5924	3.6790
Neutral					
Count	38	3	4	5	14
Exp count	37.72	7.31	3.10	5.48	10.40
Contri to χ^2	0.0021	2.5372	0.2634	0.0419	1.2445
Not involved					
Count	254	44	12	29	44
Exp count	225.71	43.72	18.53	32.79	62.25
Contri to χ^2	3.5449	0.0018	2.3025	0.4376	5.3501

Pearson Chi-Square = 26.074, DF = 8, P-Value = 0.001

Likelihood Ratio Chi-Square = 27.194, DF = 8, P-Value = 0.001

The P-value = 0.001 < 0.1. So, the null hypothesis was rejected and it was conclude that there is a relationship between the type of vehicle and the involvement in traffic accidents. From Table 5-36, it can be noticed that sedans which were involved in traffic accidents, have high positive contribution to chi-square value. On the other hand, sedans, which were not involved in traffic accidents, have high negative contribution to chi-square value.

It can be noticed that heavy trucks which were involved in the traffic accidents, have high negative contribution to chi-square value. On the other hand, heavy trucks which were not involved in traffic accidents, have high positive contribution to chi-square value.

So, heavy vehicles are more involved in traffic accidents than sedans and other vehicles. The reason for this is the physical properties of the heavy vehicles, such as turning radii and the gross weight, compared with other vehicles.

5.1.2.2.3. Testing the relationship between the degree of understanding traffic signs in Arabic and the involvement in traffic accidents

The hypothesis was set to test the relationship between the degree of understanding traffic signs in Arabic and the involvement in traffic accidents, which is:

H_0: There is no relationship between the degree of understanding traffic signs in Arabic and the involvement in traffic accidents.

H_1: There is a relationship between the degree of understanding traffic signs in Arabic and the involvement in traffic accidents.

Table 5-37 shows the count, expected count and contribution to chi-square for each type of involvement in traffic accidents and for each degree of understanding traffic signs in Arabic.

Table 5-37: The minitab output for testing the relationship between the degree of understanding traffic signs in Arabic and the involvement in the traffic accidents for chauffeurs

Involvement	degree of understanding traffic signs in Arabic Yes	Yes with difficulty	No
Involved			
Count	205	58	67
Exp count	222.22	56.77	51.01
Contri to χ^2	1.3341	0.0265	5.0138
Neutral			
Count	44	8	3
Exp count	37.04	9.46	8.50
Contri to χ^2	1.3093	0.2260	3.5600
Not involved			
Count	252	62	45
Exp count	241.75	61.76	55.49
Contri to χ^2	0.4349	0.0009	1.9833

Pearson Chi-Square = 13.889, DF = 4, P-Value = 0.008

Likelihood Ratio Chi-Square = 14.733, DF = 4, P-Value = 0.005

The P-value = 0.008 < 0.1. So, the null hypothesis was rejected and it was concluded that there is a relationship between the degree of understanding traffic signs in Arabic language and the involvement in traffic accidents. From Table 5-37, it can be noticed that the drivers who were involved in traffic accidents and do not understand traffic signs in Arabic, have high negative contribution to chi-square value. On the other hand, it can be noticed that the drivers who were neutral in traffic accidents and do not understand traffic signs in Arabic, have high positive contribution to chi-square value. So, there is an importance in understanding traffic signs in Arabic. The driving schools should focus more to improve and learn the basic Arabic words which are used while driving, to help the drivers focus on driving and not to focus on trying to understand the Arabic words in traffic signs.

5.1.2.2.4. Testing the relationship between the degree of understanding traffic signs in English and the involvement in traffic accidents

The hypothesis was set to test the relationship between the degree of understanding traffic signs in English and the involvement in traffic accidents, which is:

H_0: There is no relationship between the degree of understanding traffic signs in English and the involvement in traffic accidents.

H_1: There is a relationship between the degree of understanding traffic signs in English and the involvement in traffic accidents.

Table 5-38 shows the count, expected count and contribution to chi-square for each type of involvement in traffic accidents and for each degree of understanding traffic signs in English.

Table 5-38: The minitab output for testing the relationship between the degree of understanding traffic signs in English and the involvement in traffic accidents for chauffeurs

Involvement	degree of understanding traffic signs in English		
	Yes	**Yes with difficulty**	**No**
Involved			
Count	195	60	82
Exp count	212.42	57.36	67.22
Contri to χ^2	1.4282	0.1213	3.2494
Neutral			
Count	37	12	5
Exp count	34.04	9.19	10.77
Contri to χ^2	0.2579	0.8582	3.0923
Not involved			
Count	242	56	63
Exp count	227.55	61.45	72.01
Contri to χ^2	0.9182	0.4828	1.1269

Pearson Chi-Square = 11.535, DF = 4, P-Value = 0.021

The P-value = 0.021 < 0.1. So, the null hypothesis was rejected and it was concluded that there is a relationship between the degree of understanding traffic signs in English language and the involvement in the traffic accidents. From Table 5-38, it can be noticed that the drivers who were involved in traffic accidents and do not understand traffic signs in English, have high negative contribution to the chi-square value. On the other hand, it can be noticed that the drivers who were neutral in traffic accidents and do not understand traffic signs in English, have high positive contribution to chi-square value. So, there is an importance in understanding traffic signs in English. Similar to the understanding traffic signs in Arabic, the driving schools should focus more to improve and learn the basic Arabic and English words which are used while driving, to help the drivers to focus on driving and not to focus on trying to understand the words in traffic signs.

5.1.2.2.5. Testing the relationship between the scores of drivers for different involvements in traffic accidents

This test was used to find the relationship between the scores of the drivers for different involvements in traffic accidents by using one way ANOVA. The hypothesis is:

H_0: There is no difference between the means of scores of the chauffeurs for different involvements in traffic accidents.

H_1: There is at least one mean score which is different from the other mean scores.

Table 5-39: The minitab output for testing the relationship between the scores of the driver for different involvements in traffic accidents by using one-way ANOVA for chauffeurs

One-way ANOVA: scores versus involvement

```
Source        DF      SS    MS     F      P
Involvement    2   17.61  8.81  7.61  0.001
Error        704  815.08  1.16
Total        706  832.69
S = 1.076   R-Sq = 2.12%   R-Sq(adj) = 1.84%
                          Individual 90% CIs For Mean Based on
                          Pooled StDev
Level              N   Mean  StDev  ----+---------+---------+---------+-----
Not involved     342  4.383  0.920                          (---*----)
Neutral           49  3.959  1.172  (-----------*-----------)
Involved         316  4.092  1.209              (----*---)
                                    ----+---------+---------+---------+-----
                                     3.75      4.00      4.25      4.50
```

By looking at the ANOVA in Table 5-39, P-value = 0.001 < 0.1. So, the null hypothesis was rejected and it was concluded that there is a difference in means of scores for different nationalities. Table 5-40 shows some grouping letters. By using the Tukey method, levels that share a letter are not significantly different.

Table 5-40: The minitab output for testing the relationship between scores of the drivers for different involvements in traffic accidents by using the Tukey method for chauffeurs

```
Grouping Information Using Tukey Method

level                 N   Mean  Grouping
Not involved    342  4.383  A
Involved        316  4.092    B
Neutral          49  3.959    B

Means that do not share a letter are significantly different.
```

From Table 5-40, it can be noticed that non-involved chauffeurs score higher than other chauffeurs.

5.1.2.2.6. Summary

Based on the analysis of the traffic accidents for chauffeurs, the following summaries are drawn:

1- There is a relationship between the age and type of chauffeurs whose percentages of involvement in accidents are 100% and 75%. Chauffeurs younger than thirty years are less dangerous than chauffeurs older than thirty years and younger than fifty years.

2- There is a relationship between the type of chauffeur and the involvement in traffic accidents.

3- There is a relationship between the type of vehicle and the involvement in traffic accidents. Heavy vehicles are more involved in traffic accidents than sedan and other vehicles. It may be due to physical properties of the heavy vehicles, such as turning radii and the gross weight, compared with other vehicles.

4- Drivers whose percentages of involvement in accidents are 100% and 75% and do not understand traffic signs in Arabic and English, are overrepresented statistically. The drivers whose percentages of involvement in accidents are 50% and do not understand traffic signs in Arabic and English, are overrepresented statistically. So, there is an importance in understanding traffic signs in Arabic and English languages. The driving schools should focus more to improve and learn the basic Arabic words which are used while driving, to help the drivers to focus on driving and not to focus on trying to understand the Arabic and English words in the traffic signs.

5- There is a relationship between the percentage of involvement in traffic accidents and the total scores in traffic signs for chauffeurs. Non-involved chauffeurs score higher than other chauffeurs. Knowing traffic signs and applying the knowledge about it help reduce traffic accidents. So, driving license should be renewed on a regular period. Each time the driving license is renewed, chauffeurs should be tested on traffic signs.

5.2. Analysis of Data Collection from Driving Schools

The traffic knowledge test that was included in the questionnaire (see Appendix) was taken by the drivers selected randomly before enrollment and after graduation from driving schools. The questionnaire was analyzed descriptively and statistically based on some hypotheses which were based on the scores of the drivers.

5.2.1. Descriptive Analysis of Driving School Data

In this section, the questions were analyzed descriptively. This analysis was done by comparing the drivers who answered the questions before enrollment and after graduation from driving schools. There are eight questions that are related to the characteristics of the drivers. Also, there are thirty questions that were set to test the drivers in the traffic knowledge.

5.2.1.1. Characteristics of the Drivers

1- Number of drivers in each driving school

The purpose of this analysis was to find the number and percentage of the drivers who answered the questionnaire in each driving school before enrollment and after graduation from the driving schools. The results of the analysis are shown in Table 5-41 and Figure 5-33.

Table 5-41: The number and percentage of the drivers who answered the questionnaire in each driving school before enrollment and after graduation from the driving schools

Driving school	Before enrollment		After graduation	
	Number	Percentage	Number	Percentage
Khobar	114	20.58	94	18.32
Dammam	151	27.26	175	34.11
Jubal	117	21.12	102	19.88
Riyadh	69	12.45	81	15.79
Jeddah	103	18.59	61	11.89
Total	554	100	513	100

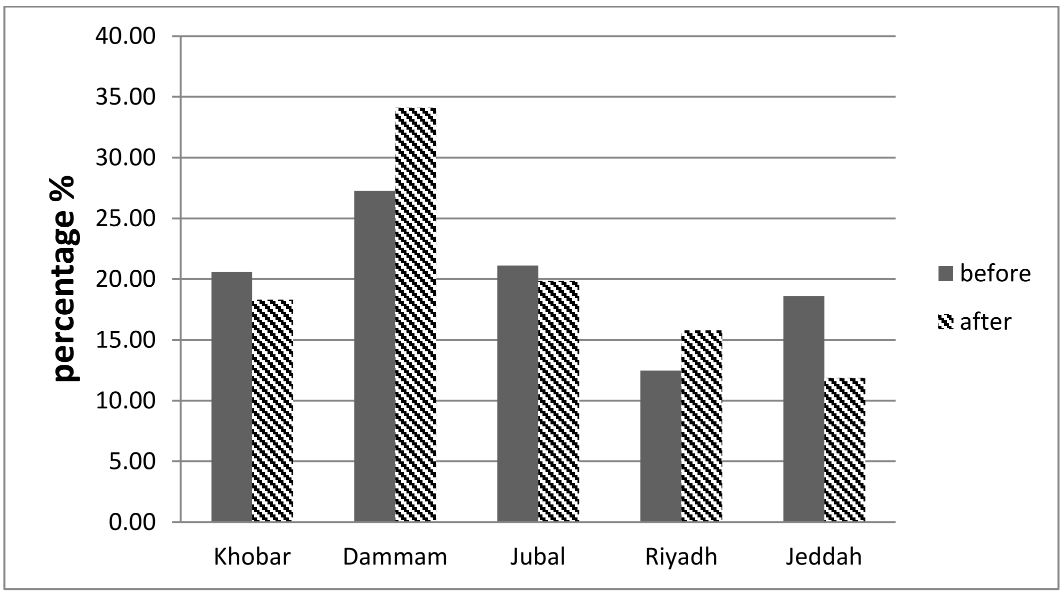

Figure 5-33: The percentage of the drivers who answered the questionnaire in each driving school before enrollment and after graduation from the driving schools

2- Nationality

The purpose of this analysis was to find the number and percentage of nationality of the drivers who answered the questionnaire in all driving schools before enrollment and after graduation from the driving schools. The results of the analysis are shown in Table 5-42 and Figure 5-34.

Table 5-42: The number and percentage of nationality of the drivers who answered the questionnaire in all driving schools before enrollment and after graduation from the driving schools

	Before enrollment		After graduation	
Nationality	**Number**	**Percentage**	**Number**	**Percentage**
Saudi	65	11.73	78	15.20
Arabian	127	22.92	145	28.27
Indian	116	20.94	97	18.91
Pakistani	72	13.00	61	11.89
Bengali	28	5.05	14	2.73
Afghan	2	0.36	2	0.39
Indonesian	4	0.72	1	0.19
Filipino	44	7.94	41	7.99
Nepalese	9	1.62	2	0.39
Other	42	7.58	39	7.60
Missing	45	8.12	33	6.43
Total	554	100	513	100

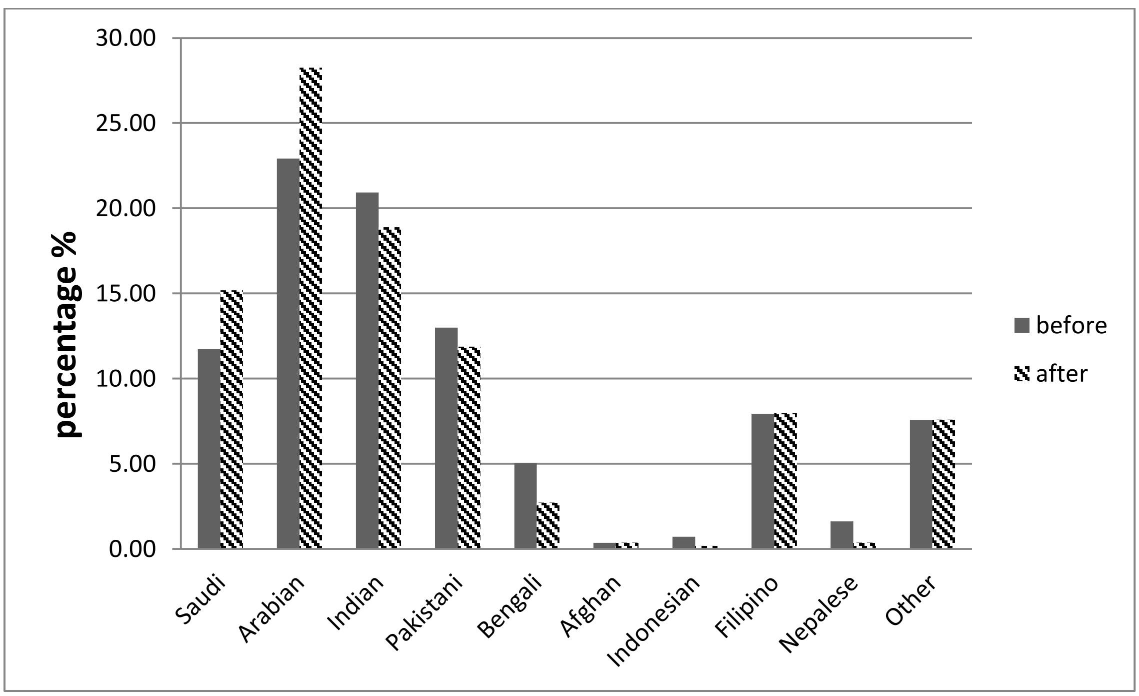

Figure 5-34: The percentage of nationality of the drivers who answered the questionnaire in all driving schools before enrollment and after graduation from the driving schools

3- Native language

The purpose of this analysis was to find the number and percentage of native language of the drivers who answered the questionnaire in all driving schools before enrollment and after graduation from the driving schools. The results of the analysis are shown in Table 5-43 and Figure 5-35.

Table 5-43:The number and the percentage of native language of the drivers who answered the questionnaire in all driving schools before enrollment and after graduation from the driving schools

	Before enrollment		After graduation	
Native language	**Number**	**Percentage**	**Number**	**Percentage**
Arabic	196	35.38	228	44.44
English	10	1.81	13	2.53
Indian	59	10.65	50	9.75
Urdu	85	15.34	75	14.62
Bengali	28	5.05	12	2.34
Tamils	16	2.89	20	3.90
Maleom	51	9.21	29	5.65
Indonesian	3	0.54	1	0.19
Filipino	43	7.76	33	6.43
Turkish	1	0.18	1	0.19
Other	10	1.81	4	0.78
Missing	52	9.39	47	9.16
Total	554	100	513	100

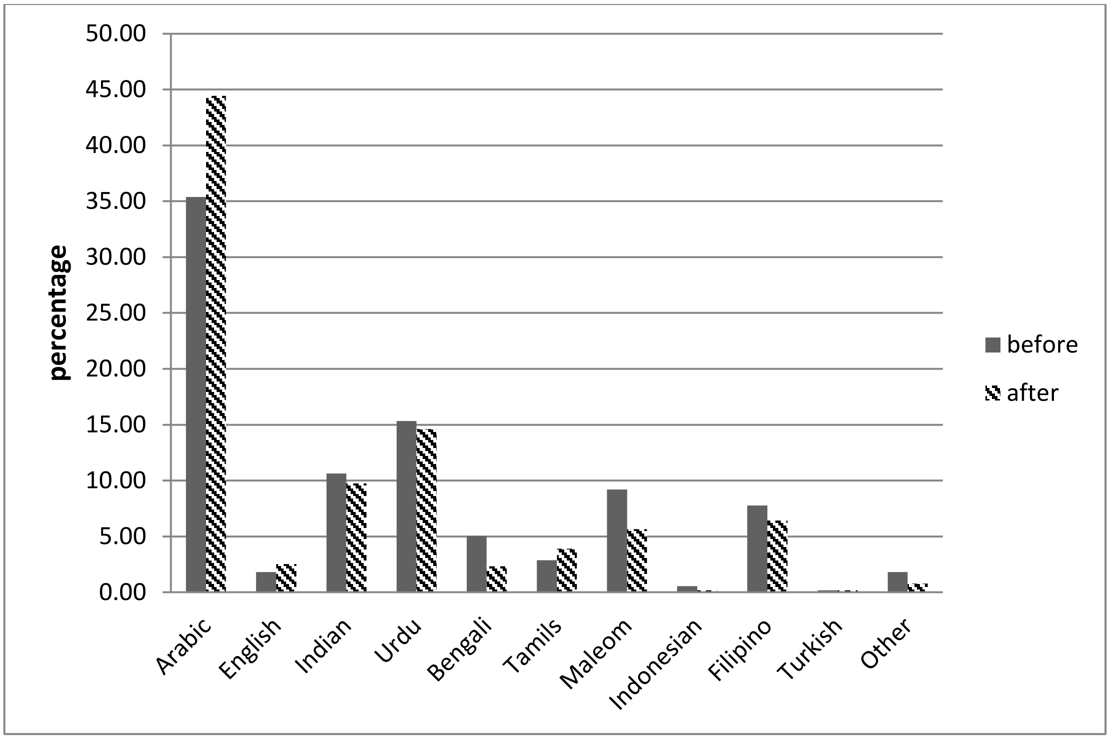

Figure 5-35: The percentage of native language of the drivers who answered the questionnaire in all driving schools before enrollment and after graduation from the driving schools

4- Years of experience as a driver outside Saudi Arabia

The purpose of this analysis was to find the number and percentage of the experience of drivers outside Saudi Arabia who answered the questionnaire in all driving schools before enrollment and after graduation from the driving schools. The results of the analysis are shown in Table 5-44 and Figure 5-36.

Table 5-44: The number and percentage of the experience of drivers outside Saudi Arabia who answered the questionnaire in all driving schools before enrollment and after graduation from the driving schools

	Before enrollment		After graduation	
Years of experience	**Number**	**Percentage**	**Number**	**Percentage**
Less than 1 year	217	39.17	190	37.04
1-2 years	92	16.61	97	18.91
3-5 years	79	14.26	66	12.87
More than 5 years	114	20.58	120	23.39
Missing	52	9.39	40	7.80
Total	554	100	513	100

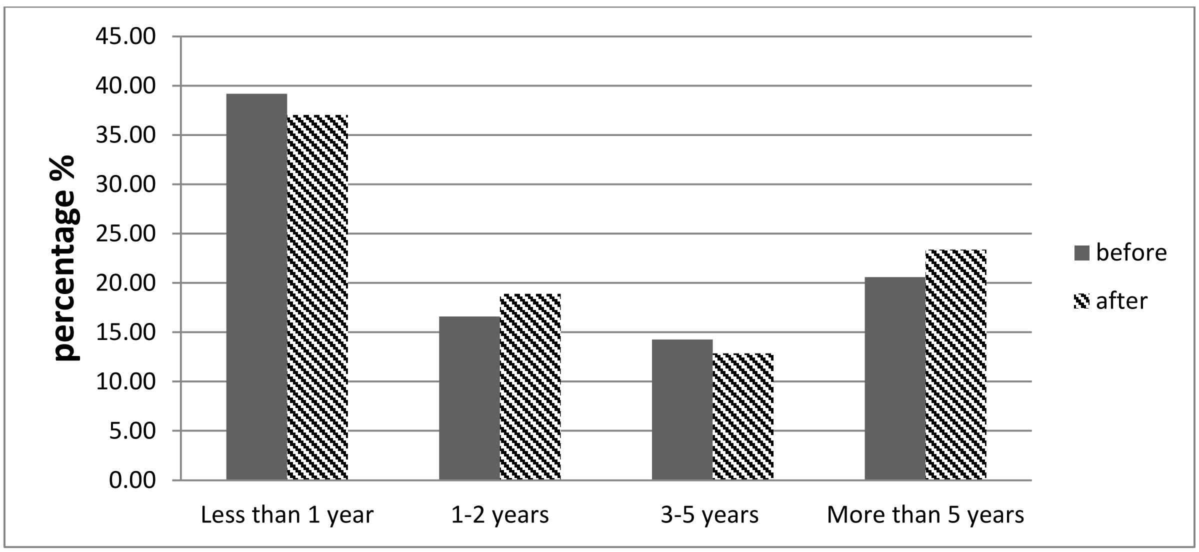

Figure 5-36: The percentage of the experience of drivers outside Saudi Arabia who answered the questionnaire in all driving schools before enrollment and after graduation from the driving schools

5- Level of education

The purpose of this analysis was to find the number and percentage of the level of education of drivers outside Saudi Arabia who answered the questionnaire in all driving schools before enrollment and after graduation from the driving schools. The results of the analysis are shown in Table 5-45 and Figure 5-37.

Table 5-45: The number and percentage of the level of education of drivers outside Saudi Arabia who answered the questionnaire in all driving schools before enrollment and after graduation from the driving schools

	Before enrollment		After graduation	
Level of education	**Number**	**Percentage**	**Number**	**Percentage**
Illiterate	17	3.07	11	2.14
Read and write in native language	144	25.99	117	22.81
Below university	189	34.12	180	35.09
University or higher	166	29.96	175	34.11
Missing	38	6.86	30	5.85
Total	554	100	513	100

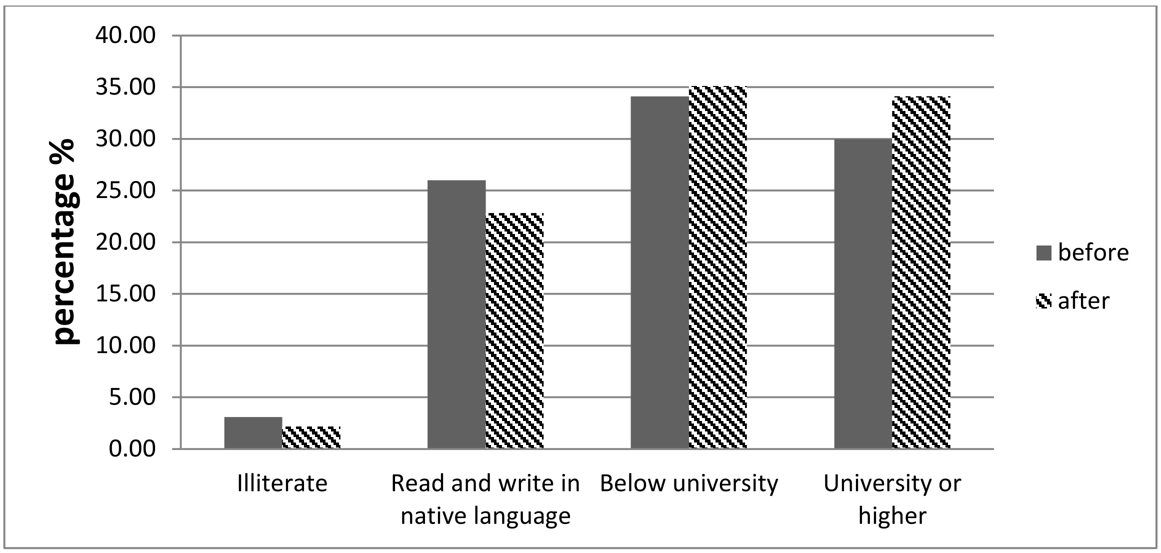

Figure 5-37: The percentage of the level of education of drivers outside Saudi Arabia who answered the questionnaire in all driving schools before enrollment and after graduation from the driving schools

6- Degree of reading and understanding traffic signs written in Arabic language

The purpose of this analysis was to find the number and percentage of degree of reading and understanding traffic signs written in Arabic language of drivers outside Saudi Arabia who answered the questionnaire in all driving schools before enrollment and after graduation from the driving schools. The results of the analysis are shown in Table 5-46 and Figure 5-38.

Table 5-46: The number and percentage of degree of reading and understanding traffic signs written in Arabic language of drivers outside Saudi Arabia who answered the questionnaire in all driving schools before enrollment and after graduation from the driving schools

	Before enrollment		After graduation	
Degree of understanding	**Number**	**Percentage**	**Number**	**Percentage**
Yes	290	52.35	330	64.33
Yes with difficulty	123	22.20	100	19.49
No	124	22.38	77	15.01
Missing	17	3.07	6	1.17
Total	554	100	513	100

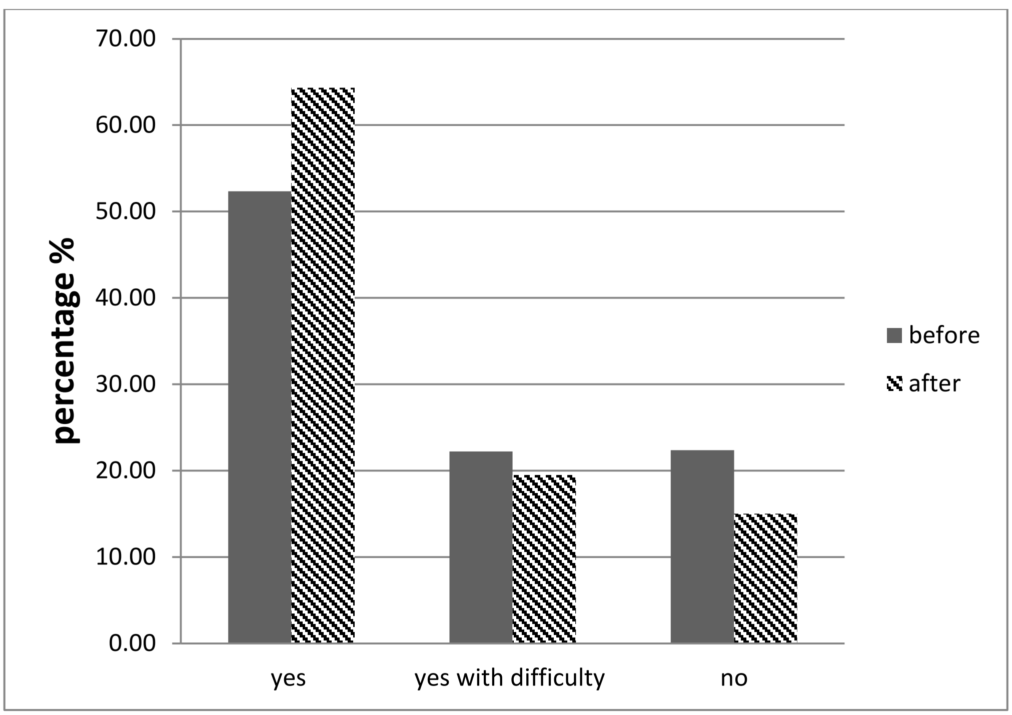

Figure 5-38: The percentage of degree of reading and understanding traffic signs written in Arabic language of drivers outside Saudi Arabia who answered the questionnaire in all driving schools before enrollment and after graduation from the driving schools

7- Degree of reading and understanding traffic signs written in English language

The purpose of this analysis was to find the number and percentage of degree of reading and understanding traffic signs written in English language of drivers outside Saudi Arabia who answered the questionnaire in all driving schools before enrollment and after graduation from the driving schools. The results of the analysis are shown in Table 5-47 and Figure 5-39.

Table 5-47: The number and percentage of degree of reading and understanding traffic signs written in English language of drivers who answered the questionnaire in all driving schools before enrollment and after graduation from the driving schools

	Before enrollment		After graduation	
Degree of understanding	**Number**	**Percentage**	**Number**	**Percentage**
Yes	399	72.02	411	80.12
Yes with difficulty	84	15.16	63	12.28
No	63	11.37	33	6.43
Missing	8	1.44	6	1.17
Total	554	100	513	100

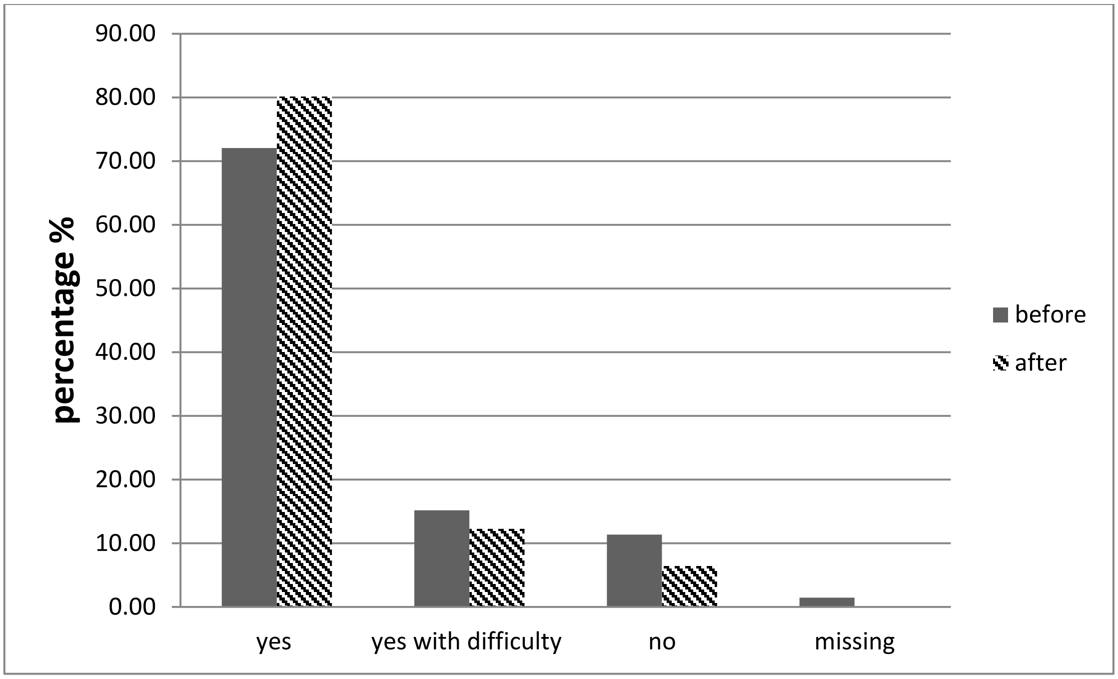

Figure 5-39: The percentage of degree of reading and understanding traffic signs written in English language of drivers outside Saudi Arabia who answered the questionnaire in all driving schools before enrollment and after graduation from the driving schools

8- Type of the drivers

The purpose of this analysis was to find the number and percentage of type of drivers outside Saudi Arabia who answered the questionnaire in all driving schools before enrollment and after graduation from the driving schools. The results of the analysis are shown in Table 5-48 and Figure 5-40.

Table 5-48: The number and percentage of type of drivers outside Saudi Arabia who answered the questionnaire in all driving schools before enrollment and after graduation from the driving schools

	Before enrollment		After graduation	
Type of drivers	**Number**	**Percentage**	**Number**	**Percentage**
Taxi Driver	16	2.89	14	2.73
Family Driver	149	26.90	121	23.59
Company Driver	149	26.90	127	24.76
Governmental Driver	13	2.35	10	1.95
Non-chauffeur	212	38.27	223	43.47
Missing	15	2.71	18	3.51
total	554	100	513	100

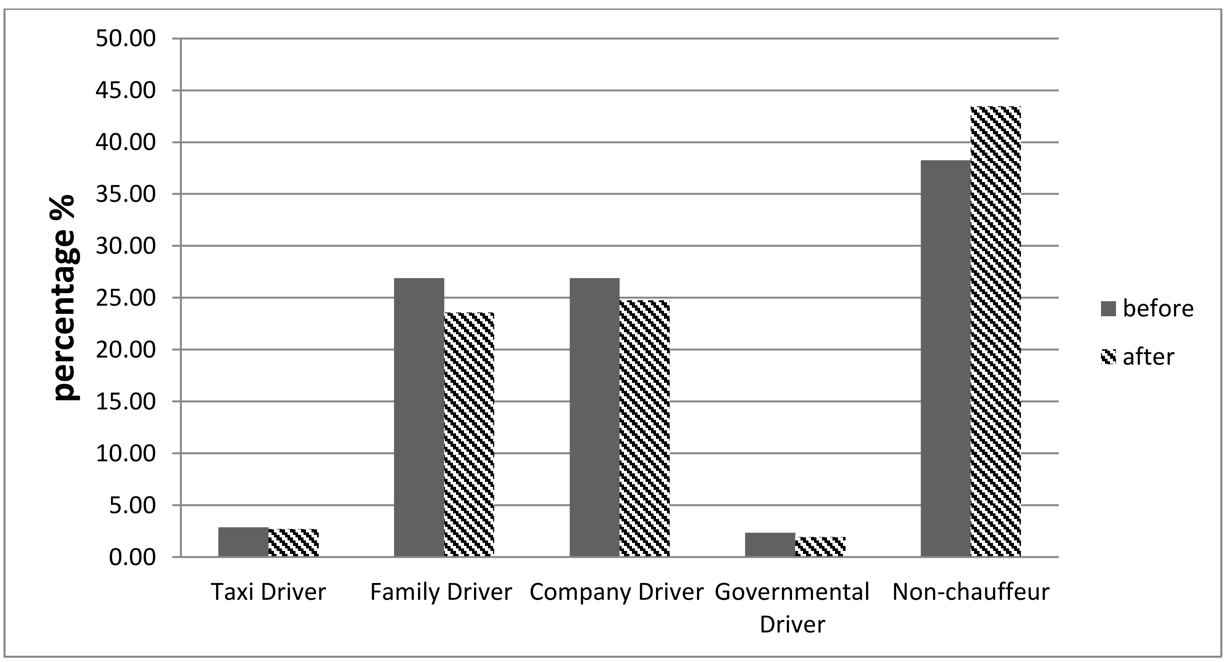

Figure 5-40: The percentage of type of drivers outside Saudi Arabia who answered the questionnaire in all driving schools before enrollment and after graduation from the driving schools

5.2.1.2. Questions in the test

There are thirty questions which the drivers answered in the questionnaire. The correct answer for each question was written in **bold** and underlined in each table. The descriptive analyses for these questions are as follows:

1- Maximum speed for small vehicles within the cities

This question asked was about the maximum speed for small vehicles within the cities in the absence of the speed limit sign. The number and percentage for each choice, which the drivers answered, are shown in Table 5-49 and Figure 5-41. Note that the correct answer is 50 Km/h.

Table 5-49: The number and percentage of maximum speed for small vehicles within the cities

	Before enrollment		After graduation	
Speed	**Number**	**Percentage**	**Number**	**Percentage**
70 km	71	12.82	57	11.11
60 km	118	21.30	84	16.37
**** 50 km***	***92***	***16.61***	***91***	***17.74***
80 km	253	45.67	270	52.63
Missing	20	3.61	11	2.14
Total	554	100	513	100

*the correct answer

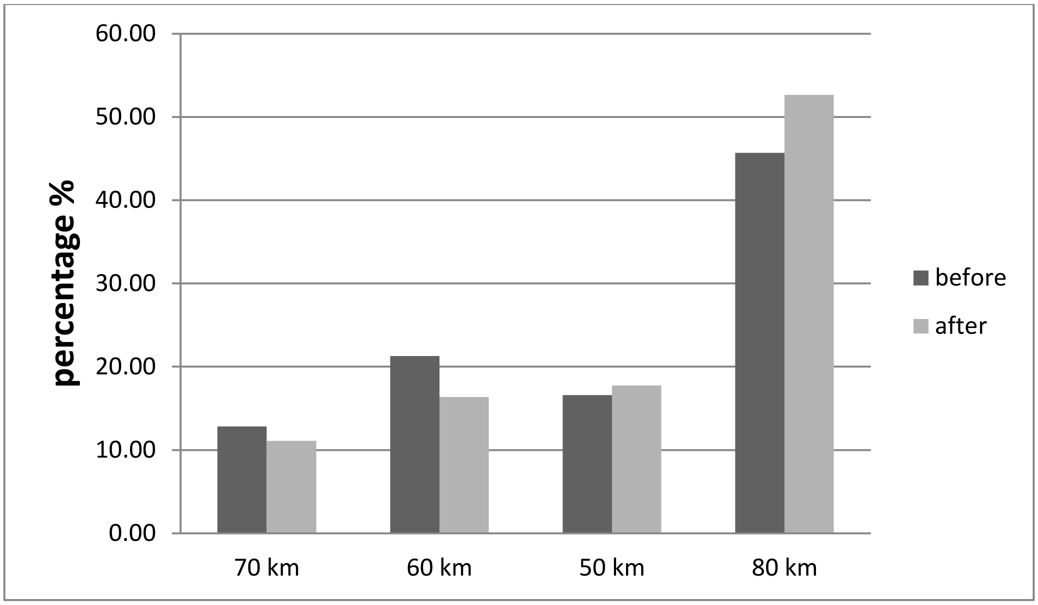

Figure 5-41: The percentage for each choice for maximum speed for small vehicles within the cities

From Table 5-49, it can be noticed that although there is an improvement in the percentage of answering this question before enrollment and after graduation from the driving schools, the difference in the improvement between the two percentages is only 1.13%. But only 17.74% of the drivers answered this question correctly after graduation from the driving schools. This means that most of the drivers failed to know the maximum speed for small vehicles within the cities.

2- The maximum weight of vehicles for private driving license

This question asked was about the maximum weight of vehicles for private driving license. The number and percentage for each choice, which the drivers answered, are shown in Table 5-50 and Figure 5-42. Note that the correct answer is 3.5 tons.

Table 5-50: The number and percentage for each choice of the maximum weight of vehicles for private driving license

	Before enrollment		After graduation	
Weight	**Number**	**Percentage**	**Number**	**Percentage**
5 tons	74	13.36	70	13.65
****3.5 tons***	***236***	***42.60***	***226***	***44.05***
1.5 tons	177	31.95	163	31.77
10 tons	22	3.97	16	3.12
Missing	45	8.12	38	7.41
Total	554	100	513	100

*the correct answer

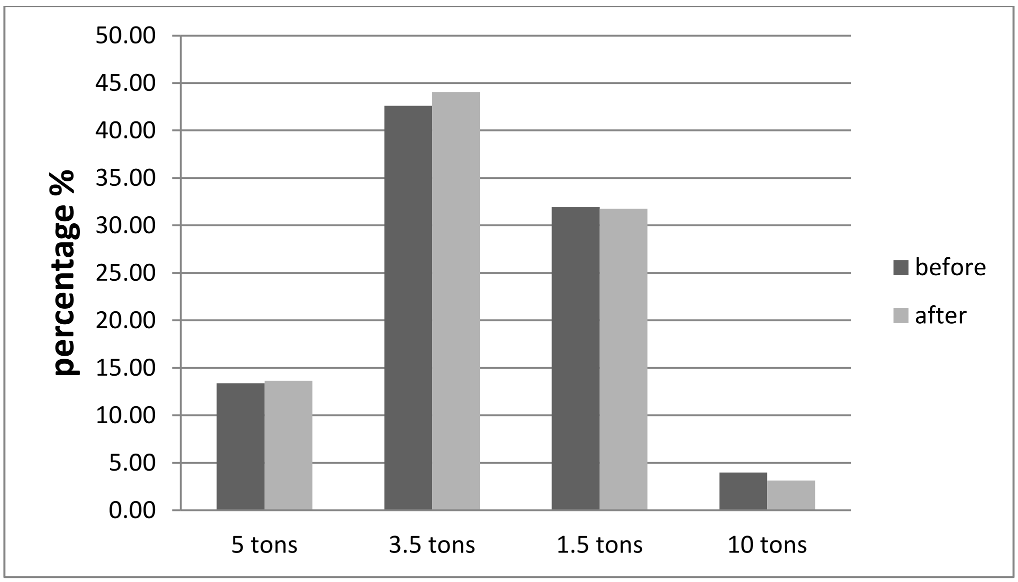

Figure 5-42: The percentage for each choice of the maximum weight of vehicles for private driving license

From Table 5-50, it can be noticed that although there is an improvement in the percentage of answering this question before enrollment and after graduation from the driving schools, the difference in the improvement between the two percentages is only 1.45%. But only 44.05% of the drivers answered this question correctly after graduation from the driving schools. This means that half of the drivers failed to know the maximum weight of vehicles for private driving license.

3- The traffic safety rules for passing vehicles

This question asked was about the traffic safety rules for passing vehicles. The number and percentage for each choice, which the drivers answered, are shown in Table 5-51 and Figure 5-43. Note that the correct answer is all of the above.

Table 5-51: Number and percentage for each choice of the traffic safety rules for passing vehicles

The traffic safety rules for passing vehicles	Before enrollment		After graduation	
	Number	Percentage	Number	Percentage
Ensure a safe distance between your vehicle and the vehicle in front of you which you intend to pass	45	8.12	32	6.24
Make sure that the lane which you want to move to is free from other vehicles	50	9.03	32	6.24
Use you turning signal (right or left), as required	59	10.65	37	7.21
***All of the above**	***377***	***68.05***	***398***	***77.58***
Missing	23	4.15	14	2.73
Total	554	100	513	100

*the correct answer

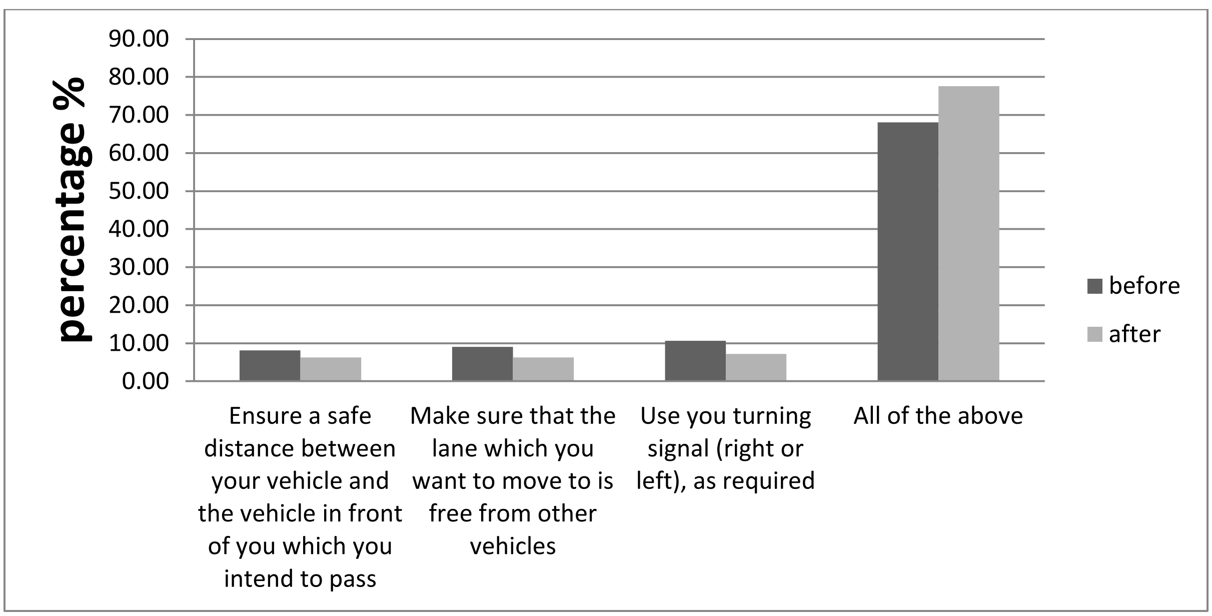

Figure 5-43: The percentage for each choice of the traffic safety rules for passing vehicle

From Table 5-51, it can be noticed that there is an improvement in the percentage of answering this question before enrollment and after graduation from the driving schools. The difference in the improvement between the two percentages is 9.53%. 77.58% of the drivers answered this question correctly after graduation from the driving schools. This means that most of the drivers succeeded to know the traffic safety rules for passing vehicles.

4- The traffic safety rules for entering a freeway

This question asked was about the traffic safety rules for entering a freeway. The number and percentage for each choice, which the drivers answered, are shown in Table 5-52 and Figure 5-44.

Table 5-52: The number and percentage for each choice of the traffic safety rules for entering a freeway

	Before enrollment		After graduation	
The traffic safety rules for entering a freeway	**Number**	**Percentage**	**Number**	**Percentage**
Accelerate gradually to match the freeway traffic speed and use turning signal	125	22.56	97	18.91
Be cautious in entering the right lane of the freeway and merge smoothly with the traffic	110	19.86	66	12.87
****The above two answers***	***265***	***47.83***	***307***	***59.84***
None of the above answers	27	4.87	25	4.87
Missing	27	4.87	18	3.51
Total	554	100	513	100

*the correct answer

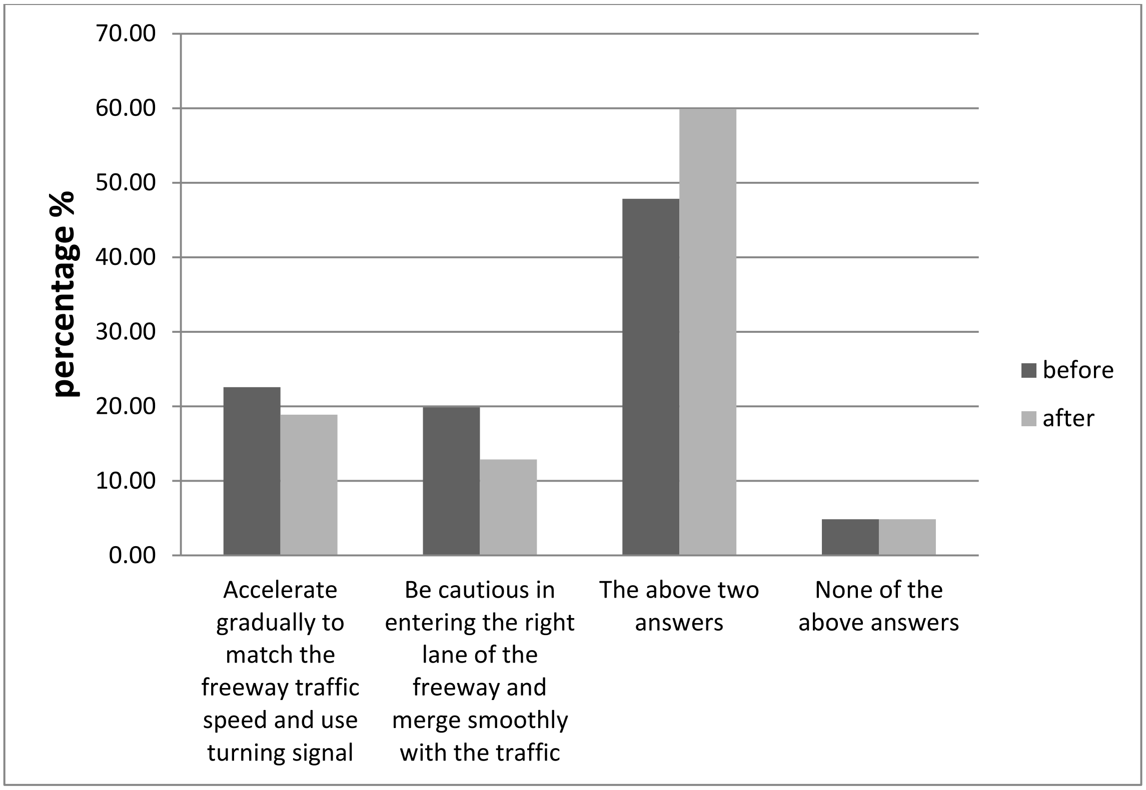

Figure 5-44: The percentage for each choice for the traffic safety rules for entering a freeway

From Table 5-52, it can be noticed that there is an improvement in percentage of answering this question before enrollment and after graduation from driving schools. The difference in the improvement between the two percentages is 12.01%. 59.84% of the drivers answered this question correctly after graduation from the driving schools. This means that most of the drivers succeeded to know the traffic safety rules for entering a freeway. Note that the correct answer is the two above answers.

5- The safety rules for crossing a work zone

This question asked about the traffic safety rules for crossing a work zone. The number and percentage for each choice, which the drivers answered, are shown in Table 5-53 and Figure 5-45. Note that the correct answer is slow down and be alert.

Table 5-53: Number and percentage for each choice of the safety rules for crossing a work zone

	Before enrollment		After graduation	
The safety rules for crossing a work zone	**Number**	**Percentage**	**Number**	**Percentage**
Change your lane to another one	45	8.12	32	6.24
***Slow down and be alert**	**383**	**69.13**	**367**	**71.54**
Stop driving	10	1.81	10	1.95
All of the above answers	90	16.25	93	18.13
Missing	26	4.69	11	2.14
Total	554	100	513	100

*the correct answer

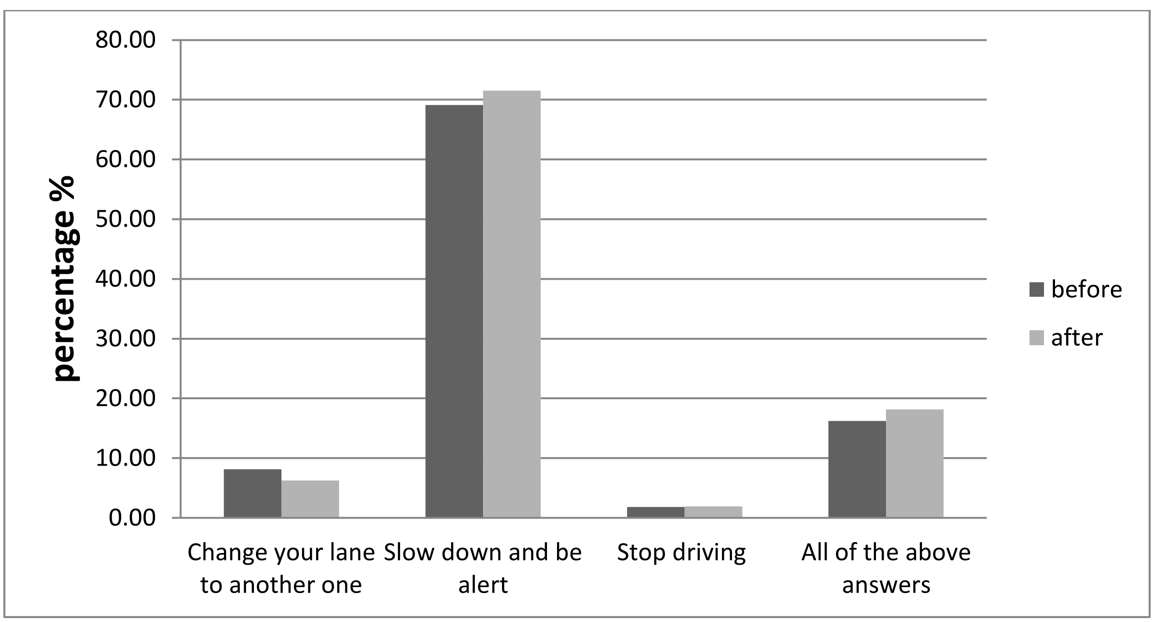

Figure 5-45: The percentage for each choice of the safety rules for crossing a work zone

From Table 5-53, it can be noticed that although the difference in the improvement in the percentage of answering this question before enrollment and after graduation from the driving schools is only 2.41%, 71.54% of the drivers answered this question correctly after graduation from the driving schools. This means that most of the drivers succeeded to know the safety rules for crossing a work zone.

6- The traffic safety rules for seeing an emergency vehicle coming from the back

This question asked was about the traffic safety rules for seeing an emergency vehicle coming from the back and flashing its lights or putting the siren on. The number and percentage for each choice, which the drivers answered, are shown in Table 5-54 and Figure 5-46. Note that the correct answer is open the way for it to pass you without dangering yourself or the other drivers.

Table 5-54: The number and percentage for each choice of the traffic safety rules for seeing an emergency vehicle coming from the back

	Before enrollment		After graduation	
The traffic safety rules for seeing an emergency vehicle coming from the back	**Number**	**Percentage**	**Number**	**Percentage**
Keep driving at the same speed and do not allow it to pass you	9	1.62	10	1.95
Open the way for it to pass you without dangering yourself or the other drivers	***499***	***90.07***	***464***	***90.45***
Increase your vehicle speed	3	0.54	3	0.58
None of the above answers	26	4.69	26	5.07
Missing	17	3.07	10	1.95
Total	554	100	513	100

*the correct answer

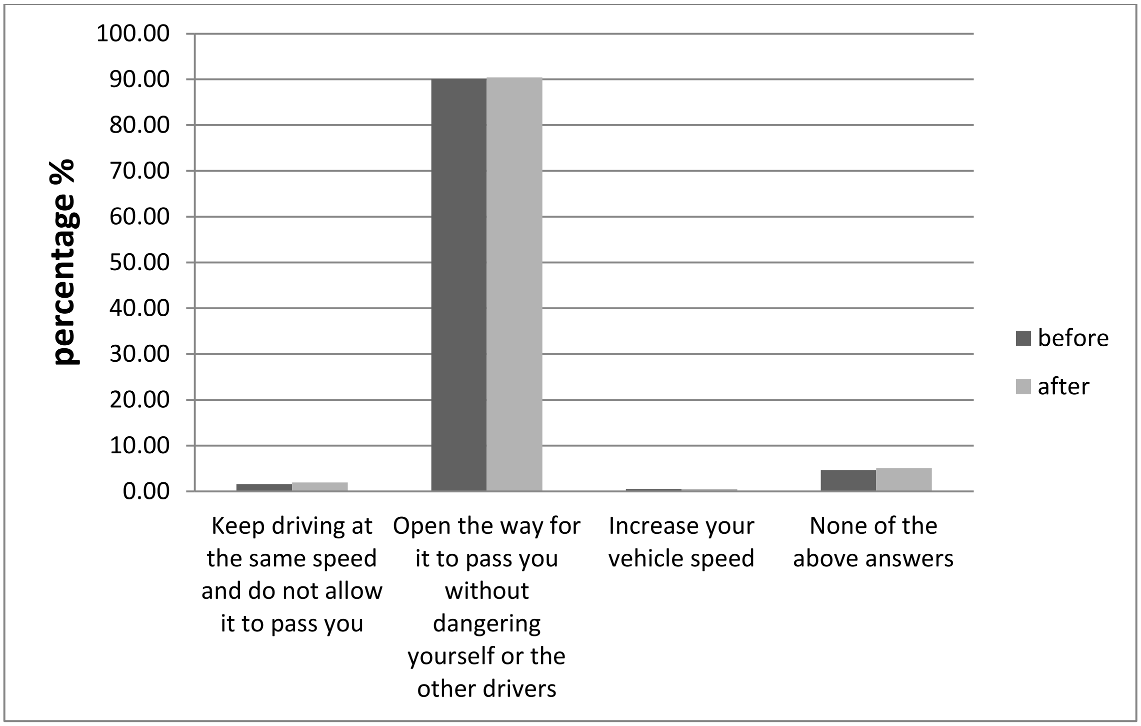

Figure 5-46: The percentage for each choice of the traffic safety rules for seeing an emergency vehicle coming from the back

From Table 5-54, it can be noticed that although the difference in the improvement in percentage of answering this question before enrollment and after graduation from the driving schools is only 0.38%, 90.45% of the drivers answered this question correctly after graduation from the driving schools. This means that most of the drivers succeeded to know the traffic safety rules for seeing an emergency vehicle coming from the back.

7- The traffic safety rules for exiting a main road to service road, and right-of-way for vehicles

This question asked was about the traffic safety rules for exiting a main road to service road, and right-of-way for vehicles. The number and percentage for each choice, which the drivers answered, are shown in Table 5-55 and Figure 5-47. Note that the correct answer is vehicles on the service road.

Table 5-55: The number and percentage of each choice for the traffic safety rules for exiting a main road to service road, and right-of-way for vehicles

	Before enrollment		After graduation	
The traffic safety rules for exiting a main road to service road, and right-of-way for vehicles	**Number**	**Percentage**	**Number**	**Percentage**
Vehicles on the main road	151	27.26	144	28.07
Vehicles with high speed	61	11.01	46	8.97
****Vehicles on the service road***	***262***	***47.29***	***261***	***50.88***
None of the above answers	35	6.32	32	6.24
Missing	45	8.12	30	5.85
Total	554	100	513	100

*the correct answer

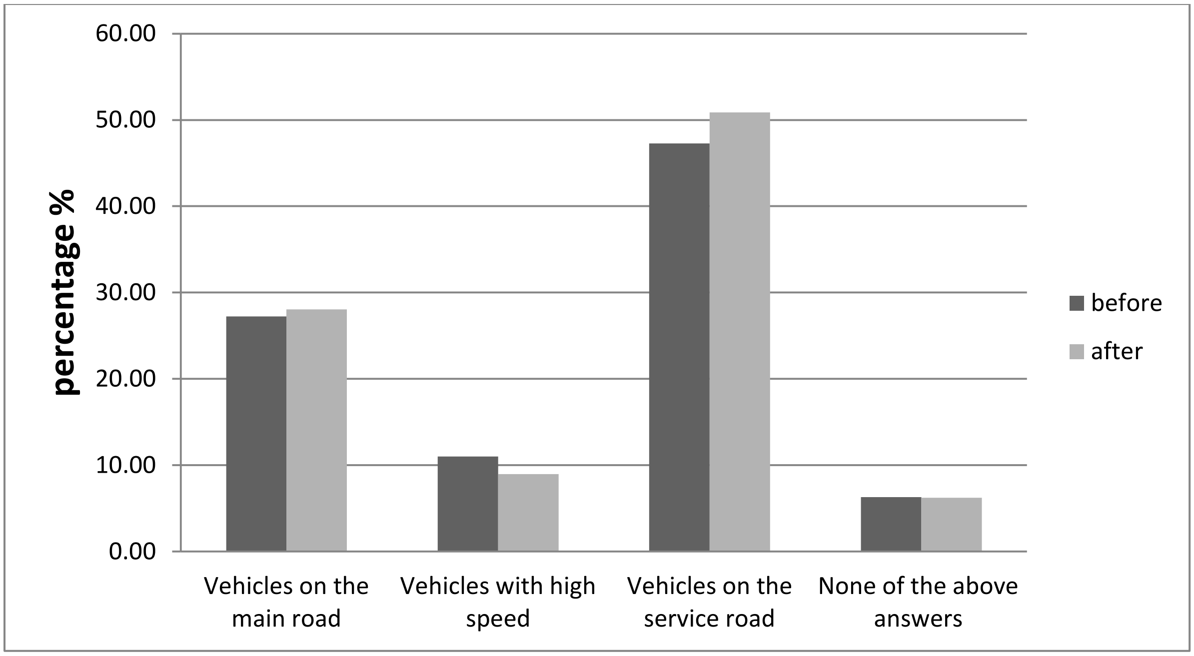

Figure 5-47: The percentage for each choice of the traffic safety rules for exiting a main road to service road, and right-of-way for vehicles

From Table 5-55, it can be noticed that although there is an improvement in the percentage of answering this question before enrollment and after graduation from the driving schools, the difference in the improvement between the two percentages is only 3.59%. But 50.88% of the drivers answered this question correctly after graduation from the driving schools. This means that almost half of the drivers failed to know the traffic safety rules for exiting a main road to service road, and right-of-way for vehicles.

8- What the driver should do when the tires of the vehicle explode

This question asked was about what the driver should do when the tires of the vehicle explode. The number and percentage for each choice, which the drivers answered, are shown in Table 5-56 and Figure 5-48. Note that the correct answer is the two above answers.

Table 5-56: The number and percentage of what the driver should do when the tires of the vehicle explode

	Before enrollment		After graduation	
What the driver should do when the tires of the vehicle explode	**Number**	**Percentage**	**Number**	**Percentage**
Lift your foot from accelerator and do not apply the brakes	63	11.37	39	7.60
Hold the steering wheel firmly and maintain the vehicle's direction in a straight line	145	26.17	104	20.27
****The above two answers***	***301***	***54.33***	***329***	***64.13***
None of the above answers	19	3.43	29	5.65
Missing	26	4.69	12	2.34
Total	554	100	513	100

*the correct answer

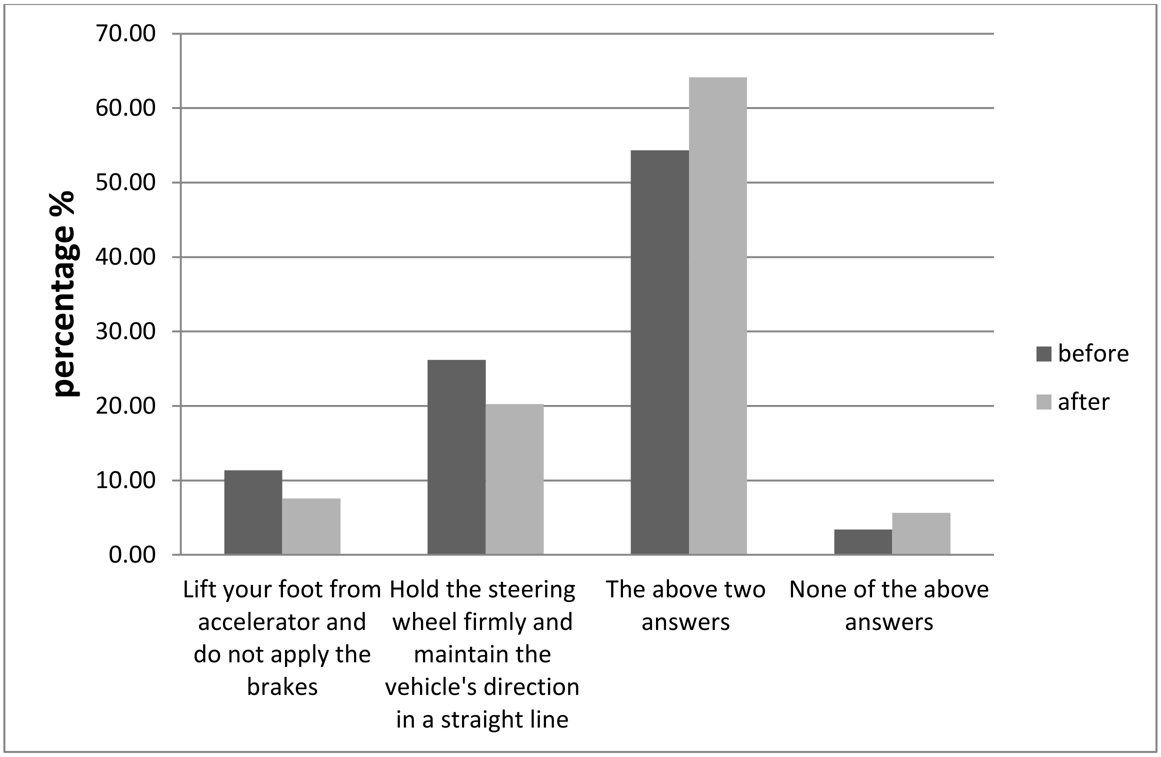

Figure 5-48: The percentage for each choice of what the driver should do when the tires of the vehicle explode

From Table 5-56, it can be noticed that there is an improvement in percentage of answering this question before enrollment and after graduation from the driving schools. The difference in the improvement between the two percentages is 9.80%, and 64.13% of the drivers answered this question correctly after graduation from the driving schools. This means that most of the drivers succeeded to know what the driver should do when the tires of the vehicle explode.

9- The meaning of the traffic sign

This question asked was about the meaning of the traffic sign shown in Figure 5-49. The number and percentage for each choice, which the drivers answered, are shown in Table 5-57 and Figure 5-50. Note that the correct answer is the speed limit.

Figure 5-49: The traffic sign

Table 5-57: The number and percentage for each choice of the meaning of the traffic sign

The meaning of the traffic sign	Before enrollment		After graduation	
	Number	Percentage	Number	Percentage
Stop	8	1.44	6	1.17
***Speed limit**	**509**	**91.88**	**487**	**94.93**
Give way	11	1.99	8	1.56
No parking	4	0.72	2	0.39
Missing	22	3.97	10	1.95
Total	554	100	513	100

*the correct answer

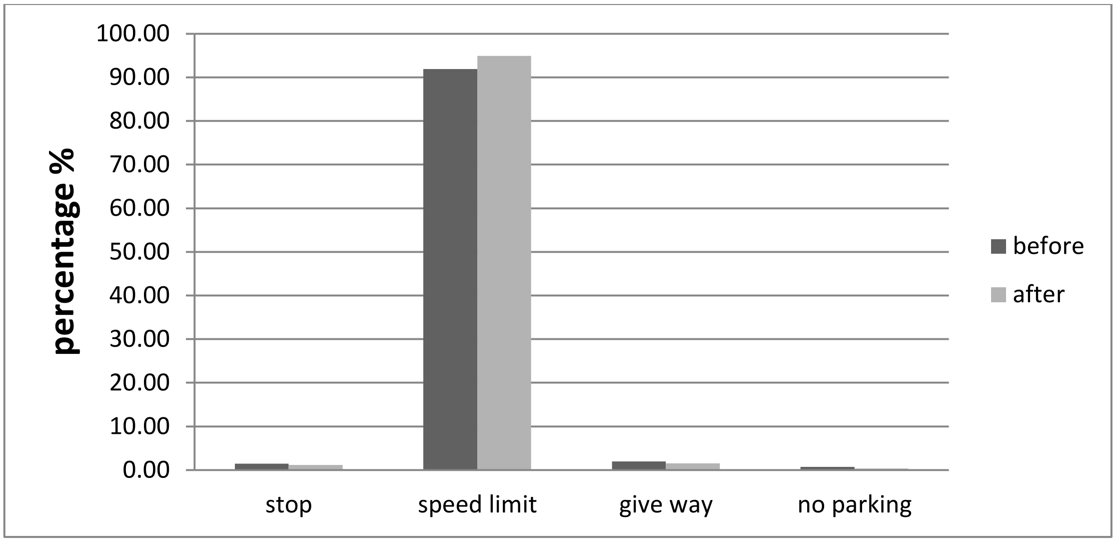

Figure 5-50: The percentage for each choice of the meaning of the traffic sign

From Table 5-57, it can be noticed that although there is an improvement in the percentage of answering this question before enrollment and after graduation from the driving schools, the difference in the improvement between the two percentages is only 3.03%. But 94.93% of the drivers answered this question correctly after graduation from the driving schools. This means that most of the drivers succeeded to know the meaning of the traffic sign.

10- The meaning of the traffic sign

This question asked was about the meaning of the traffic sign shown in Figure 5-51. The number and percentage for each choice, which the drivers answered, are shown in Table 5-58 and Figure 5-52. Note that the correct answer is give way.

Figure 5-51: The traffic sign

Table 5-58: The number and percentage for each choice of the meaning of the traffic sign

The meaning of the traffic sign	Before enrollment		After graduation	
	Number	Percentage	Number	Percentage
No overtaking	42	7.58	35	6.82
Give way	**386**	**69.68**	**389**	**75.83**
No entry	57	10.29	28	5.46
Stop	28	5.05	29	5.65
Missing	41	7.40	32	6.24
Total	554	100	513	100

*the correct answer

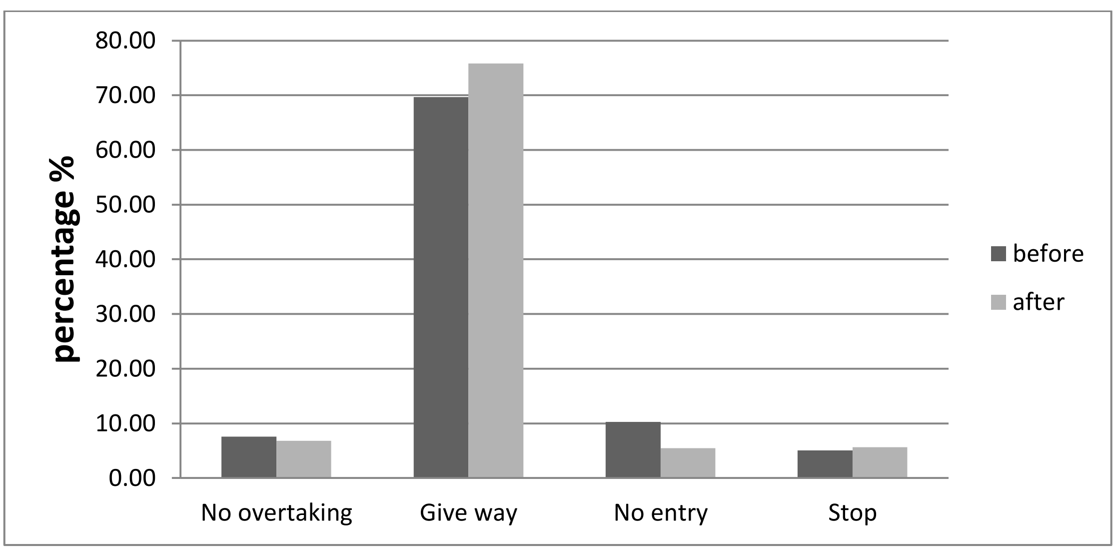

Figure 5-52: The percentage for each choice of the meaning of the traffic sign

From Table 5-58, it can be noticed that the difference in the improvement in the percentage of answering this question before enrollment and after graduation from the driving schools is 6.15%. 75.83% of the drivers answered this question correctly after graduation from the driving schools. This means that most of the drivers succeeded to know meaning of the traffic sign. Note that the correct answer is no entry.

11- The meaning of the traffic sign

This question asked was about the meaning of the traffic sign shown in Figure 5-53. The number and percentage for each choice, which the drivers answered, are shown in Table 5-59 and Figure 5-54.

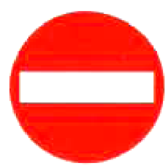

Figure 5-53: The traffic sign

Table 5-59: The number and percentage for each choice of the meaning of the traffic sign

	Before enrollment		**After graduation**	
The meaning of the traffic sign	**Number**	**Percentage**	**Number**	**Percentage**
No passing	40	7.22	42	8.19
Speed limit	19	3.43	8	1.56
***No entry**	**431**	**77.80**	**424**	**82.65**
No parking	41	7.40	33	6.43
Missing	23	4.15	6	1.17
Total	554	100	513	100

*the correct answer

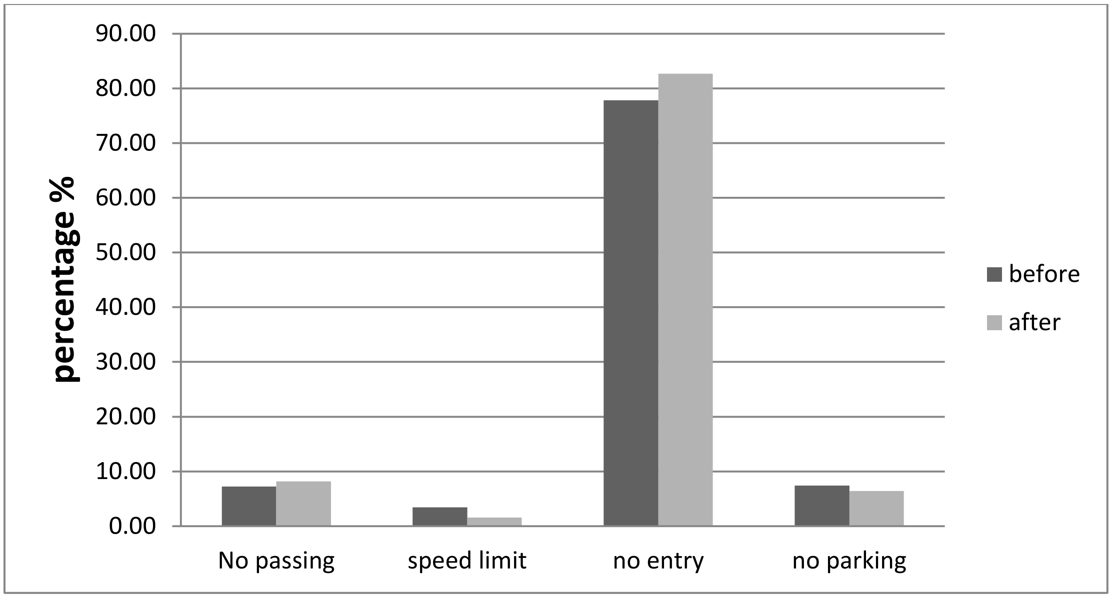

Figure 5-54: The percentage for each choice of the meaning of the traffic sign

From Table 5-59, it can be noticed that the difference in the improvement in percentage of answering this question before enrollment and after graduation from the driving schools is 4.85%. 82.65% of the drivers answered this question correctly after graduation from the driving schools. This means that most of the drivers succeeded to know the meaning of the traffic sign.

12- The meaning of the traffic sign

This question asked was about the meaning of the traffic sign shown in Figure 5-55. The number and percentage for each choice, which the drivers answered, are shown in Table 5-60 and Figure 5-56. Note that the correct answer is no passing.

Figure 5-55: The traffic sign

Table 5-60: The number and percentage for each choice of the meaning of the traffic sign

The meaning of the traffic sign	Before enrollment		After graduation	
	Number	**Percentage**	**Number**	**Percentage**
No passing	***486***	***87.73***	***460***	***89.67***
Speed limit	19	3.43	19	3.70
No entry	9	1.62	17	3.31
No parking	21	3.79	8	1.56
Missing	19	3.43	9	1.75
Total	554	100	513	100

*the correct answer

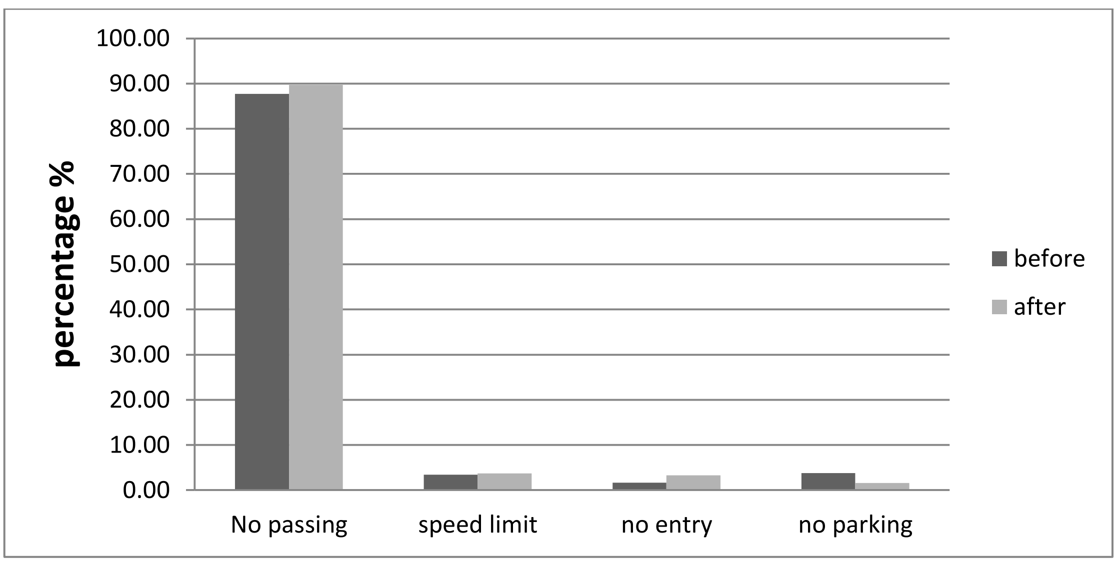

Figure 5-56: The percentage for each choice of the meaning of the traffic sign

From Table 5-60, it can be noticed that although the difference in the improvement in the percentage of answering this question before enrollment and after graduation from the driving schools is only 1.94%, 89.67% of the drivers answered this question correctly after graduation from the driving schools. This means that most of the drivers succeeded to know the meaning of the traffic sign.

13- The meaning of the traffic sign

This question asked was about the meaning of the traffic sign shown in Figure 5-57. The number and percentage for each choice, which the drivers answered, are shown in Table 5-61 and Figure 5-58. Note that the correct answer is no waiting and parking.

Figure 5-57: The traffic sign

Table 5-61: The number and percentage for each choice of the meaning of the traffic sign

	Before enrollment		After graduation	
The meaning of the traffic sign	**Number**	**Percentage**	**Number**	**Percentage**
No passing	14	2.53	15	2.92
Stop	23	4.15	27	5.26
No entry	84	15.16	54	10.53
***No waiting and parking**	***420***	***75.81***	***407***	***79.34***
Missing	13	2.35	10	1.95
Total	554	100	513	100

*the correct answer

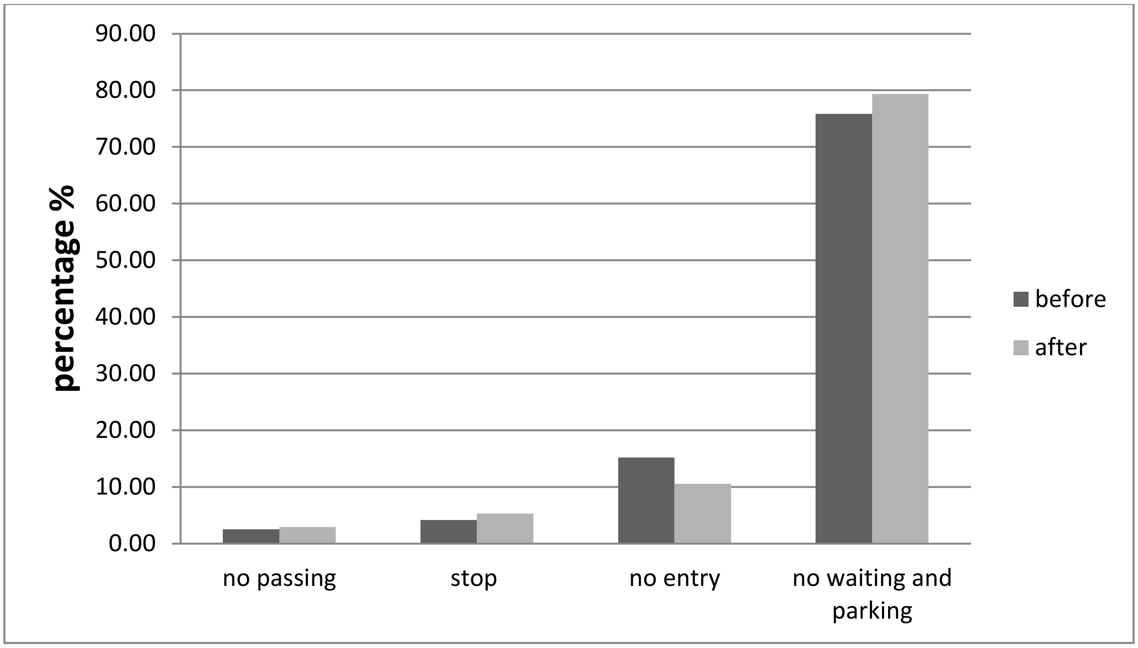

Figure 5-58: The percentage for each choice of the meaning of the traffic sign

From Table 5-61, it can be noticed that although the difference in the improvement in percentage of answering this question before enrollment and after graduation from the driving schools is only 3.53%, 79.34% of the drivers answered this question correctly after graduation from the driving schools. This means that most of the drivers succeeded to know the meaning of the traffic sign.

14- The meaning of the traffic sign

This question asked was about the meaning of the traffic sign shown in Figure 5-59. The number and percentage for each choice, which the drivers answered, are shown in Table 5-62 and Figure 5-60. Note that the correct answer is stop.

Figure 5-59: The traffic sign

Table 5-62: The number and percentage for each choice of the meaning of the traffic sign

The meaning of the traffic sign	Before enrollment		After graduation	
	Number	Percentage	Number	Percentage
No passing	7	1.26	1	0.19
***Stop**	**515**	**92.96**	**489**	**95.32**
No entry	13	2.35	4	0.78
No parking	4	0.72	10	1.95
Missing	15	2.71	9	1.75
Total	554	100	513	100

*the correct answer

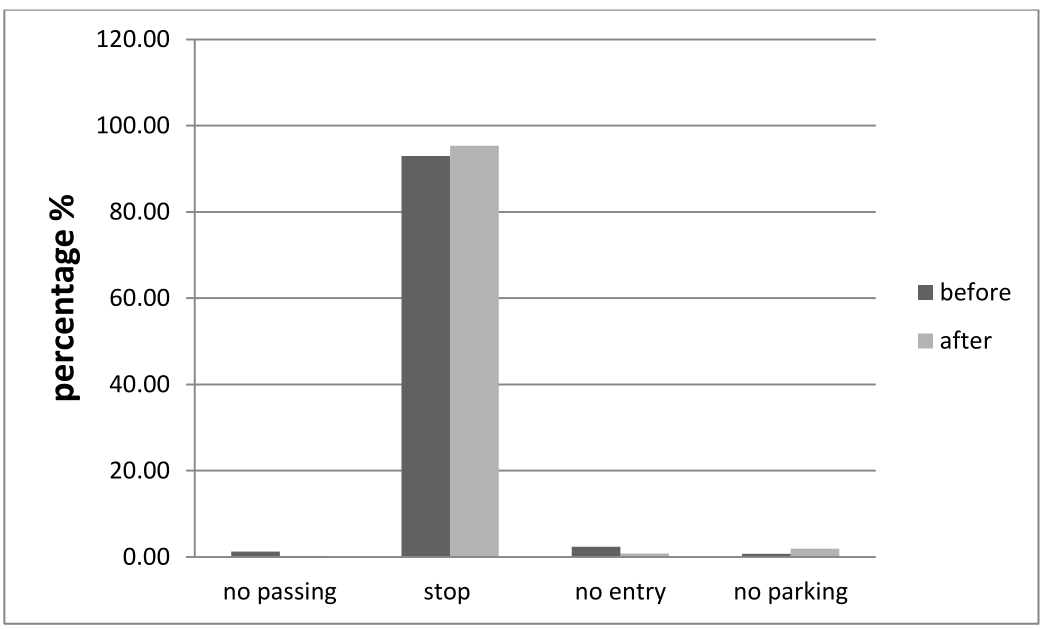

Figure 5-60: The percentage for each choice of the meaning of the traffic sign

From Table 5-62, it can be noticed that although the difference in the improvement in percentage of answering this question before enrollment and after graduation from the driving schools is only 2.36%, 95.32% of the drivers answered this question correctly after graduation from the driving schools. This means that most of the drivers succeeded to know the meaning of the traffic sign.

15- The meaning of the traffic sign

This question asked was about the meaning of the traffic sign shown in Figure 5-61. The number and percentage for each choice, which the drivers answered, are shown in Table 5-63 and Figure 5-62. Note that the correct answer is pedestrian crossing.

Figure 5-61: The traffic sign

Table 5-63: The number and the percentage for each choice of the meaning of the traffic sign

	Before enrollment		After graduation	
The meaning of the traffic sign	**Number**	**Percentage**	**Number**	**Percentage**
Pedestrian crossing ahead	283	51.08	279	54.39
Pedestrian crossing	***215***	***38.81***	***191***	***37.23***
Pedestrian prohibited	28	5.05	18	3.51
Stop	17	3.07	11	2.14
Missing	11	1.99	14	2.73
Total	554	100	513	100

*the correct answer

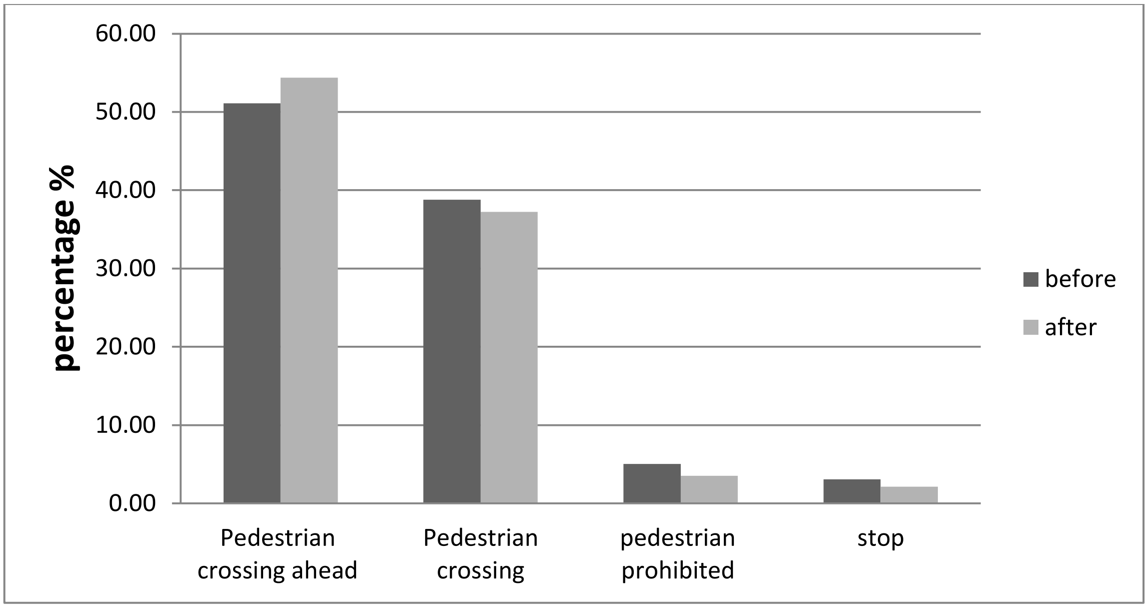

Figure 5-62: The percentage for each choice of the meaning of the traffic sign

From Table 5-63, it can be noticed that there is no improvement in the percentage of answering this question before enrollment and after graduation from the driving school. The difference in the improvement between the two percentages dropped by 1.58%, and only 37.23% of the drivers answered this question correctly after graduation from the driving schools. This means that less than half of the drivers failed to know the meaning of the traffic sign.

16- The meaning of the lane mark

This question asked was about the meaning of the lane mark shown in Figure 5-63. The number and percentage for each choice, which the drivers answered, are shown in Table 5-64 and Figure 5-64. Note that the correct answer is no overtaking or turning left.

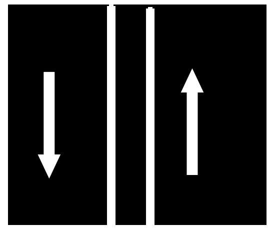

Figure 5-63: The lane mark

Table 5-64: The number and percentage for each choice of the meaning of the lane mark

The meaning of the lane mark	Before enrollment		After graduation	
	Number	Percentage	Number	Percentage
No overtaking or turning left	***384***	***69.31***	***372***	***72.51***
No entry	18	3.25	18	3.51
Overtaking is allowed	88	15.88	85	16.57
No stop	38	6.86	19	3.70
Missing	26	4.69	19	3.70
Total	554	100	513	100

*the correct answer

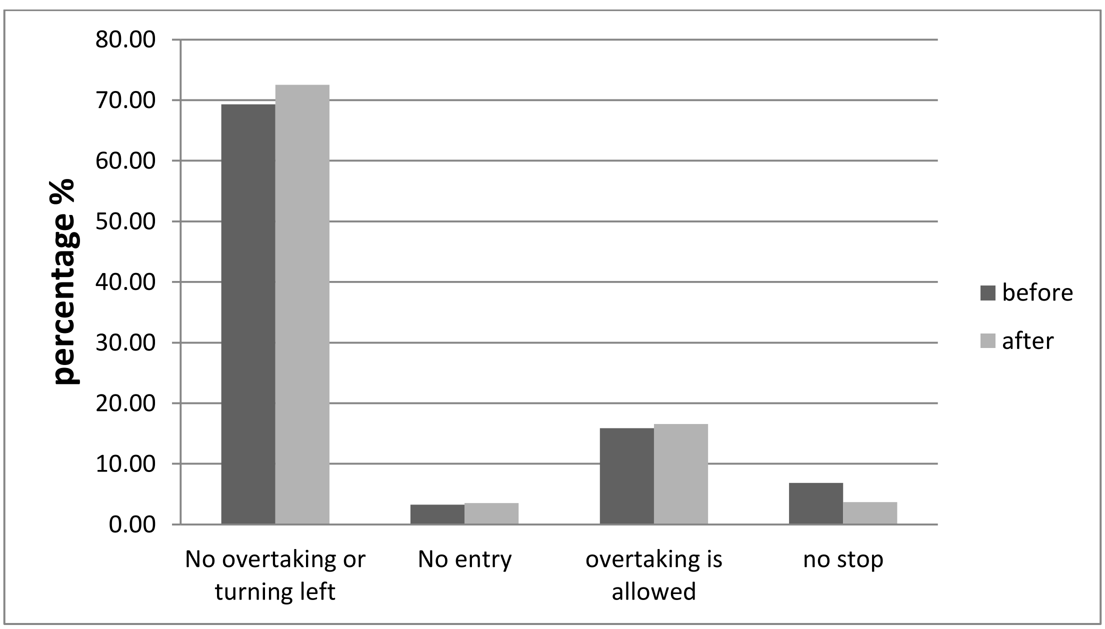

Figure 5-64: The percentage for each choice of the meaning of the lane mark

From Table 5-64, it can be noticed that although the difference in the improvement in percentage of answering this question before enrollment and after graduation from the driving schools is only 3.2%, 72.51% of the drivers answered this question correctly after graduation from the driving schools. This means that most of the drivers succeeded to know the meaning of the lane mark.

17- The meaning of the traffic sign

This question asked was about the meaning of the traffic sign shown in Figure 5-65. The number and percentage for each choice, which the drivers answered, are shown in Table 5-65 and Figure 5-66. Note that the correct answer is pedestrian crossing ahead.

Figure 5-65: The traffic sign

Table 5-65: The number and percentage for each choice of the meaning of the traffic sign

	Before enrollment		After graduation	
The meaning of the traffic sign	**Number**	**Percentage**	**Number**	**Percentage**
Pedestrian crossing ahead	***226***	***40.79***	***228***	***44.44***
Pedestrian crossing	164	29.60	163	31.77
Pedestrian prohibited	113	20.40	90	17.54
Stop	15	2.71	12	2.34
Missing	36	6.50	20	3.90
Total	554	100	513	100

*the correct answer

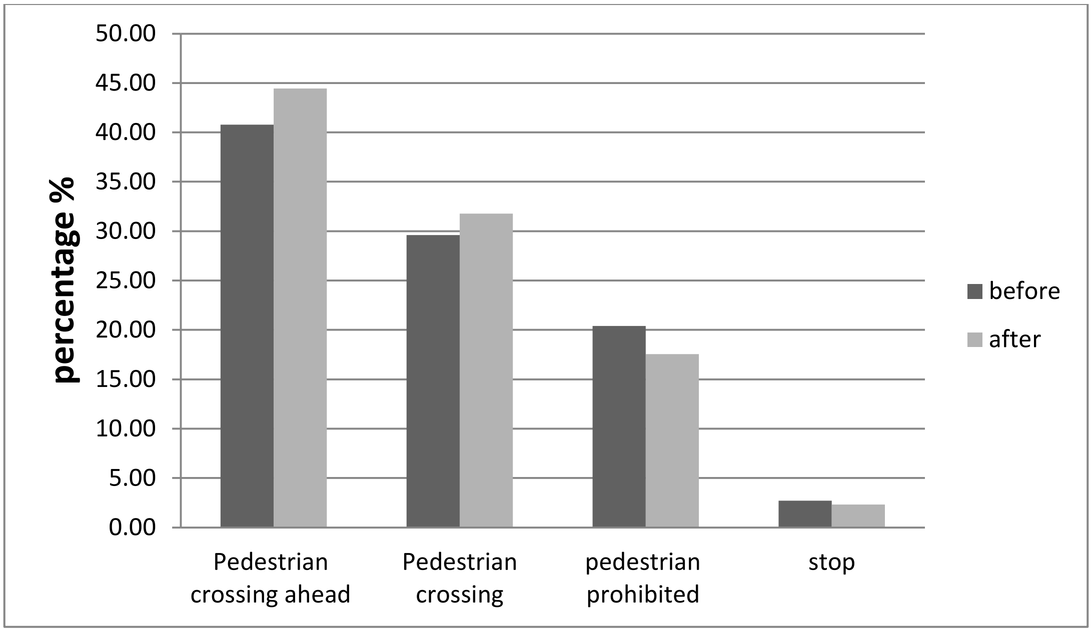

Figure 5-66: The percentage for each choice of the meaning of the traffic sign

From Table 5-65, it can be noticed that there is no an improvement in percentage of answering this question before enrollment and after graduation from the driving schools. The difference in the improvement between the two percentages is 3.65%, and only 44.44% of the drivers answered this question correctly after graduation from the driving schools. This means that less than half of the drivers failed to know the meaning of the traffic sign.

18- The meaning of the lane mark

This question asked was about the meaning of the lane mark shown in Figure 5-67. The number and percentage for each choice, which the drivers answered, are shown in Table 5-66 and Figure 5-68. Note that the correct answer is overtaking is allowed.

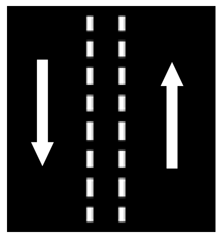

Figure 5-67: The lane mark

Table 5-66: The number and the percentage for each choice of the meaning of the lane mark

	Before enrollment		After graduation	
The meaning of lane mark	**Number**	**Percentage**	**Number**	**Percentage**
No overtaking or turning left	145	26.17	131	25.54
No entry	23	4.15	20	3.90
***Overtaking is allowed**	***306***	***55.23***	***304***	***59.26***
No stop	37	6.68	29	5.65
Missing	43	7.76	29	5.65
Total	554	100	513	100

*the correct answer

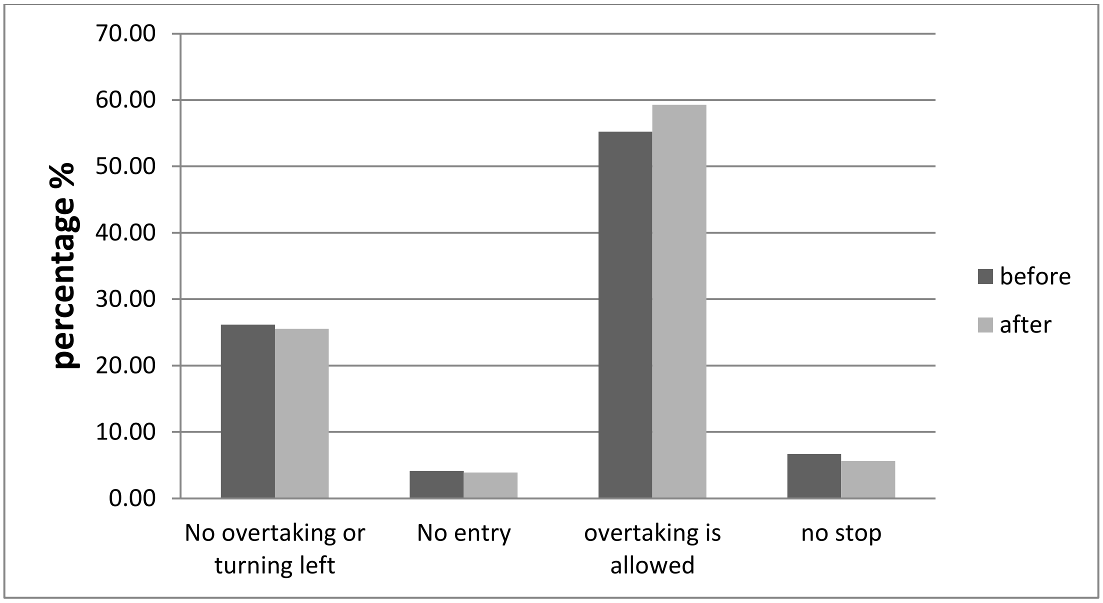

Figure 5-68: The percentage for each choice of the meaning of the lane mark

From Table 5-66, it can be noticed that although, the difference in the improvement in percentage of answering this question before enrollment and after graduation from the driving schools is only 4.03 %, 59.26 % of the drivers answered this question correctly after graduation from the driving schools. This means that most of the drivers succeeded to know the meaning of the lane mark.

19- What transmission gear should be set on when the driver drives the vehicle at a steep slope

This question asked was about what transmission gear should be set on when the driver drives the vehicle at a steep slope. The number and percentage for each choice, which the drivers answered, are shown in Table 5-67 and Figure 5-69. Note that the correct answer is low gear (1 or 2).

Table 5-67: The number and percentage for each choice of what transmission gear should be set on when the driver drives the vehicle at a step slope

	Before enrollment		After graduation	
Transmission gear	**Number**	**Percentage**	**Number**	**Percentage**
High gear (3 or 4)	51	9.21	51	9.94
***Low gear (1 or 2)**	***395***	***71.30***	***346***	***67.45***
Natural gear (N)	52	9.39	69	13.45
None of the above	23	4.15	25	4.87
Missing	33	5.96	22	4.29
Total	554	100	513	100

*the correct answer

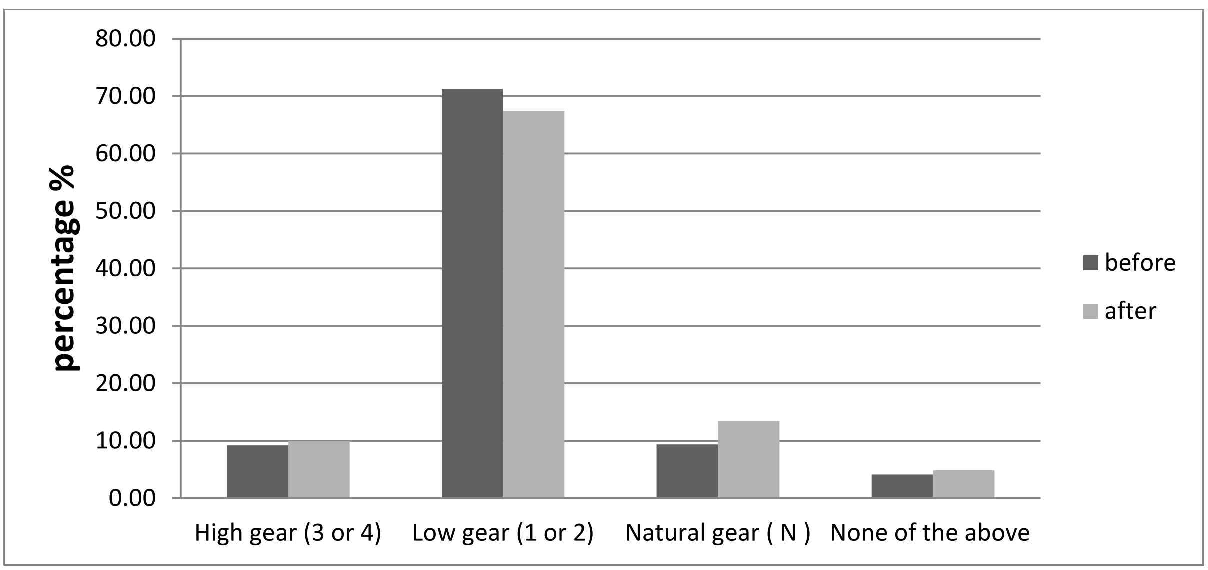

Figure 5-69: The percentage for each choice of what transmission gear should be set on when the driver drives the vehicle at a step slope

From Table 5-67, it can be noticed that although the difference in the improvement in percentage of answering this question before enrollment and after graduation from the driving schools dropped by 3.85%, 67.45% of the drivers answered this question correctly after graduation from the driving schools. This means that most of the drivers succeeded to know what transmission gear should be set on when the driver drives the vehicle at a steep slope.

20- The ideal pressure of the tires

This question asked was about the ideal pressure of the tires. The number and percentage for each choice, which the drivers answered, are shown in Table 5-68 and Figure 5-70. Note that the correct answer is as recommended by the vehicle manufacturer.

Table 5-68: The number and percentage for each choice of the ideal pressure of the tires

	Before enrollment		After graduation	
The ideal pressure of the tires	**Number**	**Percentage**	**Number**	**Percentage**
As indicated on the sidewall of the tire	128	23.10	119	23.20
As recommended by the vehicle manufacturer	***99***	***17.87***	***90***	***17.54***
The highest number of the above answers	66	11.91	61	11.89
35 psi for small vehicles and 45 psi for large vehicles	202	36.46	196	38.21
Missing	59	10.65	47	9.16
total	554	100	513	100

*the correct answer

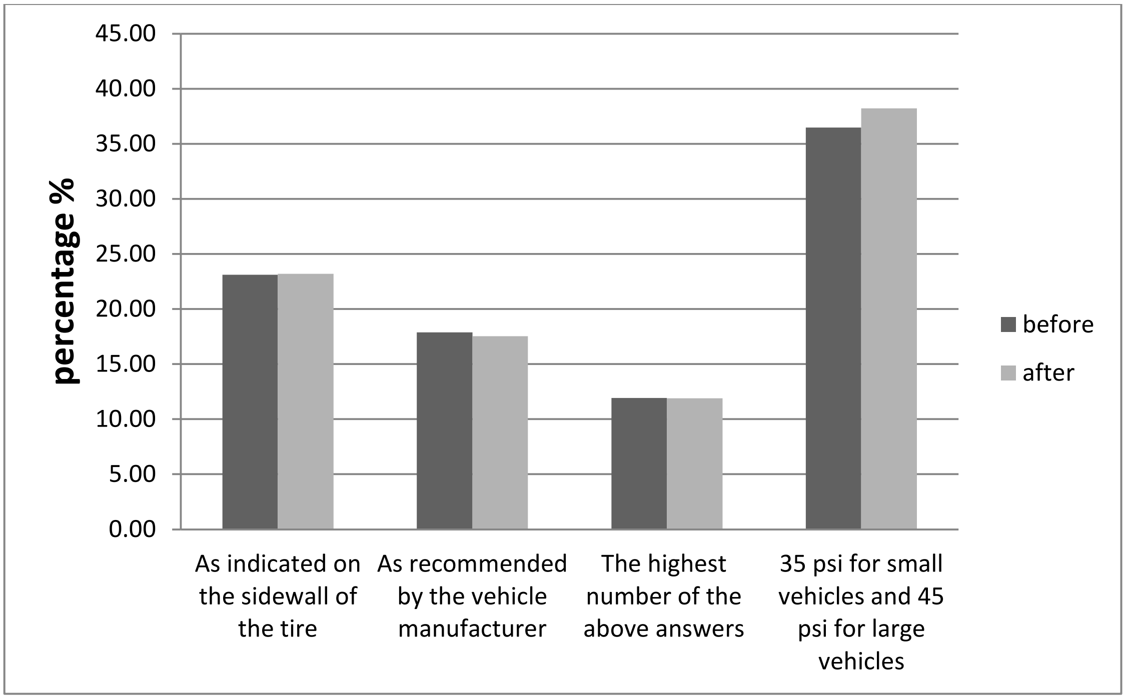

Figure 5-70: The percentage for each choice of the ideal pressure of the tires

From Table 5-68, it can be noticed that the difference in the improvement in percentage of answering this question before enrollment and after graduation from the driving schools dropped by 0.23%, and 17.54% of the drivers answered this question correctly after graduation from the driving schools. This means that most of the drivers failed to know the ideal pressure of the tires.

21- The traffic rules when the traffic signal light does not work

This question asked was about the traffic rules when the traffic signal light does not work. The number and percentage for each choice, which the drivers answered, are shown in Table 5-69 and Figure 5-71. Note that the correct answer is stop the vehicle and pass when it is safe.

Table 5-69: The number and the percentage for each choice of the traffic rules when the traffic signal light does not work

	Before enrollment		After graduation	
The traffic rules when the traffic signal light does not work	**Number**	**Percentage**	**Number**	**Percentage**
Stop the vehicle and pass when it is safe.	***399***	***72.02***	***386***	***75.24***
Do not stop and enter the intersection quickly	15	2.71	17	3.31
Reduce vehicle speed	85	15.34	82	15.98
None of the above	17	3.07	16	3.12
Missing	38	6.86	12	2.34
Total	554	100	513	100

*the correct answer

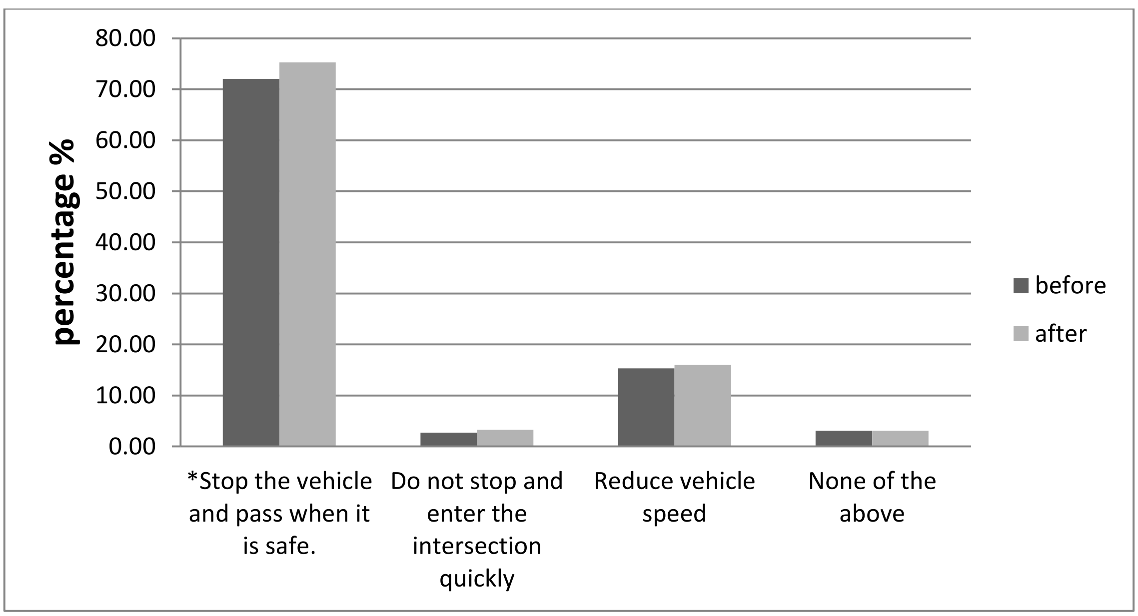

Figure 5-71: The percentage for each choice for the traffic rules when the traffic signal light does not work

From Table 5-69, it can be noticed that although the difference in the improvement in percentage of answering this question before enrollment and after graduation from the driving schools is only 3.22%, 75.24% of the drivers answered this question correctly after graduation from the driving schools. This means that most of the drivers succeeded to know the traffic rules when the traffic signal light does not work.

22- The traffic rules when a pedestrian is crossing the road and there is no crossing walkway

This question asked was about the traffic rules when a pedestrian is crossing the road and there is no crossing walkway. The number and percentage for each choice, which the drivers answered are shown in Table 5-70 and Figure 5-72. Note that the correct answer is stop and allow pedestrians to cross the street.

Table 5-70: The number and the percentage for each choice of the traffic rules when a pedestrian is crossing the road and there is no crossing walkway

	Before enrollment		After graduation	
The traffic rules when a pedestrian is crossing the road and there is no crossing walkway	**Number**	**Percentage**	**Number**	**Percentage**
Make sure the pedestrian sees you and continue driving	64	11.55	75	14.62
Reduce the speed and over-take the pedestrian	71	12.82	67	13.06
Stop and allow pedestrian to cross the street	***360***	***64.98***	***344***	***67.06***
None of the above	18	3.25	17	3.31
Missing	41	7.40	10	1.95
Total	554	100	513	100

*the correct answer

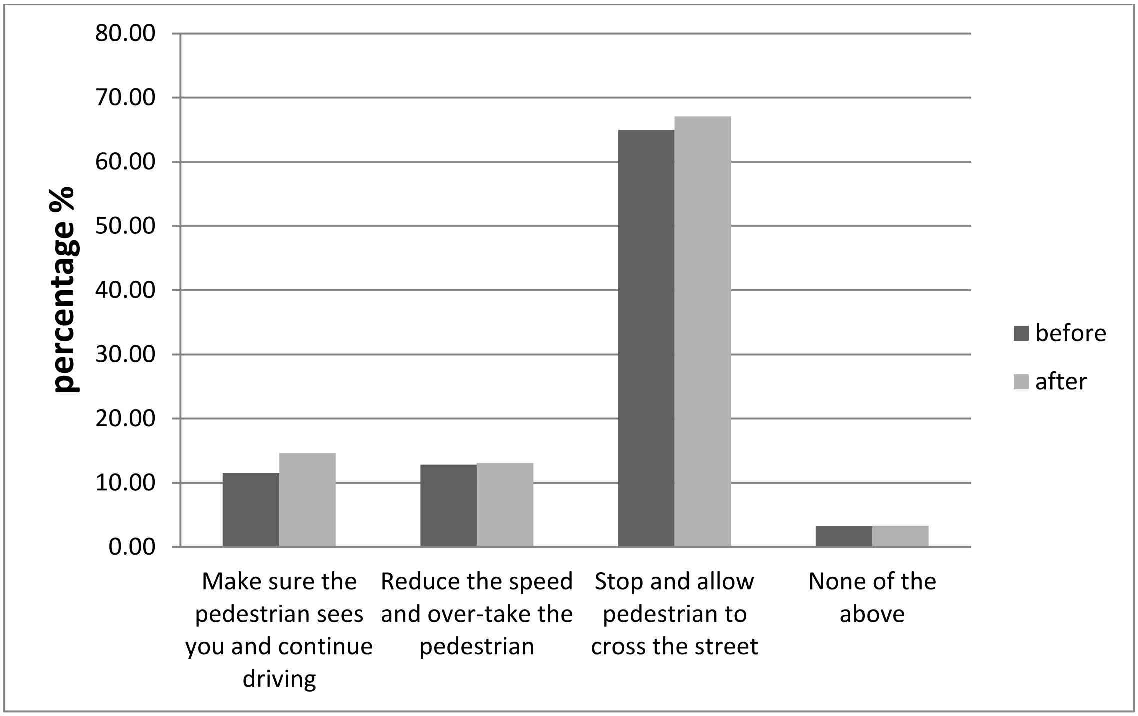

Figure 5-72: The percentage for each choice of the traffic rules when a pedestrian is crossing the road and there is no crossing walkway

From Table 5-70, it can be noticed that although the difference in the improvement in percentage of answering this question before enrollment and after graduation from the driving schools is only 2.08%, 67.06% of the drivers answered this question correctly after graduation from the driving schools. This means that most of the drivers succeeded to know the traffic rules when a pedestrian is crossing the road and there is no crossing walkway.

23- The traffic rules for priority in the roundabout

This question asked was about the traffic rules for priority in the roundabout. The number and percentage for each choice, which the drivers answered, are shown in Table 5-71 and Figure 5-73. Note that the correct answer is the traffic inside the roundabout (coming from your left).

Table 5-71: The number and percentage for each choice of the traffic rules for priority in the roundabout

	Before enrollment		After graduation	
The traffic rules for priority in the roundabout	**NUMBER**	**PERCENTAGE**	**NUMBER**	**PERCENTAGE**
The traffic inside the roundabout (coming from your left)	***409***	***73.83***	***422***	***82.26***
The traffic entering the roundabout	67	12.09	51	9.94
The faster traffic	21	3.79	15	2.92
None of the above	17	3.07	15	2.92
Missing	40	7.22	10	1.95
total	554	100	513	100

*the correct answer

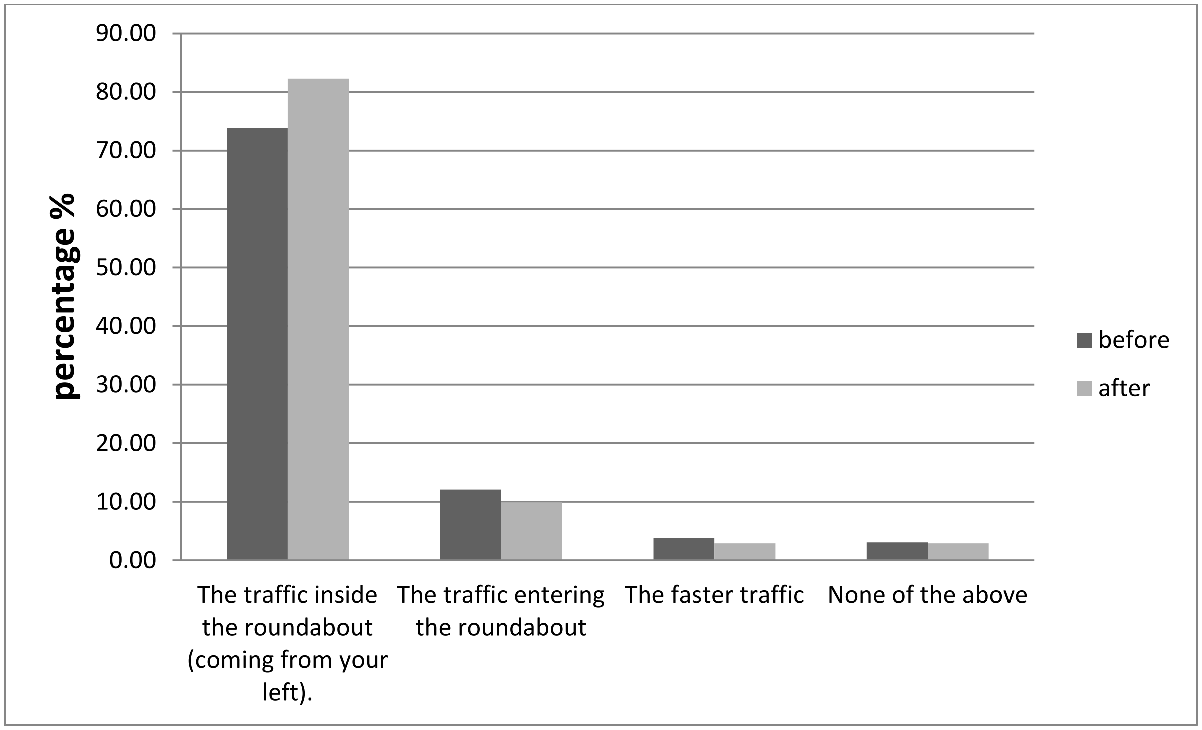

Figure 5-73: The percentage for each choice for the the traffic rules of priority in the roundabout

From Table 5-71, it can be noticed that the difference in the improvement in percentage of answering this question before enrollment and after graduation from the driving schools is 8.43%, and 67.06% of the drivers answered this question correctly after graduation from the driving schools. This means that most of the drivers succeeded to know the traffic rules for priority in the roundabout.

24- The traffic rules when roads become slippery after the rain starts

This question asked was about the traffic rules when the roads become slippery after the rain starts. The number and percentage for each choice, which the drivers answered, are shown in Table 5-72 and Figure 5-74. Note that the correct answer is avoid turning and stopping quickly.

Table 5-72: The number and percentage for each choice of the traffic rules when roads become slippery after the rain starts

	Before enrollment		After graduation	
The traffic rules when the roads become slippery after the rain starts	**Number**	**Percentage**	**Number**	**Percentage**
Avoid turning and stopping quickly.	***235***	***42.42***	***263***	***51.27***
Test the condition of the tires of your vehicle.	43	7.76	35	6.82
Reduce the distance between you and the vehicle in front.	159	28.70	142	27.68
None of the above	73	13.18	63	12.28
Missing	44	7.94	10	1.95
Total	554	100	513	100

*the correct answer

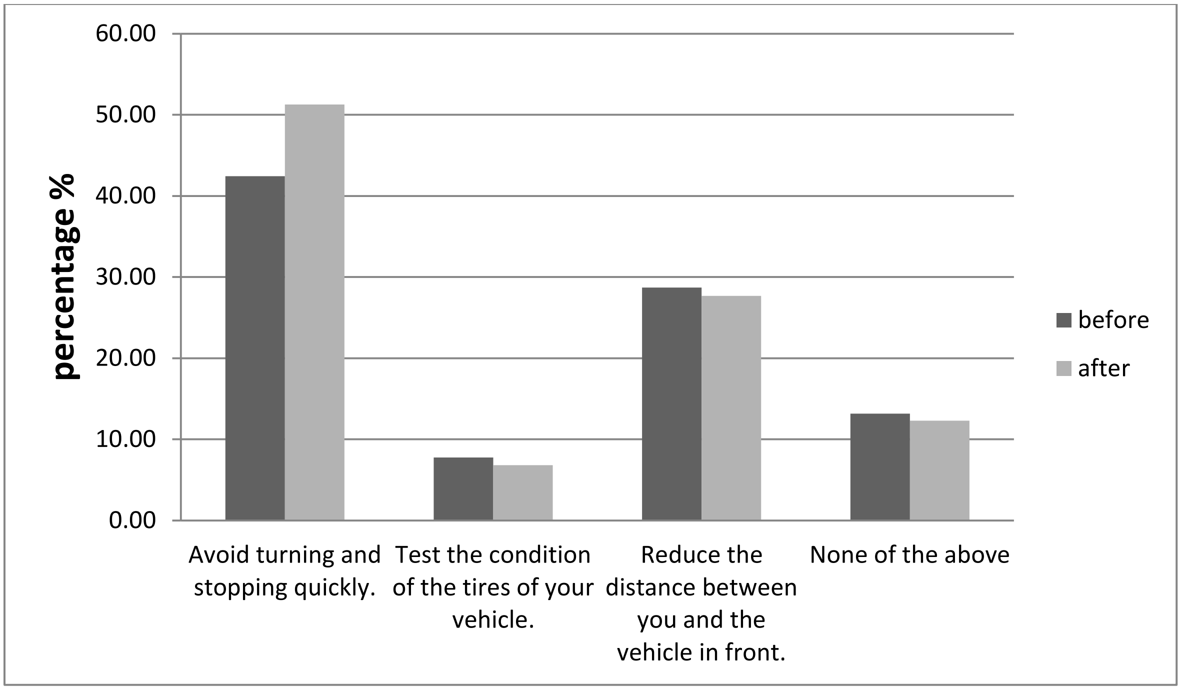

Figure 5-74: The percentage for each choice of the traffic rules when roads become slippery after the rain starts

From Table 5-72, it can be noticed that the difference in the improvement in percentage of answering this question before enrollment and after graduation from the driving schools is 8.85%, and 51.27% of the drivers answered this question correctly after graduation from the driving schools. This means that most of the drivers succeeded to know the traffic rules when roads become slippery after the rain starts.

25- When Accidents usually occur

This question asked was about when accidents usually occur. The number and percentage for each choice, which the drivers answered, are shown in Table 5-73 and

Figure 5-75. Note that the correct answer is one vehicle is moving faster or slower than the traffic.

Table 5-73: The number and percentage for each choice when accidents usually occur

	Before enrollment		After graduation	
When Accidents usually occur	**Number**	**Percentage**	**Number**	**Percentage**
All the vehicles drive at the same speed	87	15.70	77	15.01
One lane of the traffic is moving faster than other lane	81	14.62	95	18.52
****One vehicle is moving faster or slower than the traffic***	***269***	***48.56***	***250***	***48.73***
None of the above	73	13.18	70	13.65
Missing	44	7.94	21	4.09
Total	554	100	513	100

*the correct answer

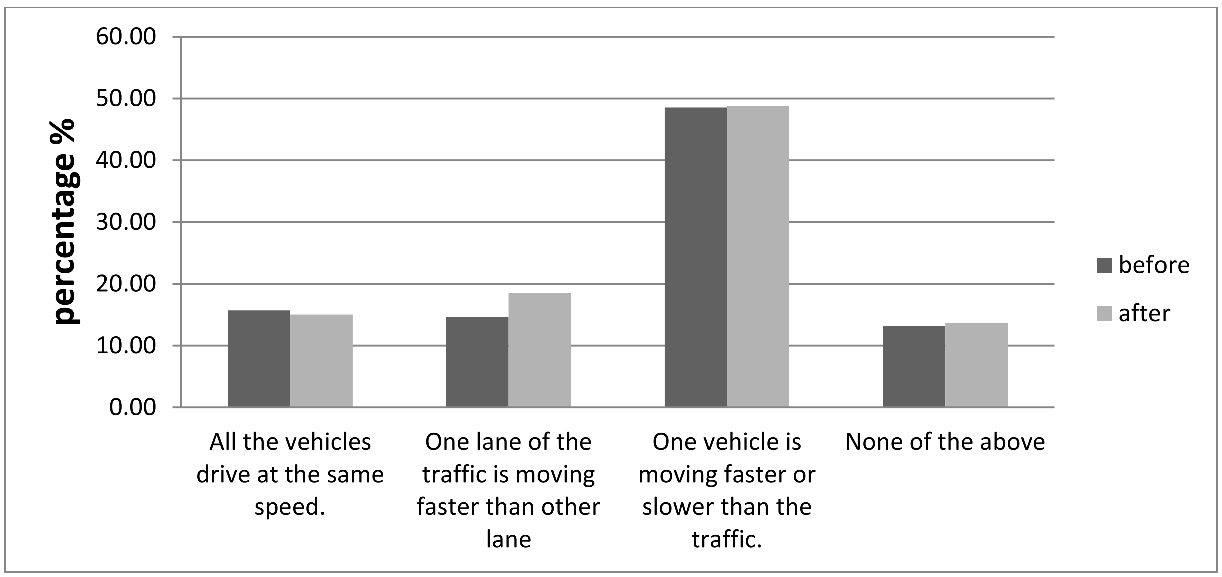

Figure 5-75:The percentage for each choice when accidents usually occur

From Table 5-73, it can be noticed that the difference in the improvement in percentage of answering this question before enrollment and after graduation from the driving schools is only 0.17%, and 48.73% of the drivers answered this question correctly after graduation from the driving schools. This means that most of the drivers failed to know when accidents usually occur.

26- The allowed traffic directions

The twenty-sixth to the thirtieth questions were about the allowed traffic movements in five different lanes. This question number twenty-sixth asked was about the allowed traffic movement in lane number one in Figure 5-76. The number and percentage for each choice, which the drivers answered, are shown in Table 5-74 and Figure 5-77. Note that the correct answer is proceed straight or turn right only.

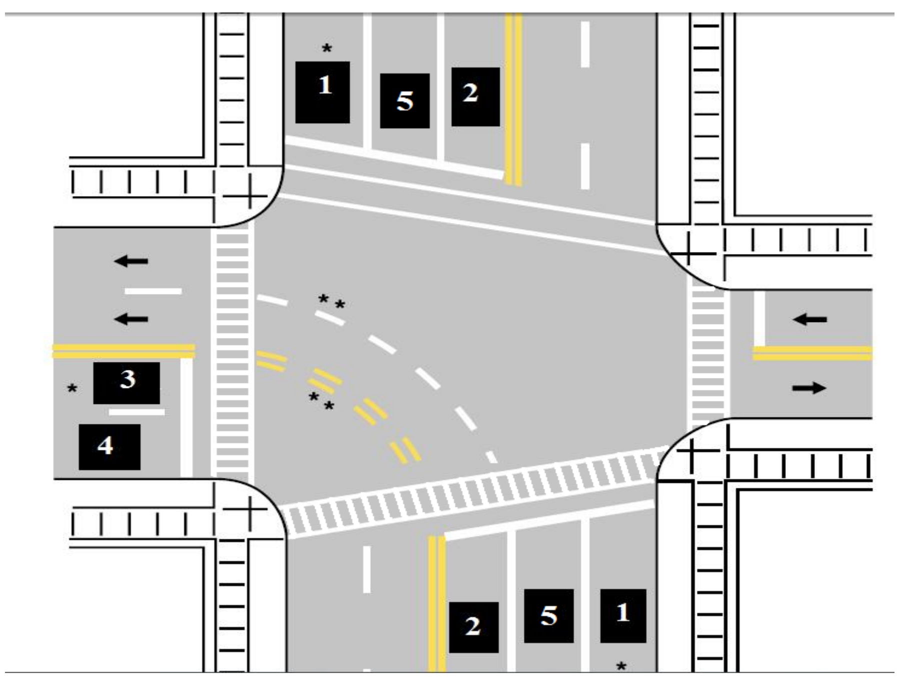

Figure 5-76: The layout of the intersection

Table 5-74: The number and percentage for each choice of the allowed traffic directions for lane 1

	Before enrollment		After graduation	
The allowed traffic directions	**Number**	**Percentage**	**Number**	**Percentage**
Proceed straight only.	96	17.33	100	19.49
****Proceed straight or turn right only.***	***160***	***28.88***	***162***	***31.58***
Turn right, left or proceed straight.	48	8.66	53	10.33
Turn right only.	190	34.30	173	33.72
Missing	60	10.83	25	4.87
Total	554	100	513	100

*the correct answer

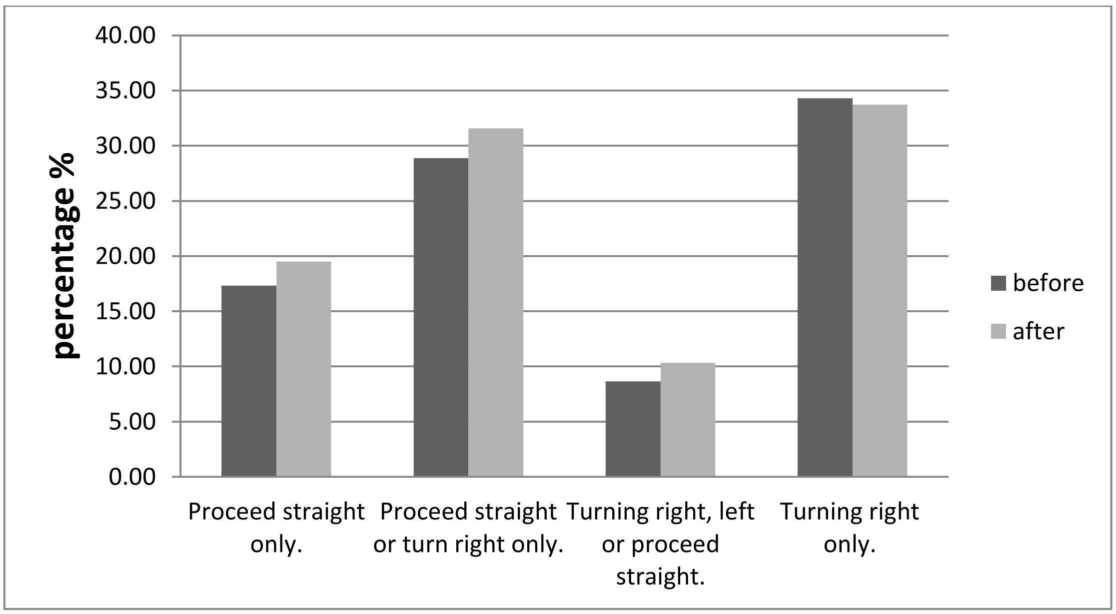

Figure 5-77: The percentage for each choice of the allowed traffic directions for lane 1

From Table 5-74, it can be noticed that the difference in the improvement in percentage of answering this question before enrollment and after graduation from the driving schools is only 2.7%, and 31.58% of the drivers answered this question correctly after graduation from the driving schools. This means that most of the drivers failed to know the allowed traffic directions.

27- The allowed traffic directions

This question asked was about the allowed traffic directions in lane number two in Figure 5-76. The number and percentage for each choice, which the drivers answered, are shown in Table 5-75 and Figure 5-78.

Table 5-75: The number and percentage for each choice for the allowed traffic directions for lane 2

	Before enrollment		After graduation	
The allowed traffic directions	**Number**	**Percentage**	**Number**	**Percentage**
Turn left.	***178***	***32.13***	***181***	***35.28***
Turn right or proceed straight only.	90	16.25	73	14.23
Turn left or proceed straight only	161	29.06	167	32.55
Turn right, left or proceed straight.	56	10.11	64	12.48
Missing	69	12.45	28	5.46
Total	554	100	513	100

*the correct answer

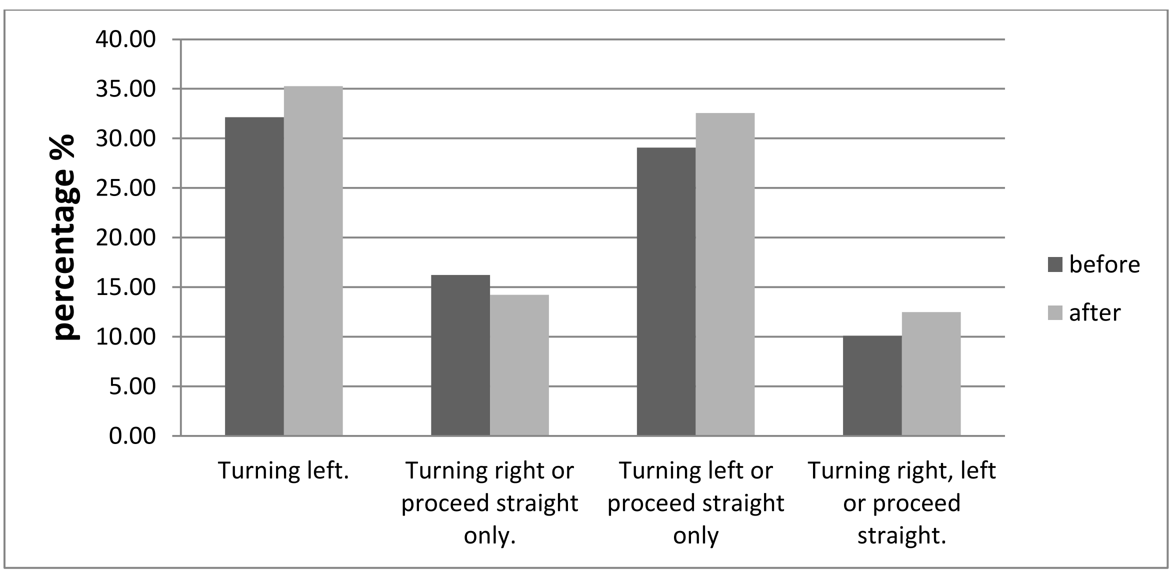

Figure 5-78: The percentage for each choice for the allowed traffic directions for lane 2

From Table 5-75, it can be noticed that the difference in the improvement in percentage of answering this question before enrollment and after graduation from the driving schools is only 3.15%, and 35.28% of the drivers answered this question correctly after graduation from the driving schools. This means that most of the drivers failed to know the allowed traffic directions. Note that the correct answer is turn left only.

28- The allowed traffic directions

This question asked was about the allowed traffic directions in lane number three in Figure 5-76. The number and percentage for each choice, which the drivers answered, are shown in Table 5-76 and Figure 5-79. Note that the correct answer is turn right, left or proceed straight.

Table 5-76: The number and percentage for each choice of the allowed traffic directions for lane 3

	Before enrollment		After graduation	
The allowed traffic directions	**Number**	**Percentage**	**Number**	**Percentage**
Turn left or proceed straight only.	168	30.32	184	35.87
Turn right or proceed straight only.	158	28.52	139	27.10
Turn right, left or proceed straight	***100***	***18.05***	***105***	***20.47***
Turn left only.	41	7.40	49	9.55
Missing	87	15.70	36	7.02
Total	554	100	513	100

*the correct answer

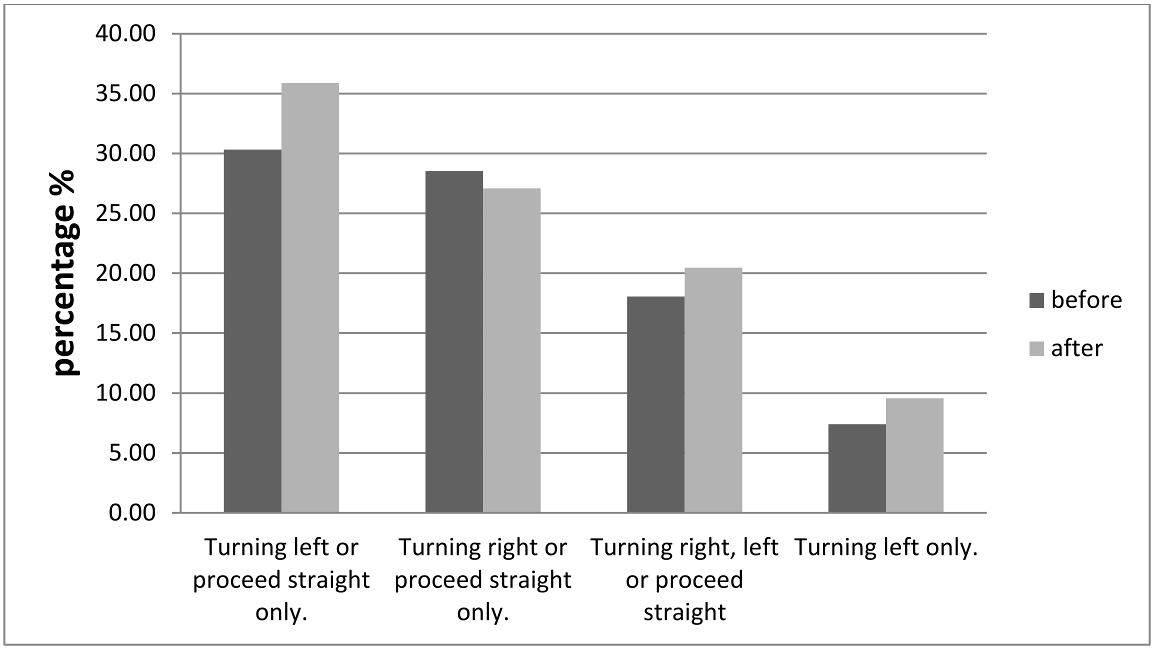

Figure 5-79: The percentage for each choice for the allowed traffic directions for lane 3

From Table 5-76, it can be noticed that the difference in the improvement in percentage of answering this question before enrollment and after graduation from the driving schools is only 2.42%, and 20.47% of the drivers answered this question correctly after graduation from the driving schools. This means that most of the drivers failed to know the allowed traffic directions.

29- The allowed traffic directions

This question asked was about the allowed traffic directions in lane number four in Figure 5-76. The number and percentage for each choice, which the drivers answered, are shown in Table 5-77 and Figure 5-80. Note that the correct answer is turn right only.

Table 5-77: The number and the percentage for each choice of the allowed traffic directions for lane 4

	Before enrollment		After graduation	
The allowed traffic directions	**Number**	**Percentage**	**Number**	**Percentage**
Proceed straight only.	66	11.91	67	13.06
Turn right or proceed straight only.	135	24.37	162	31.58
Turn right, left or proceed straight.	62	11.19	76	14.81
Turn right only.	***206***	***37.18***	***169***	***32.94***
Missing	85	15.34	39	7.60
Total	554	100	513	100

*the correct answer

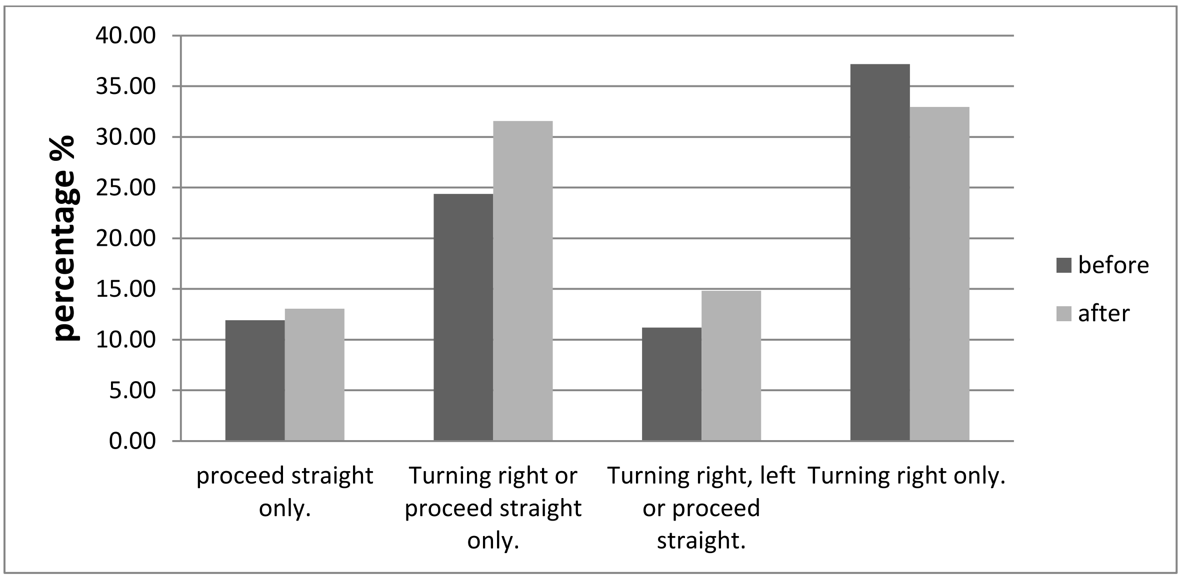

Figure 5-80: The percentage for each choice for the allowed traffic directions for lane 4

From Table 5-77, it can be noticed that the difference in the improvement in percentage of answering this question before enrollment and after graduation from the driving schools dropped by 4.24%, and 32.94% of the drivers answered this question correctly after graduation from the driving schools. This means that most of the drivers failed to know the allowed traffic directions.

30- The allowed traffic directions

This question asked was about the allowed traffic directions in lane number five in Figure 5-76. The number and percentage for each choice, which the drivers answered, are shown in Table 5-78 and Figure 5-81. Note that the correct answer is proceed straight only.

Table 5-78: The number and percentage for each choice of the allowed traffic directions for lane 5

	Before enrollment		After graduation	
The allowed traffic directions	**Number**	**Percentage**	**Number**	**Percentage**
Turn left or proceed straight only.	97	17.51	119	23.20
Turn right, left or go straight.	98	17.69	119	23.20
Proceed straight only.	***192***	***34.66***	***194***	***37.82***
Turn right or going straight only.	77	13.90	45	8.77
Missing	90	16.25	36	7.02
Total	554	100	513	100

*the correct answer

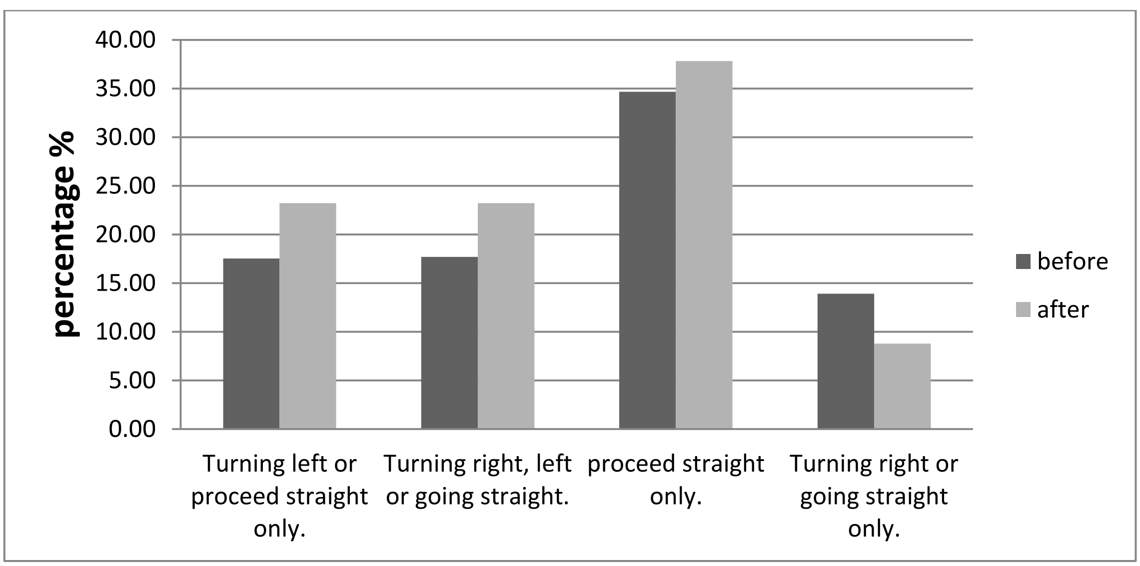

Figure 5-81: The percentage for each choice for the allowed traffic directions for lane 5

From Table 5-78, it can be noticed that the difference in the improvement in percentage of answering this question before enrollment and after graduation from the driving schools is 3.16%, and 37.82% of the drivers answered this question correctly after graduation from the driving schools. This means that most of the drivers failed to know the allowed traffic directions.

5.2.2. Satisfaction of the Drivers About the Driving Schools

In this section, the drivers were asked after graduation from the driving schools to give their opinions about the driving schools. The results of the survey are:

5.2.2.1. "The teachers know their subject well"

The answers of the drivers after graduation from the driving schools are shown in Table 5-79 and Figure 5-82.

Table 5-79: The number and percentage of opinions of the drivers whether the teachers know their subject well

Opinion	Number	Percentage
Strongly agree	182	45.16
Agree	195	48.39
Disagree	11	2.73
Strongly disagree	12	2.98
No answers	3	0.74
Total	403	100

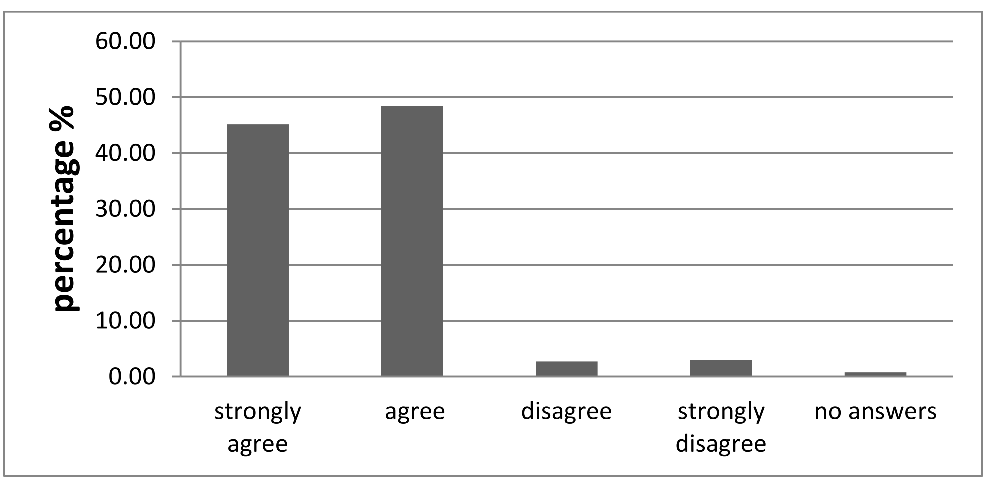

Figure 5-82: The percentage of opinions of the drivers whether the teachers know their subject well

5.2.2.2. "Teachers strive (do their best) to deliver information to the students"

The answers of the drivers after graduation from the driving schools are shown in Table 5-80 and Figure 5-83.

Table 5-80: The number and percentage of opinions of the drivers whether the teachers strive (do their best) to deliver information to the students

Opinion	Number	Percentage
Strongly agree	163	40.45
Agree	185	45.91
Disagree	33	8.19
Strongly disagree	11	2.73
No answers	11	2.73
Total	403	100

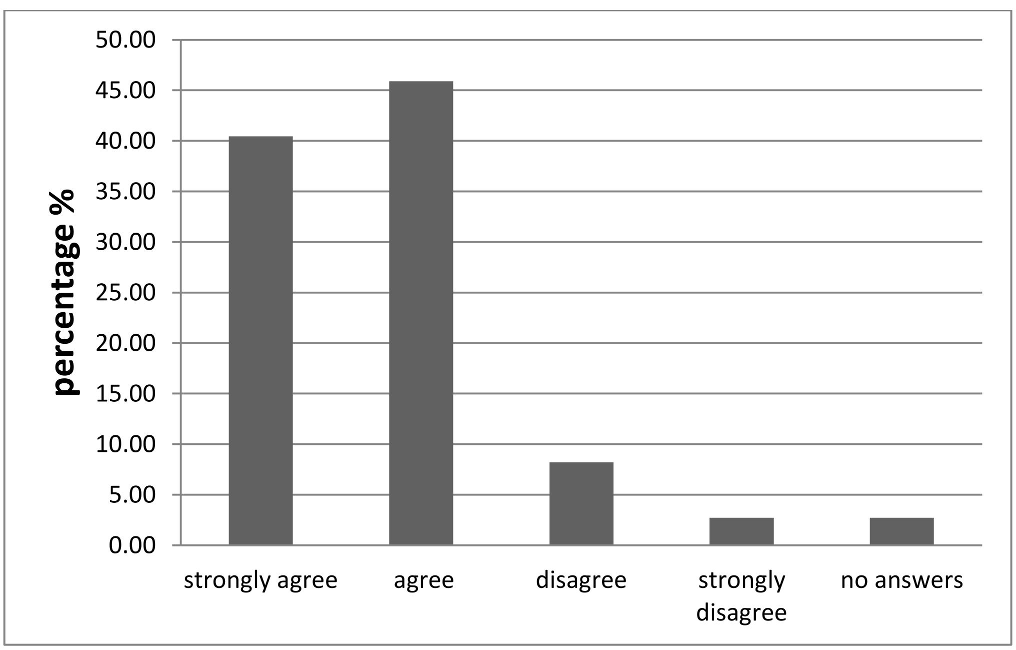

Figure 5-83: The percentage of opinions of the drivers whether the teachers strive (do their best) to deliver information to the students

5.2.2.3. "Students face difficulties in understanding teachers"

The answers of the drivers after graduation from the driving schools are shown in Table 5-81 and Figure 5-84.

Table 5-81: The number and percentage of opinions of the drivers whether the students face difficulties in understanding teachers

Opinion	Number	Percentage
Strongly agree	36	8.93
Agree	112	27.79
Disagree	195	48.39
Strongly disagree	51	12.66
No answers	9	2.23
Total	403	100

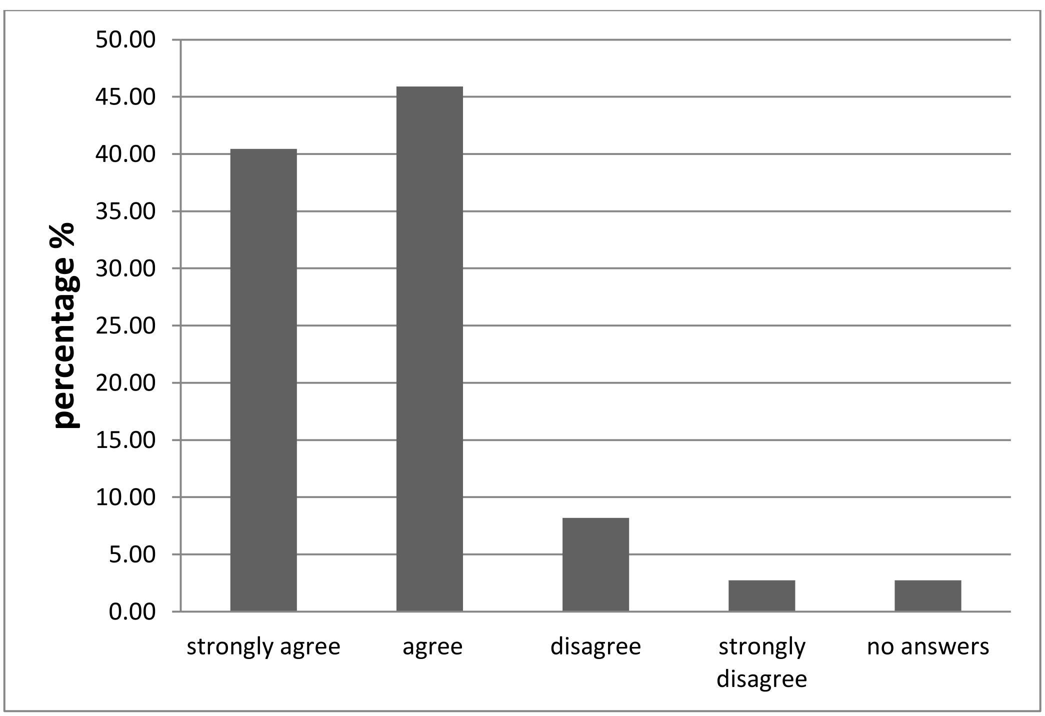

Figure 5-84: The percentage of opinions of the drivers whether the students face difficulties in understanding teachers

5.2.2.4. The teachers discriminate between the students

The answers of the drivers after graduation from the driving schools are shown in Table 5-82 and Figure 5-85.

Table 5-82: The number and percentage of opinions of the drivers whether the teachers discriminate between the students

Opinion	Number	Percentage
Strongly agree	51	12.66
Agree	90	22.33
Disagree	173	42.93
Strongly disagree	76	18.86
No answers	13	3.23
Total	403	100

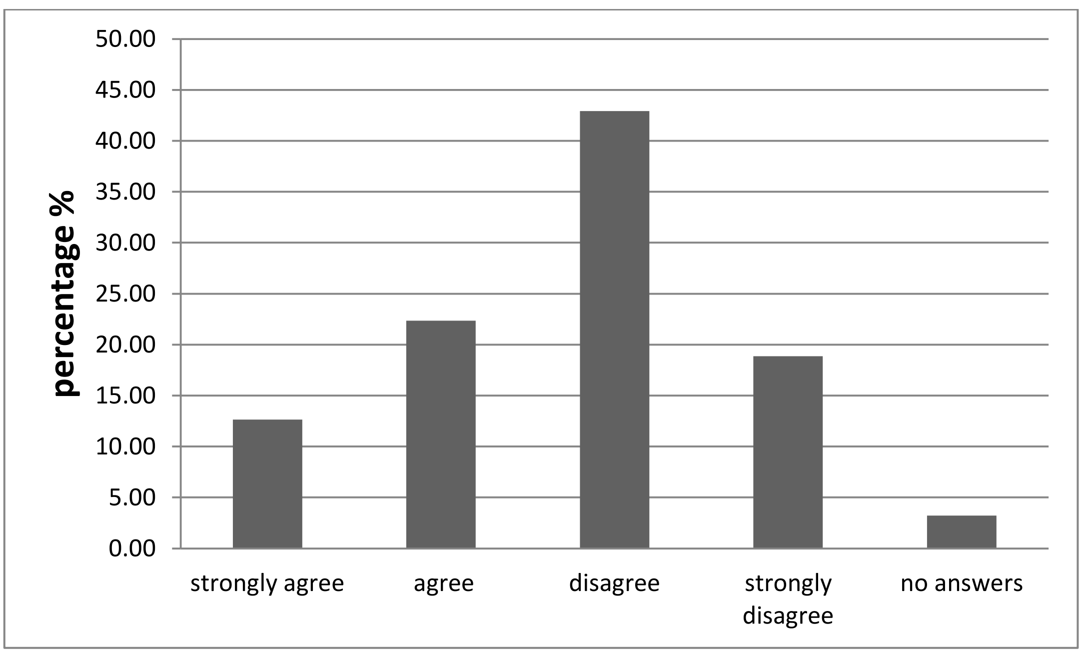

Figure 5-85: The percentage of opinions of the drivers whether the teachers discriminate between the students

5.2.2.5. "Teachers maintain order during time of class"

The answers of the drivers after graduation from the driving schools are shown in Table 5-83 and Figure 5-86.

Table 5-83: The number and percentage of opinions of the drivers whether teachers maintain order during time of class

Opinion	Number	Percentage
Strongly agree	132	32.75
Agree	218	54.09
Disagree	22	5.46
Strongly disagree	17	4.22
No answers	14	3.47
Total	403	100

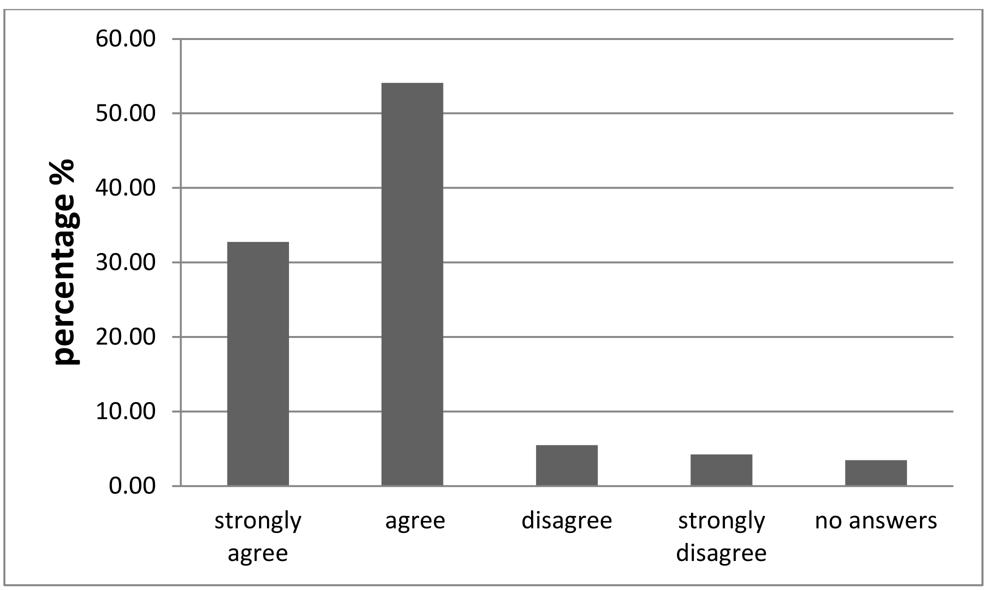

Figure 5-86: The percentage of opinions of the drivers whether the teachers maintain order during time of class

5.2.2.6. "Teachers adhere to class schedule"

The answers of the drivers after graduation from the driving schools are shown in Table 5-84 and Figure 5-87.

Table 5-84: The number and percentage of opinions of the drivers whether the teachers adhere to class schedule

Opinion	Number	Percentage
Strongly agree	120	29.78
Agree	218	54.09
Disagree	35	8.68
Strongly disagree	18	4.47
No answers	12	2.98
Total	403	

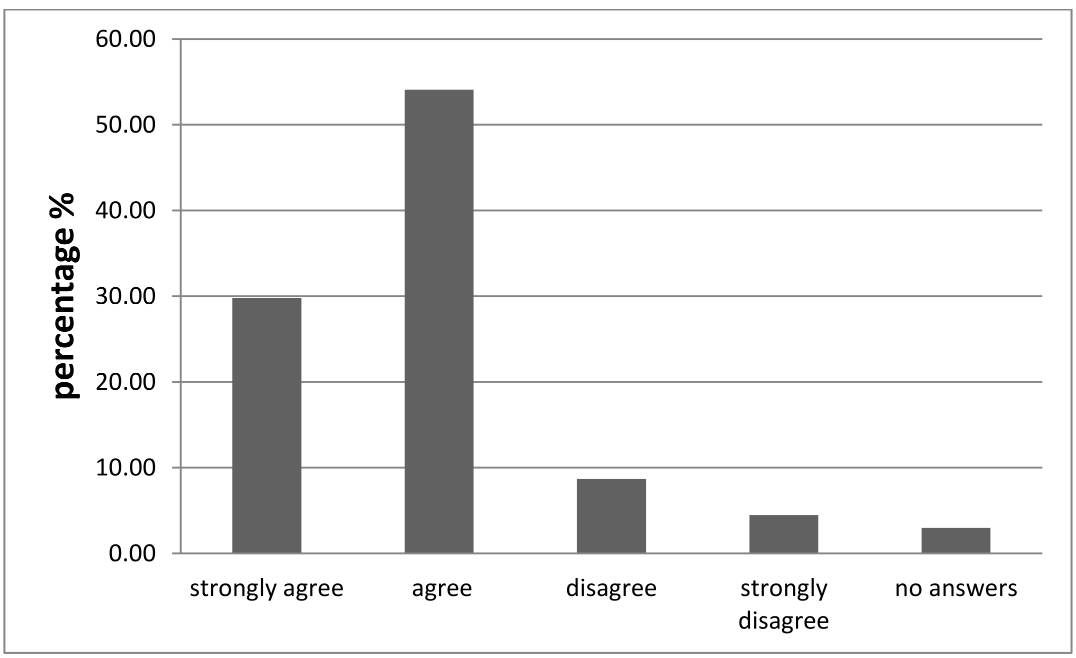

Figure 5-87: The percentage of opinion opinions of the drivers whether the teachers adhere to class schedule

5.2.2.7. "Teachers have the skill to ask questions which can be easily understood by the students"

The answers of the drivers after graduation from the driving schools are shown in Table 5-85 and Figure 5-88.

Table 5-85: The number and the percentage of opinions of the drivers whether the teachers have the skill to ask questions which can be easily understood by the students

Opinion	Number	Percentage
Strongly Agree	106	26.30
Agree	227	56.33
Disagree	40	9.93
Strongly Disagree	15	3.72
No Answers	15	3.72
Total	403	

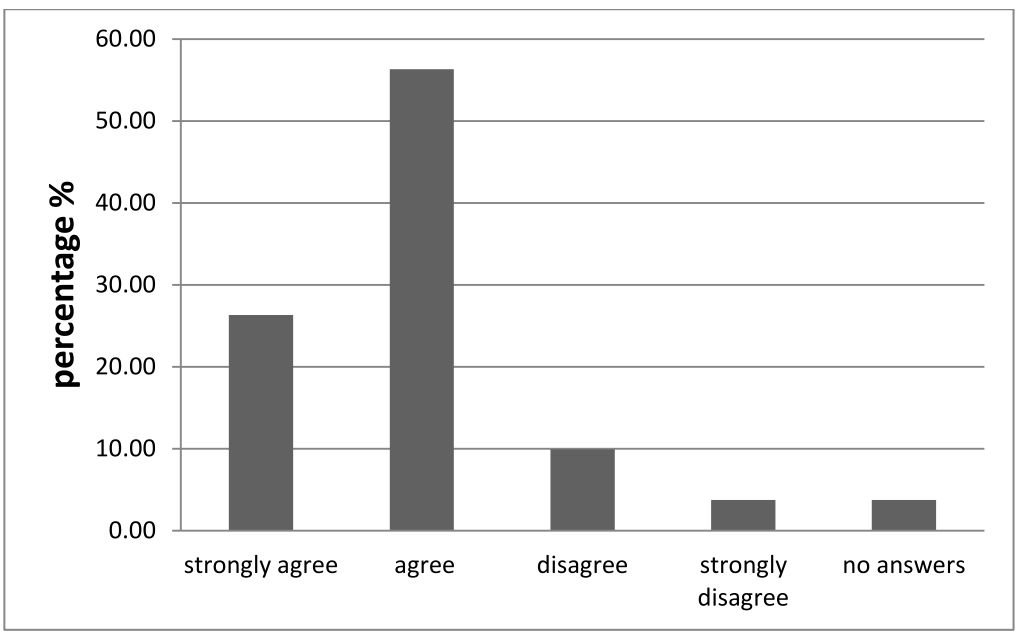

Figure 5-88: The percentage of opinions of the drivers whether the teachers have the skill to ask questions which can be easily understood by the students

5.2.2.8. "Teachers have good moral character and ethics"

The answers of the drivers after graduation from the driving schools are shown in Table 5-86 and Figure 5-89.

Table 5-86: The number and percentage of opinions of the drivers whether teachers have good moral character and ethics

Opinion	Number	Percentage
Strongly agree	129	32.01
Agree	230	57.07
Disagree	21	5.21
Strongly disagree	17	4.22
No answers	6	1.49
Total	403	

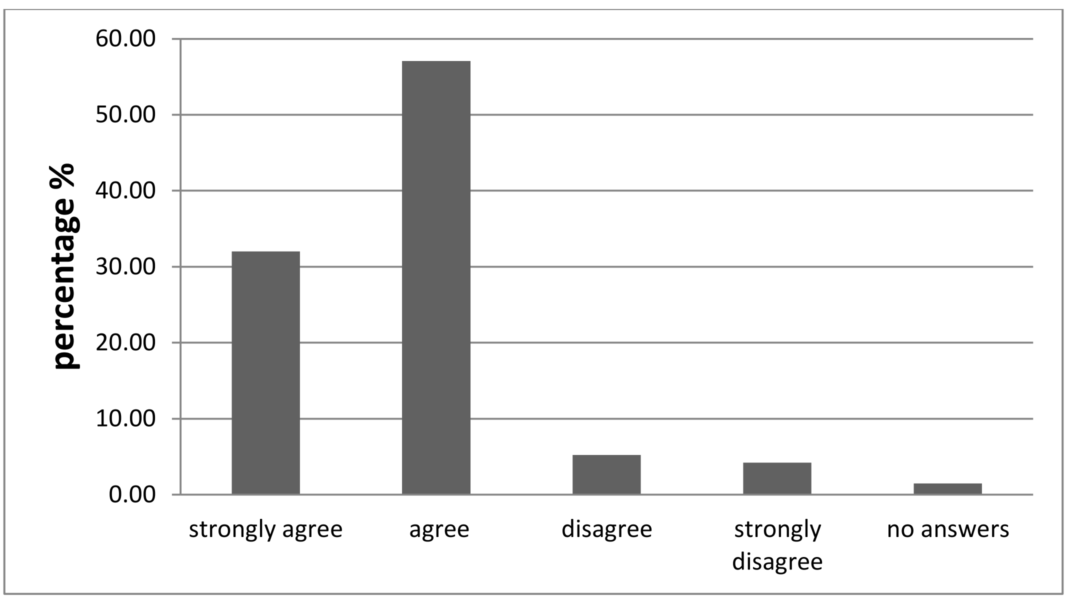

Figure 5-89: The percentage of opinions of the drivers whether teachers have good moral character and ethics

5.2.2.9. "Teachers encourage student's participation during class sessions"

The answers of the drivers after graduation from the driving schools are shown in Table 5-87 and Figure 5-90.

Table 5-87: The number and percentage of opinions of the drivers whether the teachers encourage student's participation during class sessions

Opinion	Number	Percentage
Strongly Agree	113	28.04
Agree	222	55.09
Disagree	33	8.19
Strongly Disagree	17	4.22
No Answers	18	4.47
Total	403	

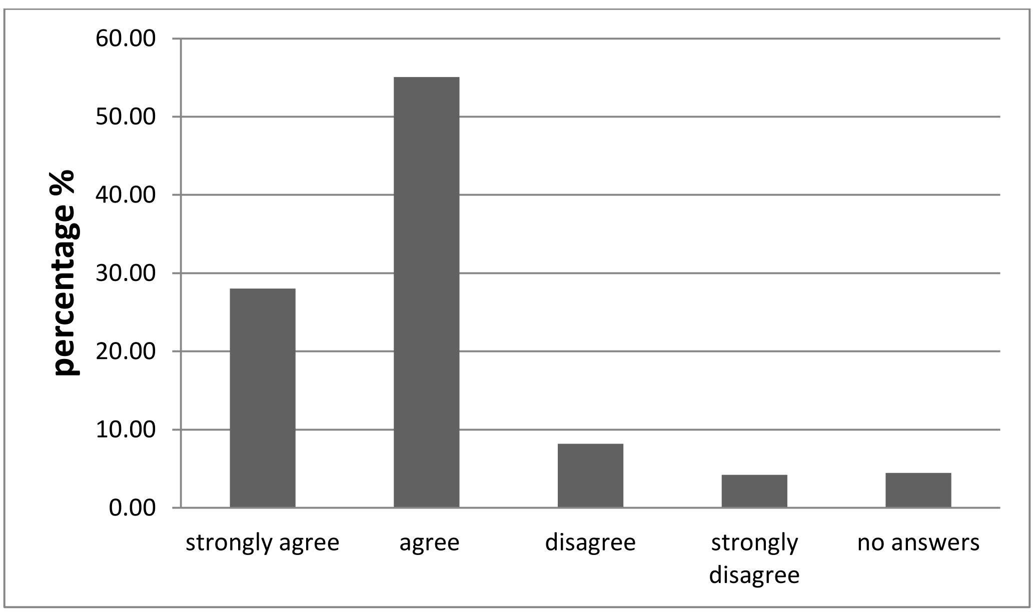

Figure 5-90: The percentage of opinions of the drivers whether the teachers encourage student's participation during class sessions

5.2.2.10. "Teachers respect student's questions and take them seriously"

The answers of the drivers after graduation from the driving schools are shown in Table 5-88 and Figure 5-91.

Table 5-88: The number and percentage of opinions of the drivers whether the teachers respect student's questions and take them seriously

Opinion	Number	Percentage
Strongly Agree	120	29.78
Agree	221	54.84
Disagree	34	8.44
Strongly Disagree	16	3.97
No Answers	12	2.98
Total	403	

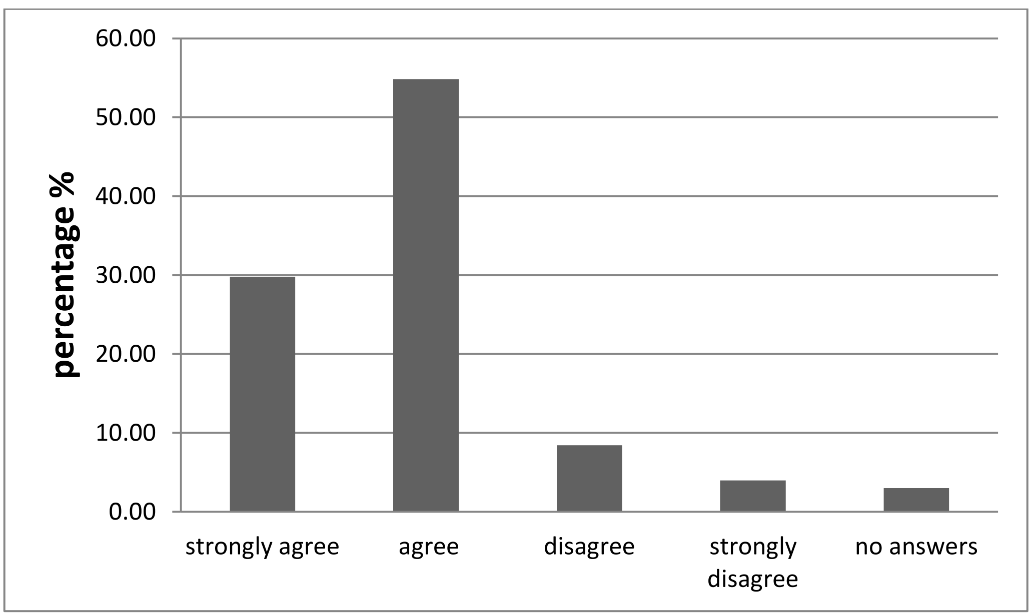

Figure 5-91: The percentage of opinions of the drivers whether the teachers respect student's questions and take them seriously

5.2.2.11. "Teachers criticize students and threaten them"

The answers of the drivers after graduation from the driving schools are shown in Table 5-89 and Figure 5-92.

Table 5-89: The number and percentage of opinions of the drivers whether the teachers criticize students and threaten them

Opinion	Number	Percentage
Strongly Agree	24	5.96
Agree	66	16.38
Disagree	200	49.63
Strongly Disagree	84	20.84
No Answers	29	7.20
Total	403	

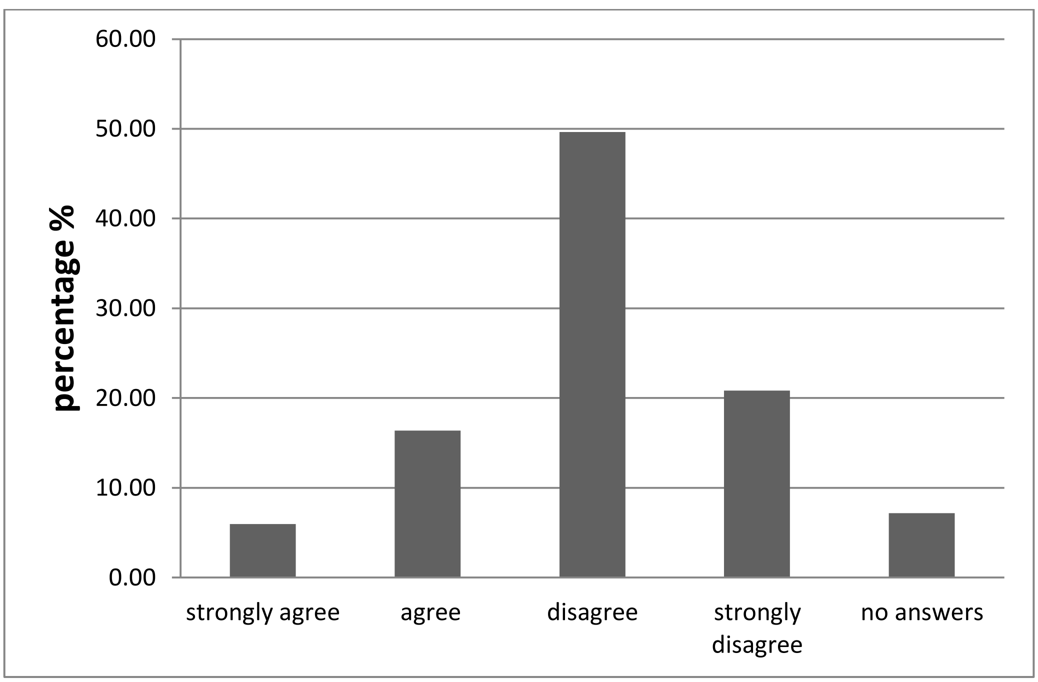

Figure 5-92: The percentage of opinions of the drivers whether the teachers criticize students and threaten them

5.2.2.12. "Teachers use inappropriate words with students"

The answers of the drivers after graduation from the driving schools are shown in Table 5-90 and Figure 5-93.

Table 5-90: The number and percentage of opinions of the drivers whether the teachers use inappropriate words with students

Opinion	Number	Percentage
Strongly Agree	30	7.44
Agree	58	14.39
Disagree	1	0.25
Strongly Disagree	183	45.41
No Answers	131	32.51
Total	403	

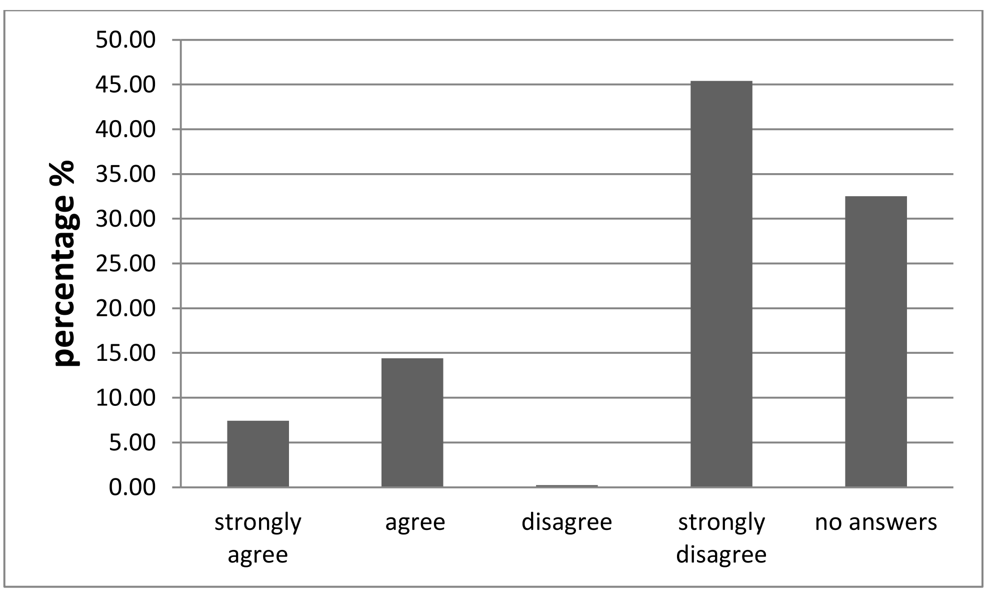

Figure 5-93; The percentage of opinions of the drivers whether the teachers use inappropriate words with students

5.2.3. Summary

Some answers to the previous questions showed a negative impression about driving schools in Saudi Arabia. Some points can be summarized which are:

1- 36.72% of the drivers said that they face difficulties in understanding teachers.
2- 34.99% of the drivers said that the teachers discriminate between the students.
3- 22.34% of the drivers said that the teachers criticize students and threaten them.
4- 21.83% of the drivers said that the teachers use inappropriate words with them.

5.2.4. Testing the Improvement in Specific Questions Statistically

The t-simple test was used to prove that there was an improvement in specific questions. These specific questions are the questions in which the improvement is 3% or higher. These questions are:

1- The traffic safety rules for passing vehicles

This question asked was about the traffic safety rules for passing vehicles. A hypothesis of testing the difference in the mean scores of the question for all driving schools before enrollment and after graduation from the driving schools is:

H_0: mean $_{\text{scores of question, before enrollment}}$ = mean $_{\text{scores of question, after graduation}}$

H_1: mean $_{\text{scores of question, before enrollment}}$ < mean $_{\text{scores of question, after graduation}}$

Table 5-91: The minitab output for testing the difference in the mean scores of question for all the driving schools before enrollment and after graduation from the driving schools

Two-sample Test for mean scores

Condition	N	Mean	StDev	SE Mean
before	512	0.695	0.461	0.020
after	501	0.786	0.410	0.018

```
Difference = mu (before) - mu (after)
Estimate for difference:  -0.091
90% upper bound for difference:  -0.0560
T-Test of difference = 0 (vs <): T-Value = -3.33  P-Value = 0.000  DF = 1002
```

From Table 5-91, P-value = 0.000 < 0.1. So, the null hypothesis was rejected and it can be concluded that the mean scores of the question before enrollment are less than the scores of the question after graduation at 0.1 level of significance. This means there is an improvement in the knowledge of the driver in traffic safety rules for passing vehicles before and after graduation from all driving schools.

2- The traffic safety rules for entering a freeway

This question asked was about the traffic safety rules for entering a freeway. A hypothesis of testing the difference in the mean scores of the question for all driving schools before enrollment and after graduation from the driving schools is:

H_0: mean $_{\text{scores of question, before enrollment}}$ = mean $_{\text{scores of question, after graduation}}$

H_1: mean $_{\text{scores of question, before enrollment}}$ < mean $_{\text{scores of question, after graduation}}$

Table 5-92: The minitab output for testing the difference in the mean scores of the question for all the driving schools before enrollment and after graduation from the driving schools

Two-sample Test for mean scores

Condition	N	Mean	StDev	SE Mean
before	512	0.496	0.500	0.022
after	501	0.607	0.489	0.022

```
Difference = mu (before) - mu (after)
Estimate for difference:  -0.1107
90% upper bound for difference:  -0.0708
T-Test of difference = 0 (vs <): T-Value = -3.56  P-Value = 0.000  DF = 1010
```

From Table 5-92, P-value = 0.000 < 0.1. So, the null hypothesis was rejected and it can be concluded that the mean scores of the question before enrollment are less than the scores of the question after graduation at 0.1 level of significance. This means there is an improvement in the knowledge of the driver in traffic safety rules for entering a freeway before and after graduation from all driving schools.

3- The traffic safety rules for exiting a main road to service road, and right-of-way for vehicles

This question asked was about the traffic safety rules for exiting a main road to service road, and right-of-way for vehicles. A hypothesis of testing the difference in the mean scores of the question for all driving schools before enrollment and after graduation from the driving schools is:

H_0: mean $_{\text{scores of question, before enrollment}}$ = mean $_{\text{scores of question, after graduation}}$

H_1: mean $_{\text{scores of question, before enrollment}}$ < mean $_{\text{scores of question, after graduation}}$

Table 5-93: The minitab output for testing the difference in the mean scores of the question for all the driving schools before enrollment and after graduation from the driving schools

Two-sample Test for mean scores

Condition	N	Mean	StDev	SE Mean
before	512	0.496	0.500	0.022
after	501	0.607	0.489	0.022

```
Difference = mu (before) - mu (after)
Estimate for difference:  -0.1107
90% upper bound for difference:  -0.0708
T-Test of difference = 0 (vs <): T-Value = -3.56  P-Value = 0.000  DF = 1010
```

From Table 5-93, P-value = 0.000 < 0.1. So, the null hypothesis was rejected and it can be concluded that the mean scores of the question before enrollment are less than the scores of the question after graduation at 0.1 level of significance. This means there is an improvement in the knowledge of the driver in traffic safety rules for exiting a main road to service road, and right-of-way for vehicles before and after graduation from all driving schools.

4- What the driver should do when the tires of the vehicle explode

This question asked was about what the driver should do when the tires of the vehicle explode. A hypothesis of testing the difference in the mean scores of the question for all driving schools before enrollment and after graduation from the driving schools is:

H_0: mean $_{\text{scores of question, before enrollment}}$ = mean $_{\text{scores of question, after graduation}}$

H_1: mean $_{\text{scores of question, before enrollment}}$ < mean $_{\text{scores of question, after graduation}}$

Table 5-94: The minitab output for testing the difference in the mean scores of the question for all the driving schools before enrollment and after graduation from the driving schools

Two-sample Test for mean scores

Condition	N	Mean	StDev	SE Mean
Before	512	0.561	0.497	0.022
After	501	0.651	0.477	0.021

```
Difference = mu (before) - mu (after)
Estimate for difference:  -0.0902
90% upper bound for difference:  -0.0509
T-Test of difference = 0 (vs <): T-Value = -2.95  P-Value = 0.002  DF = 1010
```

From Table 5-94, P-value = 0.000 < 0.1. So, the null hypothesis was rejected and it can be concluded that the mean scores of the question before enrollment are less than the scores of the question after graduation at 0.1 level of significance. This means there is an improvement in the knowledge of the driver in traffic safety rules when the tires of the vehicle explode before and after graduation from all driving schools.

5- The meaning of the traffic sign

This question asked was about the meaning of the traffic sign in Figure 5-94. A hypothesis of testing the difference in the mean scores of the question for all driving schools before enrollment and after graduation from the driving schools is:

H_0: mean $_{\text{scores of question, before enrollment}}$ = mean $_{\text{scores of question, after graduation}}$

H_1: mean $_{\text{scores of question, before enrollment}}$ < mean $_{\text{scores of question, after graduation}}$

Figure 5-94: The traffic sign

Table 5-95: The minitab output for testing the difference in the mean scores of the question for all the driving schools before enrollment and after graduation from the driving schools

Two-sample Test for mean scores

```
Condition            N    Mean   StDev   SE Mean
before             512   0.936   0.246     0.011
after              501   0.954   0.209    0.0094


Difference = mu (0) - mu (1)
Estimate for difference:  -0.0185
90% upper bound for difference:  -0.0002
T-Test of difference = 0 (vs <): T-Value = -1.29  P-Value = 0.098  DF = 992
```

From Table 5-95, P-value = 0.098 < 0.1. So, the null hypothesis was rejected and it can be concluded that the mean scores of the question before enrollment are less than the scores of the question after graduation at 0.1 level of significance. This means there is an improvement in the knowledge of the driver in understanding the meaning of the traffic sign before and after graduation from all driving schools. Note that the correct answer is speed limit.

6- The meaning of the traffic sign

This question asked was about the meaning of the traffic sign in Figure 5-95. A hypothesis of testing the difference in the mean scores of the question for all driving schools before enrollment and after graduation from the driving schools is:

$\mathbf{H_0}$: mean $_{\text{scores of question, before enrollment}}$ = mean $_{\text{scores of question, after graduation}}$

$\mathbf{H_1}$: mean $_{\text{scores of question, before enrollment}}$ < mean $_{\text{scores of question, after graduation}}$

Figure 5-95: The traffic sign

Table 5-96: The minitab output for testing the difference in the mean scores of the question for all the driving schools before enrollment and after graduation from the driving schools

Two-sample Test for mean scores

Condition	N	Mean	StDev	SE Mean
before	512	0.727	0.446	0.020
after	501	0.766	0.424	0.019

```
Difference = mu (0) - mu (1)
Estimate for difference:  -0.0399
90% upper bound for difference:  -0.0049
T-Test of difference = 0 (vs <): T-Value = -1.46  P-Value = 0.072  DF = 1010
```

From Table 5-96, P-value = 0.072 < 0.1. So, the null hypothesis was rejected and it can be concluded that the mean scores of the question before enrollment are less than the scores of the question after graduation at 0.1 level of significance. This means there is an improvement in the knowledge of the driver in understanding the meaning of the traffic sign. Note that the correct answer is give way.

7- The meaning of the traffic sign

This question asked was about the meaning of the traffic sign in Figure 5-96. A hypothesis of testing the difference in the mean scores of the question for all driving schools before enrollment and after graduation from the driving schools is:

H_0: mean $_{\text{scores of question, before enrollment}}$ = mean $_{\text{scores of question, after graduation}}$

H_1: mean $_{\text{scores of question, before enrollment}}$ < mean $_{\text{scores of question, after graduation}}$

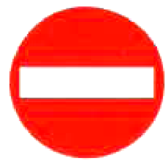

Figure 5-96: The traffic sign

Table 5-97: The minitab output for testing the difference in the mean scores of the question for all the driving schools before enrollment and after graduation from the driving schools

Two-sample Test for mean scores

Condition	N	Mean	StDev	SE Mean
before	512	0.797	0.403	0.018
after	501	0.828	0.377	0.017

```
Difference = mu (0) - mu (1)
Estimate for difference:  -0.0315
90% upper bound for difference:  -0.0000
T-Test of difference = 0 (vs <): T-Value = -1.28  P-Value = 0.100  DF = 1009
```

From Table 5-97, P-value = 0.1. So, the null hypothesis was not rejected and it cannot be concluded that the mean scores of the question before enrollment are less than the scores of the question after graduation at the 0.1 level of significance. Note that the correct answer is no entry.

8- The meaning of the lane mark

This question asked was about the meaning of the lane mark in Figure 5-97. A hypothesis of testing the difference in the mean scores of the question for all driving schools before enrollment and after graduation from the driving schools is:

H_0: mean $_{\text{scores of question, before enrollment}}$ = mean $_{\text{scores of question, after graduation}}$

H_1: mean $_{\text{scores of question, before enrollment}}$ < mean $_{\text{scores of question, after graduation}}$

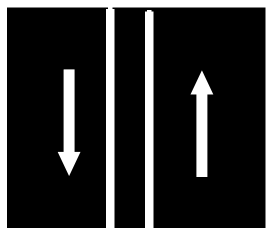

Figure 5-97: The traffic mark

Table 5-98: The minitab output for testing the difference in the mean scores of the question for all the driving schools before enrollment and after graduation from the driving schools

Two-sample Test for mean scores

Condition	N	Mean	StDev	SE Mean
before	512	0.705	0.456	0.020
after	501	0.737	0.441	0.020

```
Difference = mu (0) - mu (1)
Estimate for difference:  -0.0314
90% upper bound for difference:  0.0047
T-Test of difference = 0 (vs <): T-Value = -1.12  P-Value = 0.132  DF = 1010
```

From Table 5-98, P-value = 0.132 > 0.1. So, the null hypothesis was not rejected and it cannot be concluded that the mean scores of the question before enrollment are less than the scores of the question after graduation at 0.1 level of significance.

9- The traffic rules for the priority in the roundabout

This question asked was about the traffic rules for the priority in the roundabout. A hypothesis of testing the difference in the mean scores of the question for all driving schools before enrollment and after graduation from the driving schools is:

H_0: mean $_{\text{scores of question, before enrollment}}$ = mean $_{\text{scores of question, after graduation}}$

H_1: mean $_{\text{scores of question, before enrollment}}$ < mean $_{\text{scores of question, after graduation}}$

Table 5-99: The minitab output for testing the difference in the mean scores of the question for all the driving schools before enrollment and after graduation from the driving schools

Two-sample Test for mean scores

Condition	N	Mean	StDev	SE Mean
Before	512	0.781	0.414	0.018
After	501	0.832	0.374	0.017

```
Difference = mu (0) - mu (1)
Estimate for difference:  -0.0511
90% upper bound for difference:  -0.0193
T-Test of difference = 0 (vs <): T-Value = -2.06  P-Value = 0.020  DF = 1004
```

From Table 5-99, P-value = 0.020 < 0.1. So, the null hypothesis was rejected and it can be concluded that the mean scores of the question before enrollment are less than the scores of the question after graduation at 0.1 level of significance. This means there is an improvement in the knowledge of the driver in traffic safety rules for the priority in the roundabout before and after graduation from all driving schools. Note that the correct answer is the traffic inside the roundabout (coming from your left).

10- The traffic rules when roads become slippery after the rain starts

This question asked was about the traffic rules when roads become slippery after the rain starts. A hypothesis of testing the difference in the mean scores of the question for all driving schools before enrollment and after graduation from the driving schools is:

H_0: $\text{mean}_{\text{scores of question, before enrollment}} = \text{mean}_{\text{scores of question, after graduation}}$

H_1: $\text{mean}_{\text{scores of question, before enrollment}} < \text{mean}_{\text{scores of question, after graduation}}$

Table 5-100: The minitab output for testing the difference in the mean scores of the question for all the driving schools before enrollment and after graduation from the driving schools

Two-sample Test for mean scores

Condition	N	Mean	StDev	SE Mean
Before	512	0.455	0.498	0.022
After	501	0.517	0.500	0.022

```
Difference = mu (0) - mu (1)
Estimate for difference:  -0.0619
90% upper bound for difference:  -0.0216
T-Test of difference = 0 (vs <): T-Value = -1.97 P-Value = 0.024 DF = 1010
```

From Table 5-100, P-value = 0.024 < 0.1. So, the null hypothesis was rejected and it can be concluded that the mean scores of the question before enrollment are less than the scores of the question after graduation at 0.1 level of significance. This means there is an improvement in the knowledge of the driver in traffic safety rules when roads become slippery after the rain starts before and after graduation from all driving schools. Note that the correct answer is avoid turning and stop quickly.

5.2.5. Testing if There is a Difference in the Mean Scores Before Enrollment and After Graduation from the Driving Schools

This test was used to test the difference in the mean scores for all driving schools before enrollment and after graduation from the driving schools. Before that, the scores of the drivers before enrollment to different driving schools were tested by using ANOVA. The P-value is equal to 0.366. By using 10% level of significance, it can be concluded that there is no difference between all the scores of the drivers before enrollment to different driving schools. A hypothesis of testing the difference in the mean scores for all driving schools before enrollment and after graduation from the driving schools was set which was based on the following assumption:

$\mathbf{H_0}$: $\text{mean}_{\text{scores, before enrollment}} = \text{mean}_{\text{scores, after graduation}}$

$\mathbf{H_1}$: $\text{mean}_{\text{scores, before enrollment}} < \text{mean}_{\text{scores, after graduation}}$

Table 5-101: The minitab output for testing the difference in the mean scores for all driving schools before enrollment and after graduation from the driving schools

Two-sample Test for mean scores

Condition	N	Mean	StDev	SE Mean
Before enrollment	512	17.38	3.81	0.17
After graduation	501	17.92	3.78	0.17

Estimate for difference = $\text{mean}_{\text{scores, before enrollment}} - \text{mean}_{\text{scores, after graduation}} = -0.533$

95% upper bound for difference: -0.141

T-Value = -2.24 **P-Value =** 0.013 **DF =** 1010

From Table 5-101, P-value = 0.013 < 0.1. So, the null hypothesis was rejected and it can be concluded that the mean scores of the drivers before enrollment are less than the scores of the drivers after graduation at 0.1 level of significance. From the results, it indicates that the improvement in mean scores between before enrollment and after graduation is only 0.533, which represents 1.67%. This improvement in the mean scores is low. Therefore, it can be concluded that the gained traffic knowledge is low and the driving schools do not help the drivers to gain practically better traffic knowledge although the improvement is statistically sound.

5.2.6. Testing if There is a Difference in the Means Scores Before Enrollment and After Graduation from Each Driving School

These tests were needed to check if there is a difference in the mean scores between before and after graduation from each driving schools. These driving schools are Dammam, Khobar, Jubal, Riyadh and Jeddah driving schools.

5.2.6.1. Dammam driving school

This test was used to test the difference in the mean scores before enrollment and after graduation from the Dammam driving school by using two-sample t-test. The hypothesis is

H_0: mean $_{\text{scores, before enrollment}}$ = mean $_{\text{scores, after graduation}}$

H_1: mean $_{\text{scores, before enrollment}}$ < mean $_{\text{scores, after graduation}}$

Table 5-102: The minitab output for testing the difference in the mean scores before enrollment and after graduation from Dammam driving school

Two-sample Test for scores

Condition	N	Mean	StDev	SE Mean
Before enrollment	100	17.13	3.74	0.37
After graduation	90	17.16	4.06	0.43

Estimate for difference = $\text{mean}_{\text{scores, before enrollment}} - \text{mean}_{\text{scores, after graduation}}$ = **-0.026**
95% upper bound for difference: 0.914
T-Value = -0.04 **P-Value =** 0.482 **DF =** 181

From Table 5-102, P-value = 0.482 > 0.1. So, there is no evidence to reject the null hypothesis and it cannot be concluded that the mean scores are the same before and after graduation from Dammam driving school.

5.2.6.2. Khobar driving school

This test was used to test the difference in the mean scores before enrollment and after graduation from Khobar driving school by using two-sample t-test. The hypothesis is

$\mathbf{H_0}$: $\text{mean}_{\text{scores, before enrollment}} = \text{mean}_{\text{scores, after graduation}}$

$\mathbf{H_1}$: $\text{mean}_{\text{scores, before enrollment}} < \text{mean}_{\text{scores, after graduation}}$

Table 5-103: The minitab output for testing the difference in the mean scores before enrollment and after graduation from the Khobar driving school

Two-sample Test for scores

condition	N	Mean	StDev	SE Mean
after graduation	169	18.21	3.75	0.29
before enrollment	131	16.94	3.91	0.34

Estimate for difference = $\text{mean}_{\text{scores, before enrollment}} - \text{mean}_{\text{scores, after graduation}}$ = **- 1.268**
95% lower bound for difference: 0.530
T-Value = 2.83 **P-Value =** 0.002 **DF =** 273

From Table 5-103, P-value = 0.002 < 0.1. So, the null hypothesis was rejected and it can be concluded that the mean scores of the drivers in Khobar driving school before enrollment are less than the mean scores after graduation at 0.1 level of significance. From the results, it indicates that the improvement in mean scores between before enrollment and after graduation is only 1.2, which represents 4.2%. This improvement in the mean scores is low. Therefore, it can be concluded that the gained traffic knowledge is low and Khobar driving school does not help the drivers to gain practically better traffic knowledge although the improvement is statistically sound.

5.2.6.3. Jubal driving school

This test was used to test the difference in the mean scores before enrollment and after graduation from Jubal driving school by using two-sample t-test. The hypothesis is

H_0: mean $_{\text{scores, before enrollment}}$ = mean $_{\text{scores, after graduation}}$

H_1: mean $_{\text{scores, before enrollment}}$ < mean $_{\text{scores, after graduation}}$

Table 5-104: The minitab output for testing the difference in the mean scores before enrollment and after graduation from the Jubal driving school

Two-sample Test for scores

condition	**N**	**Mean**	**StDev**	**SE Mean**
after graduation	102	18.83	3.44	0.34
before enrollment	113	17.64	3.73	0.35

Estimate for difference = mean $_{\text{scores, before enrollment}}$ - mean $_{\text{scores, after graduation}}$ = **- 1.196**
95% lower bound for difference: 0.388
T-Value = 2.45 **P-Value =** 0.008 **DF =** 212

From Table 5-104, P-value = 0.008 < 0.1. So, the null hypothesis was rejected and it can be concluded that the mean scores of the drivers in Jubal driving school before enrollment are less than the mean scores after graduation at 0.1 level of significance. From the results, it indicates that the improvement in mean scores between before enrollment and after graduation is only 1.196, which represents 3.98%. This improvement in the mean scores is low. Therefore, it can be concluded that the gained traffic knowledge is low and Jubal driving school does not help the drivers to gain practically better traffic knowledge although the improvement is statistically sound.

5.2.6.4. Riyadh driving school

This test was used to test the difference in the mean scores before enrollment and after graduation from Riyadh driving school by using two-sample t-test. The hypothesis is

H_0: $\text{mean}_{\text{scores, before enrollment}} = \text{mean}_{\text{scores, after graduation}}$

H_1: $\text{mean}_{\text{scores, before enrollment}} < \text{mean}_{\text{scores, after graduation}}$

Table 5-105: The minitab output for testing the difference in the mean scores before enrollment and after graduation from the Riyadh driving school

Two-sample T for scores

condition	**N**	**Mean**	**StDev**	**SE Mean**
after graduation	80	17.43	3.74	0.42
before enrollment	69	17.49	4.26	0.51

Estimate for difference = $\text{mean}_{\text{scores, before enrollment}} - \text{mean}_{\text{scores, after graduation}}$ = **+ 0.068**

95% lower bound for difference: -1.164

T-Value = -0.10 **P-Value =** 0.541 **DF =** 136

From Table 5-105, P-value = 0.541 > 0.1. So, there is no evidence to reject the null hypothesis and it cannot be concluded that the mean scores are the same before and after graduation from Riyadh driving school.

5.2.6.5. Jeddah driving school

This test was used to test the difference in the mean scores before enrollment and after graduation from Jeddah driving school by using two- sample t-test. The hypothesis is

H_0: mean $_{\text{scores, before enrollment}}$ = mean $_{\text{scores, after graduation}}$

H_1: mean $_{\text{scores, before enrollment}}$ < mean $_{\text{scores, after graduation}}$

Table 5-106: The minitab output for testing the difference in the mean scores before enrollment and after graduation from Jeddah driving school

Two-sample Test for scores

condition	**N**	**Mean**	**StDev**	**SE Mean**
after graduation	60	17.33	3.71	0.48
before enrollment	99	17.86	3.50	0.35

Estimate for difference = mean $_{\text{scores, before enrollment}}$ - mean $_{\text{scores, after graduation}}$ = + 0.525
95% lower bound for difference: -1.511
T-Value = -0.88 **P-Value =** 0.811 **DF =** 118

From Table 5-106, P-value = 0.811 > 0.1. So, there is no evidence to reject the null hypothesis and it cannot be concluded that the mean scores are the same before and after graduation from Jeddah driving school.

5.2.6.6. Discussion

The results of the tests show that only Khobar and Jubal driving schools helped to improve the traffic knowledge of the drivers. However, the improvement in the traffic knowledge is very low. The percentage of improvement in Khobar driving school is only 4.32% and the percentage of improvement in Jubal driving school is only 3.99%. These improvements are not practically better although the improvements are statistically sound.

5.2.7. Testing if There is a Difference in the Mean Scores Before Enrollment and After Graduation from Driving Schools for Different Categories of Drivers

These tests were needed to check the effectiveness of the driving schools to improve traffic knowledge for different categories of drivers by using two-sample t-tests. These categories of drivers are according to nationality (Saudi or non-Saudi), type of driver (chauffeur or non-chauffeur) and the native language. The results of these tests are shown in Table 5-107.

Table 5-107: The summary results of testing if there is a difference in the mean scores before enrollment and after graduation from driving schools for different categories of drivers

The category	P-value	The conclusion
Saudi	0.981	There is no evidence to reject the hypothesis and it cannot be concluded that the mean scores before enrollment are not less than the scores after graduation at 0.1 level of significance
Non-Saudi	0.998	There is no evidence to reject the hypothesis and it cannot be concluded that the mean scores before enrollment are not less than the scores after graduation at 0.1 level of significance
<u>Chauffeur</u>	<u>0.044</u>	The hypothesis was rejected and it can be concluded that the mean scores before enrollment are less than the scores after graduation at 0.1 level of significance
Non-chauffeur	0.199	There is no evidence to reject the hypothesis and it cannot be concluded that the mean scores before enrollment are not less than the scores after graduation at 0.1 level of significance
Arabic speaking	0.675	There is no evidence to reject the hypothesis and it cannot be concluded that the mean scores before enrollment are not less than the scores after graduation at 0.1 level of significance
<u>Indian speaking</u>	<u>0.088</u>	The hypothesis was rejected and it can be concluded that the mean scores before enrollment are less than the scores after graduation at 0.1 level of significance
<u>Urdu speaking</u>	<u>0.034</u>	The hypothesis was rejected and it can be concluded that the mean scores before enrollment are less than the scores after graduation at 0.1 level of significance
Bengali speaking	0.142	There is no evidence to reject the hypothesis and it cannot be concluded that the mean scores before enrollment are not less than the scores after graduation at 0.1 level of significance
Tamils speaking	0.414	There is no evidence to reject the hypothesis and it cannot be concluded that the mean scores before enrollment are not less than the scores after graduation at 0.1 level of significance
Maleom speaking	0.64	There is no evidence to reject the hypothesis and it cannot be concluded that the mean scores before enrollment are not less than the scores after graduation at 0.1 level of significance
Filipino speaking	0.897	There is no evidence to reject the hypothesis and it cannot be concluded that the mean scores before enrollment are not less than the scores after graduation at 0.1 level of significance

From Table 5-107, there are only three categories of drivers whose mean scores after graduation are better than their mean scores before enrollment to driving schools. These three categories of drivers are chauffeur drivers, Indian speaking drivers and Urdu speaking drivers. The details about these tests are as follows:

5.2.7.1.Chauffeur drivers

This test was used to test the difference in the mean scores before enrollment and after graduation from driving schools for chauffeur drivers by using two-sample t-test. The hypothesis is

H_0: mean $_{\text{scores, before enrollment}}$ = mean $_{\text{scores, after graduation}}$

H_1: mean $_{\text{scores, before enrollment}}$ < mean $_{\text{scores, after graduation}}$

Table 5-108: The minitab output for testing difference in the mean scores before enrollment and after graduation from driving schools for chauffeur drivers

Two-sample Test for scores

Condition	N	Mean	StDev	SE Mean
After graduation	262	17.15	3.79	0.23
Before enrollment	298	16.60	3.86	0.22

Estimate for difference = mean $_{\text{scores, before enrollment}}$ - mean $_{\text{scores, after graduation}}$ = **- 0.552**
95% lower bound for difference: 0.019
T-Value = 1.71 **P-Value** = 0.044 **DF** = 551

From Table 5-108, P-value = 0.044 < 0.1. So, the null hypothesis was rejected and it can be concluded that the mean scores before enrollment are less than the scores of the students after graduation for chauffeur drivers at 0.1 level of significance. However, this improvement, which is only 1.8%, is not practically better although the improvement is statistically sound.

5.2.7.2.Indian speaking drivers

This test was used to test the difference in the mean scores before enrollment and after graduation from driving schools for Indian speaking drivers by using two-sample t-test. The hypothesis is

H_0: mean $_{\text{scores, before enrollment}}$ = mean $_{\text{scores, after graduation}}$

H_1: mean $_{\text{scores, before enrollment}}$ < mean $_{\text{scores, after graduation}}$

Table 5-109: The minitab output for testing the difference in the mean scores before enrollment and after graduation from driving schools for Indian speaking drivers

Two-sample T for scores

Condition	N	Mean	StDev	SE Mean
After graduation	48	17.85	4.74	0.68
Before enrollment	55	16.65	4.11	0.55

Estimate for difference = mean $_{\text{scores, before enrollment}}$ - mean $_{\text{scores, after graduation}}$ = **-1.200**
95% lower bound for difference: 0.264
T-Value = -1.36 **P-Value** = 0.088 **DF** = 93

From Table 5-109, P-value = 0.088 < 0.1. So, the null hypothesis was rejected and it can be concluded that the mean scores before enrollment are less than the scores of the students after graduation for Indian speaking drivers at 0.1 level of significance. However, this improvement, which is only 4.0%, is not practically better although the improvement is statistically sound.

5.2.7.3. Urdu speaking drivers

This test was used to test the difference in the mean scores before enrollment and after graduation from driving schools for Urdu speaking drivers by using two sample t-test. The hypothesis is

H_0: mean $_{\text{scores, before enrollment}}$ = mean $_{\text{scores, after graduation}}$

H_1: mean $_{\text{scores, before enrollment}}$ < mean $_{\text{scores, after graduation}}$

Table 5-110: The minitab output for testing the difference in the mean scores before enrollment and after graduation from driving schools for Urdu speaking drivers

Two-sample T for scores

Condition	**N**	**Mean**	**StDev**	**SE Mean**
After graduation	73	16.51	3.74	0.44
Before enrollment	75	15.49	2.91	0.34

Estimate for difference = mean $_{\text{scores, before enrollment}}$ - mean $_{\text{scores, after graduation}}$ = **-1.014**

95% lower bound for difference: –0.100

T-Value = –1.84 **P-Value** = 0.034 **DF** = 135

From Table 5-100, P-value = 0.034 < 0.1. So, the null hypothesis was rejected and it can be concluded that the mean scores before enrollment are less than the scores of the students after graduation for Urdu speaking drivers at 0.1 level of significance. However, this improvement, which is only 3.4%, is not practically better although the improvement is statistically sound.

5.2.8. Modeling the Relationship of the Scores for Different Characteristics

The scores of the drivers were modeled against different characteristics to find if the scores can be explained by one of these characteristics. This modeling was done for the drivers before they enrolled to the driving schools and after graduation from the driving schools.

5.2.8.1. Analyzing the mean scores of the drivers before enrollment to driving schools

The scores of the drivers were modeled for different characteristics of the drivers before enrollment to driving schools. The characteristics are nationality, native language, age, years of experience, level of education, and degree of reading and understanding traffic signs in Arabic and English languages. It was found that there is no difference between the mean scores for different ages and years of experience. It was found that there are differences between the mean scores and some characteristics of the drivers and the results are as follows:

5.2.8.1.1. Means scores for different nationalities

A hypothesis tested the difference between the mean scores for different nationalities, which is:

H_0: There is no difference between the mean scores for different nationalities.

H_1: There is at least one mean score that is different from the other means.

Table 5-111: The minitab output for modeling difference between the mean scores for different nationalities

One-way ANOVA Table:

```
Source          DF      SS     MS      F      P
Nationality      6  1622.2  270.4  23.51  0.000
Error          505  5806.8   11.5
Total          511  7429.0

S = 3.391   R-Sq = 21.84%   R-Sq(adj) = 20.91%
                           Individual 90% CIs For Mean Based on Pooled StDev
Nationality   N    Mean  StDev     +---------+---------+---------+---------
Saudi        61  18.984  3.041                                 (---*---)
Arabian     120  19.325  3.149                                    (--*--)
Indian      111  17.153  4.010                         (--*--)
Pakistani    64  15.125  2.930                 (----*---)
Bengali      22  13.500  2.907     (------*-------)
Filipino     43  19.023  2.739                                (----*----)
Other        91  15.780  3.756                     (---*--)
                                   +---------+---------+---------+---------
Pooled StDev = 3.391            12.0      14.0      16.0      18.0
```

From Table 5-111, P-value = 0 < 0.1. So, the null hypothesis was rejected and it was concluded that these is a difference in the mean scores for different nationalities. Table 5-112 shows some grouping letters. The Tukey method was used to find out which of the nationalities caused the rejection of the null hypothesis. The nationalities, which share the same letter, are not significantly different. The means are significantly different if they do not share the same letter.

Table 5-112: The minitab output for grouping information for nationalities using the Tukey method

Nationality	N	Mean	Grouping
Arabian	120	19.325	A
Filipino	43	19.023	A
Saudi	61	18.984	A
Indian	111	17.153	B
Other	91	15.780	C
Pakistani	64	15.125	C D
Bengali	22	13.500	D

From Table 5-112, it can be noticed that Arabian, Filipino and Saudi drivers score higher than the other drivers and they have better traffic knowledge than the other drivers before they came to Saudi Arabia. The Pakistani and Bengali drivers score lower than the other drivers.

5.2.8.1.2. Mean scores for different native languages

A hypothesis tested the difference between the mean scores for different native languages which is:

H_0: There is no difference between the mean scores for different native languages**.**

H_1: There is at least one mean score that is different from the other means.

Table 5-113: The minitab output for modeling difference between the mean scores for different native languages

```
Source              DF      SS     MS      F      P
Native language      8  1352.2  169.0  15.88  0.000
Error              454  4833.5   10.6
Total              462  6185.8
S = 3.263   R-Sq = 21.86%   R-Sq(adj) = 20.48%
                           Individual 90% CIs For Mean Based on
                           Pooled StDev
Native language   N    Mean  StDev  ---------+---------+---------+---------+
Arabic          185  19.151  3.138                                  (--*-)
English          10  17.200  3.765                (---------*---------)
Indian           55  16.655  4.111                   (---*----)
Urdu             75  15.493  2.906              (--*---)
Bengali          22  13.500  2.907  (------*-----)
Tamils           16  15.875  3.704           (-------*-------)
Malaeom          48  18.125  3.330                          (----*---)
Filipino         42  19.000  2.767                              (----*----)
Other            10  16.500  3.923            (----------*---------)
                                    ---------+---------+---------+---------+
                                           14.0      16.0      18.0      20.0
Pooled StDev = 3.263
```

From Table 5-113, P-value = 0 < 0.1. So, the null hypothesis was rejected and it was concluded that there is a difference between the mean scores for different native languages. Table 5-114 shows some grouping letters. The Tukey method was used to find out which of the native languages caused the rejection of the null hypothesis. The native languages, which share the same letter, are not significantly different. The means are significantly different if they do not share the same letter.

Table 5-114: The minitab output for grouping information for native languages using the Tukey method

```
Native language    N    Mean  Grouping
Arabic           185  19.151  A
Filipino          42  19.000  A
malaeom           48  18.125  A B
English           10  17.200  A B C
Indian            55  16.655    B C
Other             10  16.500  A B C D
Tamils            16  15.875    B C D
Urdu              75  15.493      C D
Bengali           22  13.500        D
```

From Table 5-114, it can be noticed that Arabic and Filipino speaking drivers score higher than the other drivers and they have better traffic knowledge than the other drivers before they came to Saudi Arabia. Also, the Urdu and Bengali speaking drivers score lower than the other drivers.

5.2.8.1.3. Mean scores for different levels of education

A hypothesis tested the difference between the mean scores for different levels of education, which is:

H_0: There is no difference between the mean scores for different levels of education.

H_1: There is at least one mean score that is different from the other means.

Table 5-115: The minitab output for modeling the difference between the mean scores for different levels of education

```
Source              DF      SS      MS      F      P
Level of education   3  1082.4   360.8  28.62  0.000
Error              475  5987.1    12.6
Total              478  7069.5
S = 3.550   R-Sq = 15.31%   R-Sq(adj) = 14.78%
                           Individual 90% CIs For Mean Based on
                           Pooled StDev
Edu       N    Mean  StDev  ------+---------+---------+---------+---
0        12  13.000  4.000  (-------*-------)
1       130  15.800  3.915                  (-*--)
2       178  17.455  3.518                         (-*-)
3       159  19.208  3.226                                (-*-)
                            ------+---------+---------+---------+---
                               12.5      15.0      17.5      20.0
```

Table 5-116: The coding for the level of education

Level	code
Illiterate	0
Read and write in native language	1
below the university	2
University or higher	3

From Table 5-115, P-value = 0 < 0.1. So, the null hypothesis was rejected and it was concluded that there is a difference in the mean scores for different levels of education. Table 5-117 shows some grouping letters. The Tukey method was used to find out which level of education caused the rejection of the null hypothesis. The levels of education, which share the same letter, are not significantly different. The means are significantly different if they do not share the same letter.

Table 5-117: The minitab output for grouping information for different levels of education using the Tukey method

```
Level of education    N    Mean  Grouping
3                   159  19.208  A
2                   178  17.455    B
1                   130  15.800      C
0                    12  13.000        D
```

From Table 5-116 and 5-117, it can be noticed that the level of education plays a big role in traffic knowledge. As the level of education increases, the mean score increases. The drivers whose level of education is university or higher scored the highest while the illiterate scored the lowest.

5.2.8.1.4. Mean scores for different degrees of reading and understanding traffic signs in Arabic

A hypothesis tested the difference between the mean scores for different degrees of reading and understanding traffic signs in Arabic, which is:

H_0: There is no difference between the mean scores for different degrees of reading and understanding traffic signs in Arabic.

H_1: There is at least one mean score that is different from the other means.

Table 5-118: The minitab output for modeling difference between the mean scores for different degrees of reading and understanding traffic signs in Arabic

```
Source                 DF      SS     MS      F      P
Understanding Arabic    2   496.1  248.1  17.96  0.000
Error                 494  6823.7   13.8
Total                 496  7319.8

S = 3.717   R-Sq = 6.78%   R-Sq(adj) = 6.40%


                           Individual 90% CIs For Mean Based on
                           Pooled StDev
Understanding       N    Mean  StDev  ------+---------+---------+---------
yes               270  18.293  3.447                        (----*---)
yes with diff     115  16.522  4.012      (------*------)
no                112  16.089  4.019  (------*------)
                                      ------+---------+---------+---------
                                          16.0      17.0      18.0
Pooled StDev = 3.717
```

From Table 5-118, P-value = 0 < 0.1. So, the null hypothesis was rejected and it was concluded that there is a difference in the mean scores for different degrees of reading and understanding traffic signs in Arabic. Table 5-119 shows some grouping letters. The

Tukey method was used to find out which degree of reading and understanding traffic signs in Arabic caused the rejection of the null hypothesis. The degree of reading and understanding traffic signs in Arabic, which share the same letter, are not significantly different. The means are significantly different if they do not share the same letter.

Table 5-119: The minitab output for grouping information for degrees of reading and understanding traffic signs in Arabic using the Tukey method

Understanding Arabic	N	Mean	Grouping
yes	270	18.293	A
yes with diff	115	16.522	B
no	112	16.089	B

From Table 5-119, it can be noticed that the degree of reading and understanding traffic signs in Arabic plays a big role in the traffic knowledge. As the degree of reading and understanding traffic signs in Arabic increases, the mean score increases. The drivers who understand Arabic language scored the highest while the drivers who do not understand Arabic language scored the lowest.

5.2.8.1.5. Mean scores for different degrees of reading and understanding traffic signs in English

A hypothesis tested the difference between the mean scores for different degrees of reading and understanding traffic signs in English, which is:

H_0: There is no difference between the mean scores for different degrees of reading and understanding traffic signs in English**.**

H_1: There is at least one mean score that is different from the other means.

Table 5-120: The minitab output for modeling difference between the mean scores for different degrees of reading and understanding traffic signs in English

```
Source                    DF      SS    MS     F      P
Understanding English      2   128.0  64.0  4.41  0.013
Error                    502  7282.5  14.5
Total                    504  7410.6
S = 3.809   R-Sq = 1.73%   R-Sq(adj) = 1.34%
                           Individual 90% CIs For Mean Based on Pooled StDev
Understanding      N    Mean  StDev     +---------+---------+---------+-----
yes              370  17.576  3.772                          (---*---)
yes with diff     78  17.564  3.860                     (--------*-------)
no                57  15.982  3.975     (---------*---------)
                                        +---------+---------+---------+-----
                                      15.0      16.0      17.0      18.0
```

From Table 5-120, P-value = 0.013 < 0.1. So, the null hypothesis was rejected and it was concluded that there is a difference in the mean scores for different degrees of reading and understanding traffic signs in English. Table 5-121 shows some grouping letters. The Tukey method was used to find out which degree of reading and understanding traffic signs in English caused the rejection of the null hypothesis. The degree of reading and understanding traffic signs in English, which share the same letter, are not significantly different. The means are significantly different if they do not share the same letter.

Table 5-121: The minitab output for grouping information for degrees of reading and understanding traffic signs in English using The Tukey method

Understanding English	N	Mean	Grouping
yes	370	17.576	A
yes with diff	78	17.564	A
no	57	15.982	B

From Table 5-121, it can be noticed that the degree of reading and understanding traffic signs in English plays a big role in traffic knowledge. As the degree of reading and understanding traffic signs in English increases, the mean score increases. The drivers who understand English language scored the highest while the drivers who do not understand the English language scored the lowest.

5.2.8.1.6. Mean scores for different types of drivers

A hypothesis tested the difference between the mean scores for different types of drivers, which is:

H_0: There is no difference between the mean scores for different types of drivers.

H_1: There is at least one mean score that is different from the other means.

Table 5-122: The minitab output for modeling the difference between the mean scores for different types of drivers

```
Source           DF      SS     MS     F      P
Type of driver    4   514.6  128.6  9.51  0.000
Error           493  6672.3   13.5
Total           497  7186.9
S = 3.679   R-Sq = 7.16%   R-Sq(adj) = 6.41%
                           Individual 90% CIs For Mean Based on
                           Pooled StDev
Type of driver      N    Mean  StDev  -------+---------+---------+---------
Taxi               13  16.000  4.123  (-------------*------------)
Family            141  17.021  3.813                  (---*----)
Company           133  16.241  3.621             (---*---)
Government         11  16.273  6.358   (-------------*--------------)
Non-chauffeur     200  18.575  3.399                              (---*--)
                                      -------+---------+---------+---------
                                          15.0      16.5      18.0
```

From Table 5-122, P-value = 0 < 0.1. So, the null hypothesis was rejected and it can be concluded that there is a difference in the mean scores for different types of drivers. The Table 5-123 shows some grouping letters. The Tukey method was used to find out which type of driver caused the rejection of the null hypothesis. The types of drivers, which share the same letter, are not significantly different. The means are significantly different if they do not share the same letter.

Table 5-123: The minitab output for grouping information for different type of driver using the Tukey method

Type of driver	N	Mean	Grouping
Non-chauffeur	200	18.575	A
Family	141	17.021	B
Government	11	16.273	A B
Company	133	16.241	B
Taxi	13	16.000	A B

From Table 5-123, it can be noticed that the mean scores of non-chauffeurs are the highest among the other drivers. The mean scores of taxi drivers are the lowest.

5.2.8.2. Analyzing mean scores of drivers after graduation from driving schools

The scores of the drivers were modeled for different characteristics of the drivers after graduation from driving schools. The characteristics are nationality, native language, age, years of experience, level of education, and degree of reading and understanding traffic signs in Arabic and English languages. It was found that there is no difference between the mean scores for different ages and years of experience. It was found that there are differences between the mean scores and some characteristics of the drivers, and the results are as follows:

5.2.8.2.1. Mean scores for different nationalities

A hypothesis tested the difference between the mean scores for different nationalities, which is:

H_0: There is no difference between the mean scores for different nationalities.

H_1: There is at least one mean score that is different from the other means.

Table 5-124: The minitab output for modeling difference between the mean scores for different nationalities

```
Source        DF      SS     MS      F      P
Nationality    6   904.4  150.7  11.94  0.000
Error        494  6234.1   12.6
Total        500  7138.5
S = 3.552   R-Sq = 12.67%   R-Sq(adj) = 11.61%
                           Individual 95% CIs For Mean Based on
                           Pooled StDev
Nationality     N    Mean  StDev  -------+---------+---------+---------+--
Saudi          78  17.859  3.234                      (---*---)
Arabian       145  19.614  3.065                                (--*--)
Indian         92  18.207  4.018                        (---*---)
Pakistani      58  16.172  3.681             (----*---)
Bengali        13  14.462  2.904  (---------*---------)
Filipino       41  17.366  3.625                  (-----*----)
Other          74  16.568  4.068                (---*---)
                                  -------+---------+---------+---------+--
                                       14.0      16.0      18.0      20.0
```

From Table 5-124, P-value = 0 < 0.1. So, the null hypothesis was rejected and it was concluded that there is a difference in the mean scores for different nationalities. Table 5-125 shows some grouping letters. The Tukey method was used to find out which of the nationalities caused the rejection of the null hypothesis. The nationalities, which share the same letter, are not significantly different. The means are significantly different if they do not share the same letter.

Table 5-125: The minitab output for grouping information for nationalities using the Tukey method

```
Nationality       N    Mean  Grouping
Arabian         145  19.614  A
Indian           92  18.207    B
Saudi            78  17.859    B C
Filipino         41  17.366    B C D
Other            74  16.568      C D
Pakistani        58  16.172        D
Bengali          13  14.462        D
```

From Table 5-125, it can be noticed that Arabian drivers scored higher than the other drivers and they have better traffic knowledge than the other drivers before they came to Saudi Arabia. Also, the Bengali drivers scored lower than the other drivers.

5.2.8.2.2. Mean scores for different native languages

A hypothesis tested the difference between the mean scores for different native languages, which is:

H_0: There is no difference between the mean scores for different native languages.

H_1: There is at least one mean score that is different from the other means.

Table 5-126: The minitab output for modeling difference between the mean scores for different native languages

```
Source              DF      SS     MS     F      P
Native language      8   535.9   67.0  5.04  0.000
Error              449  5970.3   13.3
Total              457  6506.2
S = 3.646   R-Sq = 8.24%   R-Sq(adj) = 6.60%
                           Individual 95% CIs For Mean Based on Pooled StDev
Native language   N    Mean  StDev     +---------+---------+---------+------
Arabic          228  19.009  3.257                              (-*-)
English          13  18.077  5.008                    (-------*-------)
Indian           48  17.854  4.744                       (---*----)
Urdu             73  16.507  3.738                   (--*--)
Bengali          11  14.727  3.069     (--------*--------)
Tamils           19  16.842  4.425                 (-----*------)
Malaeom          27  17.852  3.047                      (----*-----)
tagalo           33  17.848  3.563                      (----*----)
Other             6  17.833  4.535                (----------*-----------)
                                       +---------+---------+---------+------
                                     12.5      15.0      17.5      20.0
```

From Table 5-126, P-value = 0 < 0.1. So, the null hypothesis was rejected and it was concluded that there is a difference between the mean scores for different native languages. Table 5-127 shows some grouping letters. The Tukey method was used to find out which of the native languages caused the rejection of the null hypothesis. The native languages, which share the same letter, are not significantly different. The means are significantly different if they do not share the same letter.

Table 5-127: The minitab output for grouping information for native languages using the Tukey method

Native language	N	Mean	Grouping
Arabic	228	19.009	A
English	13	18.077	A B
Indian	48	17.854	A B
Malaeom	27	17.852	A B
tagalo	33	17.848	A B
Other	6	17.833	A B
Tamils	19	16.842	A B
Urdu	73	16.507	B
Bengali	11	14.727	B

From Table 5-127, it can be noticed that Arabic speaking drivers scored higher than the other drivers and they have better traffic knowledge than the other driver after they graduated from driving schools. Also, the Bengali speaking drivers scored lower than the other drivers.

5.2.8.2.3. Mean scores for different levels of education

A hypothesis tested the difference between the mean scores for different levels of education, which is:

H_0: There is no difference between the mean scores for different levels of education.

H_1: There is at least one mean score that is different from the other means.

Table 5-128: The minitab output for modeling difference between the mean scores for different levels of education

```
Source              DF      SS     MS      F      P
Level of education   3   700.4  233.5  17.95  0.000
Error              467  6072.2   13.0
Total              470  6772.6

S = 3.606   R-Sq = 10.34%   R-Sq(adj) = 9.77%
                            Individual 95% CIs For Mean Based on
                            Pooled StDev
Edu    N    Mean  StDev  --------+---------+---------+---------+-
0       11  14.545  4.228  (----------*---------)
1      110  16.309  3.993                 (---*--)
2      176  18.347  3.798                            (--*-)
3      174  19.167  3.072                                (--*--)
                            --------+---------+---------+---------+-
                                 14.0      16.0      18.0      20.0
```

Table 5-129: The coding for the level of education

Level	code
Illiterate	0
Read and write in native language	1
Under the university	2
University or higher	3

From Table 5-128, P-value = 0 < 0.1. So, the null hypothesis was rejected and it was concluded that there is a difference in the mean scores for different levels of education. Table 5-130 shows some grouping letters. The Tukey method was used to find out which level of education caused the rejection of the null hypothesis. The levels of education, which share the same letter, are not significantly different. The means are significantly different if they do not share the same letter.

Table 5-130: The minitab output for grouping information for different levels of education using the Tukey method

Level of education	N	Mean	Grouping	
3	174	19.167	A	
2	176	18.347	A	
1	110	16.309		B
0	11	14.545		B

From Tables 5-119 and 5-120, it can be noticed that that level of education plays a big role in traffic knowledge. As the level of education increases, the mean score increases. The drivers whose education is university or higher scored the highest while the illiterate scored the lowest.

5.2.8.2.4. Mean scores for different degrees of reading and understanding traffic signs in Arabic

A hypothesis tested the difference between the mean scores for different degrees of reading and understanding traffic signs in Arabic, which is:

H_0: There is no difference between the mean scores for different degrees of reading and understanding traffic signs in Arabic.

H_1: There is at least one mean score that is different from the other means.

Table 5-131: The minitab output for modeling difference between the mean scores for different degrees of reading and understanding traffic signs in Arabic

```
Source                   DF      SS     MS      F      P
Understanding Arabic      2   365.4  182.7  13.67  0.000
Error                   492  6574.2   13.4
Total                   494  6939.6
S = 3.655   R-Sq = 5.27%   R-Sq(adj) = 4.88%
                           Individual 95% CIs For Mean Based on
                           Pooled StDev
Understanding    N    Mean  StDev   --+---------+---------+---------+-------
Yes            326  18.589  3.376                               (----*----)
Yes with diff   97  16.866  4.135       (--------*--------)
No              72  16.667  4.159   (---------*----------)
                                    --+---------+---------+---------+-------
                                    16.00     16.80     17.60     18.40
```

From Table 5-131, P-value = 0 < 0.1. So, the null hypothesis was rejected and it was concluded that there is a difference in the mean scores for different degrees of reading and understanding traffic signs in Arabic. Table 5-132 shows some grouping letters. The Tukey method was used to find out which degree of reading and understanding traffic signs in Arabic caused the rejection of the null hypothesis. The degree of reading and understanding traffic signs in Arabic, which share the same letter, are not significantly different. The means are significantly different if they do not share the same letter.

Table 5-132: The minitab output for grouping information for different degrees of reading and understanding traffic signs in Arabic using the Tukey method

Understanding	N	Mean	Grouping
Yes	326	18.589	A
Yes with diff	97	16.866	B
No	72	16.667	B

From Table 5-132, it can be noticed that the degree of reading and understanding traffic signs in Arabic plays a big role in the traffic knowledge. As the degree of reading and understanding traffic signs in Arabic increases, the mean score increases. The drivers who understand Arabic language scored the highest while the drivers who do not understand Arabic language scored the lowest.

5.2.8.2.5. Mean scores for different degrees of reading and understanding traffic signs in English

A hypothesis tested the difference between the mean scores for different degrees of reading and understanding traffic signs in English, which is:

H_0: There is no difference between the mean scores for different degrees of reading and understanding traffic signs in English.

H_1: There is at least one mean score that is different from the other means.

Table 5-133: The minitab output for modeling difference between the mean scores for different degrees of reading and understanding traffic signs in English

```
Source                    DF      SS    MS     F      P
Understanding English      2   111.1  55.6  3.98  0.019
Error                    493  6887.9  14.0
Total                    495  6999.1

S = 3.738   R-Sq = 1.59%   R-Sq(adj) = 1.19%
                           Individual 90% CIs For Mean Based on
                           Pooled StDev
Understanding       N    Mean  StDev  ----+---------+---------+---------+--
Yes               404  18.163  3.721                          (----*----)
Yes with diff      59  16.932  3.704      (-----------*-----------)
No                 33  16.970  4.004  (---------------*---------------)
                           ----+---------+---------+---------+-----
                            16.00     16.80     17.60     18.40
```

From Table 5-133, P-value = 0.019 < 0.1. So, the null hypothesis was rejected and it was concluded that there is a difference in the mean scores for different degrees of reading and understanding traffic signs in English. Table 5-134 shows some grouping letters. The Tukey method was used to find out which degree of reading and understanding traffic signs in English caused the rejection of the null hypothesis. The degree of reading and understanding traffic signs in English, which share the same letter, are not significantly different. The means are significantly different if they do not share the same letter.

Table 5-134: The minitab output for grouping information for differentdegrees of reading and understanding traffic signs in English using the Tukey method

```
Understanding            N    Mean  Grouping
yes                    404  18.163  A
no                      33  16.970  A B
Yes with diff           59  16.932    B
```

From Table 5-121, it can be noticed that the degree of reading and understanding traffic signs in English plays a big role in traffic knowledge. As the degree of reading and understanding traffic signs in English increases, the mean score increases. The drivers who understand English language scored the highest while the drivers who do not understand the English language scored the lowest.

5.2.8.2.6. Mean scores for different types of driver

A hypothesis tested the difference between the mean scores for different types of drivers, which is:

H_0: There is no difference between the mean scores for different types of drivers.

H_1: There is at least one mean score that is different from the other means.

Table 5-135: The minitab output for modeling difference between the mean scores for different types of drivers

```
Source           DF      SS    MS     F      P
Type of driver    4   349.0  87.2  6.49  0.000
Error           478  6429.9  13.5
Total           482  6778.9
S = 3.668   R-Sq = 5.15%   R-Sq(adj) = 4.35%
                           Individual 90% CIs For Mean Based on Pooled StDev
Type of driver     N    Mean  StDev     +---------+---------+---------+-----
Taxi              14  15.857  3.255               (--------*---------)
Family           113  17.558  3.598                             (---*--)
Company          126  17.127  3.921                           (---*--)
Government         9  14.444  3.909     (-----------*-----------)
Non-chauffeur    221  18.570  3.566                                   (--*-)
                                        +---------+---------+---------+-----
                                      12.0      14.0      16.0      18.0
```

From Table 5-135, P-value = 0 < 0.1. So, the null hypothesis was rejected and it can be concluded that there is a difference in mean scores for different types of drivers. The Table 5-136 shows some grouping letters. The Tukey method was used to find out which type of driver that caused the rejection of the null hypothesis. The types of drivers, which share the same letter, are not significantly different. The means are significantly different if they do not share the same letter

Table 5-136: The minitab output for grouping information for different types of drivers using the Tukey method

Type of driver	N	Mean	Grouping
Non-chauffeur	221	18.570	A
Family	113	17.558	A B
Company	126	17.127	B
Taxi	14	15.857	B
Government	9	14.444	B

From Table 5-136, it can be noticed that mean scores of non-chauffeurs is the highest among other drivers. The mean scores of government drivers are the lowest.

5.2.8.3. Summary

Based on the analysis of the driving school questionnaires, the following conclusions are drawn:

1- The improvement in the mean scores between before enrollment and after graduation of drivers from all driving schools is only 0.533, which represents 1.67%. This improvement in the mean scores is low. So, it can be concluded that the gained traffic knowledge is low and the driving schools do not help the drivers to gain much traffic knowledge.

2- After testing the scores of the drivers from each driving school, the results of these tests show that only Khobar and Jubal driving schools helped to improve the traffic knowledge of the drivers. However, the improvement in the traffic knowledge is very low. The percentage of improvement in Khobar driving school is only 4.32% and the percentage of improvement in Jubal driving school is only 3.99%. These improvements are very low and are not much.

3- The scores of the drivers were tested for different categories. These categories of the drivers are according to nationality (Saudi or non-Saudi), type of driver (chauffeur or non-chauffeur) and the native language. There are only three categories of the drivers whose scores after graduation are better than their scores before enrollment to driving schools. These three categories of the driver are chauffeur drivers, Indian speaking drivers and Urdu speaking drivers. But, these improvements are not much and not efficient.

4- The scores of the drivers were modeled against the different characteristics of the drivers before enrollment and after graduation from the driving schools. The characteristics are nationality, native language, age, years of experience, level of education, and degree of reading and understanding traffic signs in Arabic and English languages. It was found that there is no difference between the mean scores for different ages and years of experience of the drivers.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

6.1. Conclusions

Based on the analysis of the traffic accidents and driving school questionnaires, the most points and findings in this section are drawn:

1- There is a relationship between the nationality and type of the drivers involved in traffic accidents. In non-chauffeurs category, all chauffeurs except Saudi and Arabian chauffeurs have high negative contribution to chi-square (observed accidents are more than expected). This is supported by some studies mentioned before in the literature review which concluded that expatriate chauffeurs are more dangerous than Saudi drivers. Also, Saudi and Arabian non-chauffeurs have high negative contribution to chi-square (observed accidents are more than expected). In non-chauffeurs category, Saudi and Arabic are more dangerous than other nationalities.

2- There is a relationship between the type of accident and the type of drivers (i.e. chauffeurs or non-chauffeurs) involved in traffic accidents. The chauffeurs are less involved in injuries and fatal accidents in contrast to non-chauffeurs who are more involved in injuries and fatal accidents.

3- There is a relationship between the type of accident and the nationality of the driver involved in traffic accidents. The non-Saudis are less involved in injuries and fatal accidents in contrast to Saudi who are more involved in injuries and fatal accidents. So, Saudi drivers are more dangerous than non-Saudi drivers.

4- There is a relationship between the type of vehicle and the involvement in traffic accidents. Heavy trucks which are involved and at fault in traffic accidents (the responsibility in causing accident is between 75% and 100%), are more involved in accidents.

5- There is a relationship between the age and nationality of the drivers who are involved and at fault in traffic accidents (the responsibility in causing accident is between 75% and 100%). Some points were noticed:

- Saudi drivers younger than thirty years are more dangerous than Saudi drivers older than thirty years and younger than fifty years.
- Indian drivers younger than thirty years are less dangerous than Indian drivers older than thirty years and younger than forty years.
- Pakistani drivers younger than thirty years are less dangerous than Pakistani drivers older than thirty years and younger than fifty years.
- Filipino drivers younger than thirty years are less dangerous than Filipino drivers older than fifty years.
- Other nationality drivers younger than thirty years are less dangerous than other nationality drivers older than thirty years and younger than forty years.

6- There is a relationship between the age and type of drivers (i.e. chauffeurs or non-chauffeurs) who at fault in traffic accidents (the responsibility in causing accidents is between 75% and 100%). Chauffeurs at fault who are older than thirty years old are more involved in traffic accidents than the chauffeurs who are younger than thirty years. On other hand, non-chauffeurs at fault who are younger than thirty years old are more involved in traffic accidents than those non-chauffeurs who are older than thirty years.

7- There is a relationship between the type of chauffeur (i.e. taxi, family company or government) and the percentage of involvement (at fault, neutral or not at fault) in traffic accidents. It seems that the taxi and family chauffeurs are less involved in traffic accidents compared to the other chauffeurs.

8- There is a relationship between the type of vehicle and the involvement in traffic accidents. Heavy vehicles are more involved in traffic accidents than sedan and other vehicles.

9- Drivers, whose percentages of involvement in accidents are at fault and do not understand traffic signs in Arabic and English, are more involved in traffic accidents than the other chauffeurs. So, there is an importance in understanding traffic signs in Arabic and English languages. The driving schools should focus more to improve and learn the basic Arabic words which are used while driving, to help the drivers to focus on driving and not to focus on trying to understand the Arabic and English words in the traffic signs.

10- There is a relationship between the percentage of involvement in traffic accidents and the total scores in understanding by the traffic signs for chauffeurs. Not at fault chauffeurs scores are higher than other chauffeurs. Knowing traffic signs, seems to help reduce traffic accidents. So, driving license should be renewed on a regular period. Each time the driving license is renewed, chauffeurs should be tested on traffic signs.

11- The improvement in the mean scores before enrollment and after graduation of drivers from all driving schools is only 0.533, which represents 1.67%. This improvement in the means scores is practically not important although it is statistically sound.

12- After testing the scores of the drivers from each driving school, the results of these tests show that only Khobar and Jubal driving schools helped to improve the traffic knowledge of the drivers. The percentage of improvement in Khobar driving school is only 4.32% and the percentage of improvement in Jubal driving school is only 3.99%. However, these improvements in the mean scores are practically not important although they are statistically sound.

13- The scores of the drivers were tested for different categories. These categories of the drivers are according to nationality (Saudi or non-Saudi), type of driver (chauffeur or non-chauffeur) and the native language. There are only three categories of the drivers whose scores after graduation are better than their scores before enrollment to driving schools. These three categories of the drivers are chauffeur drivers, Indian speaking drivers and Urdu speaking drivers. But, these improvements in the mean scores are practically not important although they are statistically sound.

14- The scores of the drivers were modeled against the different characteristics of the drivers before enrollment and after graduation from the driving schools. The characteristics are nationality, native language, age, years of experience, level of education, and degree of reading and understanding traffic signs in Arabic and

English languages. It was found that there is no difference between the mean scores for different ages and years of experience of the drivers.

6.2. Recommendations

Driving school is the first ring in the chain of driving. Driving schools seem to be not capable educating the drivers properly. The results show that non-Arabic and non-Saudi chauffeurs at different level of experience are dangerous. There are two levels of driving. The first level is handling the wheel and driving within the lanes. The second level is the defensive driving. The driving schools are focusing on the minimum education which helps the drivers just to pass the exam with minimum emphasis on safety. Although enforcement is important, self-enforcement is more important. Driving schools are directly and/or indirectly responsible for a large number of traffic accidents. To improve the driving schools the following steps should be done:

1- Improve the driving manual. The current manual is very weak in many levels compared with other driving manuals in USA.

2- Introduce a the new technology in teaching such as: audio, vision and simulation.

3- Training and testing the drivers should be under real driving environment on the roads.

4- Field driving test should follow documented procedures covering all driving skills and safety issues.

6.3. Recommendations for Future Projects

The recommendations for future projects are as follows

1- Study the effect of driving schools on its graduates; long term effect of traffic accidents on drivers who graduated from driving schools should be studied.

2- Teaching procedure should be examined and evaluated under the guidance of a wide range of educators.

CHAPTER 7

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APPENDIX

The questionnaire

a) The accident questionnaire in Arabic language

أخي السائق

السلام عليكم ورحمة الله وبركاته

تهدف هذه الدراسة المدعومة من قبل مدينة الملك عبد العزيز للعلوم والتكنلوجيا و المنفذة من قبل فريق بحثي من جامعة الملك فهد للبترول والمعادن الى رفع السلامة المرورية في المملكة وتقليل عدد الحوادث. ويركز هذا البحث على الجانب البشري في الحوادث المرورية حيث انه السبب الرئيسي في معظم الحوادث. ان المعلومات التي ستدلي بها في هذه الإستبانة هي لأغراض البحث العلمي فقط وسوف تحاط بسرية كامة ولن تعطي الى اي جهة اخرى.

الجزء الأول: معلومات شخصية

الاسم: الجنسية: العمر:

رقم الحاسب(الاحوال المدنية/ الإقامة) : المهنه:

العنوان الهاتف"

الجزء الثاني: معلومات حول الحادث

تاريخ الحادث: مكان الحادث: وقت الحادث:

1. نوع الحادث

❑ تلفيات ❑ إصابات بسيطة ❑ إصابات جسيمة ❑ وفاة أو إعاقة

2. ماهي نسبة مسؤولية السائق لهذه السيارة في الحادث

❑ 100% ❑ 75% ❑ 50% ❑ 25% ❑ 0%

3. ماهو السبب الرئيسي للحادث

❑ بشري ❑ مركبة ❑ طريق ❑ أخرى

4. نوع المركبة

❑ سيدان ❑ حافلة صغيرة ❑ حافلة كبيرة ❑ نقل خفيف ❑ نقل ثقيل

الجزء الثالث: معلومات حول السائقين الذين يمتهنون السياقة

1. كم عدد سنوات الخبرة في السياقة خارج المملكة

❑ بدون خبرة ❑ بين 1–2 سنوات ❑ بين 3–5 سنوات ❑ اكثر من5 سنوات

2. كم عدد سنوات الخبرة في السياقة داخل المملكة

❑ اقل من سنة ❑ بين 1–2 سنوات ❑ بين 3–5 سنوات ❑ اكثر من5 سنوات

3.هل حصلت على رخصتك الاولى من

❑ المملكه ❑ الخارج

4. اذا كنت قد حصلت على رخصتك من المملكه فما مدى استفادتك من مدرسة تعليم القيادة

❑ مفيدة جدا ❑ مفيده ❑ مفيدة قليلا ❑ غير مفيده

5. كم يبعد سكنك عن مكان عملك .... كلم

6. كم عدد الكليومترات التي تسوقها يومياً تقريباً ....كلم

7. كم عدد الساعات التي تقضيها في السياقة يومياً ....ساعة

8. هل تقراء وتفهم الإشارات المرورية المكتوبة باللغة العربية

❑ نعم ❑ بصعوبة ❑ لا

9. هل تقراء وتفهم الإشارات المرورية المكتوبة باللغة الإنجليزية

❑ نعم ❑ بصعوبة ❑ لا

10. هل تقرا و تكتب بلغتك الام

❑ نعم ❑ بصعوبة ❑ لا

11. هل انت سائق

❑ تكسي أجرة ❑ عائلة ❑ شركة ❑ حكومي ❑ أخرى: اذكرها ....

12. مدى رضاك عن عملك

❑ راضي ❑ غير راضي

13. هل المرتب الذي تتقاضاه يتناسب مع عدد ساعات عملك

❑ نعم ❑ لا

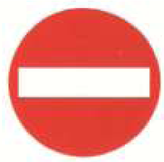
14. هل حالتك صحية

❑ جيده ❑ غير جيدة

ماذا تعني هذه الاشاره

❑ قف ❑ السرعة القصوى ❑ الافضلية ❑ ممنوع الوقوف

ماذا تعني هذه الاشاره



❑ قف ❑ السرعة القصوى ❑ ممنوع الدخول ❑ ممنوع الوقوف

ماذا تعني هذه الاشاره

❑ ممنوع التجاوز ❑ السرعة القصوى ❑ ممنوع الدخول ❑ ممنوع الوقوف

ماذا تعني هذه الاشاره

❑ ممنوع التجاوز ❑ توقف ❑ ممنوع الدخول ❑ ممنوع الوقوف

ماذا تعني هذه الاشاره

❑ ممنوع التجاوز ❑ الافضليه ❑ ممنوع الدخول ❑ ممنوع الوقوف

b) The accident questionnaire in English language

أخي السائق

السلام عليكم ورحمة الله وبركاته

تهدف هذه الدراسة المدعومة من قبل مدينة الملك عبد العزيز للعلوم والتكنلوجيا و المنفذة من قبل فريق بحثي من جامعة الملك فهد للبترول والمعادن الى رفع السلامة المرورية في المملكة وتقليل عدد الحوادث. ويركز هذا البحث على الجانب البشري في الحوادث المرورية حيث انه السبب الرئيسي في معظم الحوادث. ان المعلومات التي ستدلي بها في هذه الإستبانة هي لأغراض البحث العلمي فقط وسوف تحاط بسرية كاملة ولن تعطي الى اي جهة اخرى.

الجزء الأول: معلومات شخصية

الاسم　　　　الجنسية　　　　العمر

رقم الحاسب(الاحوال المدنية/ الإقامة)

العنوان　　　　الهاتف

الجزء الثاني: معلومات حول الحادث

تاريخ الحادث:　　　　مكان الحادث:　　　　وقت الحادث:

1. نوع الحادث

❑ تلفيات　❑ إصابات بسيطة　❑ إصابات جسيمة　❑ وفاة أو إعاقة

2. ماهي نسبة مسؤولية السائق لهذه السيارة في الحادث

❑ %100　❑ %75　❑ %50　❑ %25　❑ %0

3. ماهو السبب الرئيسي للحادث

❑ بشري　❑ مركبة　❑ طريق　❑ أخرى

4. نوع المركبة

❑ سيدان　❑ حافلة صغيرة　❑ حافلة كبيرة　❑ نقل خفيف　❑ نقل ثقيل

<u>Part Three : Information About Drivers :</u>

1- Years of experience as a driver outside Saudi Arabia:
□ No Experience　□ 1-2 years　□ 3-5 years　□ More than 5 years.

2- Years of experience as a driver inside Saudi Arabia:
□ Less than 1 year　□ 1-2 years　□ 3-5 years　□ More than 5 years.

3- Did you get you first license from
□ Saudi arabia　□ outside Saudi Arabia

4- If you've got your license from the kingdom, to what extent did you benefit from the Driving School
□ Very good □ good □ weak □ very weak.

5- How far is your residence from your workplace? …………………. KMs

6- How many kilometers you approximately drive per day? ……………….. KMs.

7- How many hours you spend in driving per day? ………………. Hours.

8- Do you read and understand traffic signs written in Arabic Language ?
□ Yes □ With Difficulty □ No

9- Do you read and understand traffic signs written in English Language ?
□ Yes □ With Difficulty □ No

10- Which kind of drivers you are ?
□ Taxi Driver □ Family Driver □ Company Driver □ Governmental Driver □ Other (…………..)

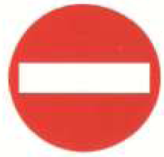
11- Are you satisfied with your work ?
□ Yes □ No

12- Is your salary appropriate to your work hours?
□ Yes □ No

13- Your health condition :
□ Good □ Not Good

What does this traffic sign mean?

❑ stop ❑ speed limit ❑ No entry ❑ No parking what does this traffic sign mean?



❑ Stop ❑ speed limit ❑ No entry ❑ No parking

what does this traffi sign mena?

❑ stop ❑ No overtaking ❑ No entry ❑ No parking

what does this traffic sign mean?

❑ No overtaking ❑ stop ❑ No entry ❑ No parking

what does this traffic sign mean?

❑ No overtaking ❑ roundabout ❑ No entry ❑ No parking

c) Driving school questionnaire in Arabic language

اخي السائق/ تهدف هذه الدراسة المدعومة من قبل مدينة الملك عبد العزيز للعلوم والتكنلوجيا و المنفذة من قبل فريق بحثي من جامعة الملك فهد للبترول والمعادن الى رفع السلامة المرورية في المملكة وتقليل عدد الحوادث.ان المعلومات التي ستدلي بها في هذه الإستبانة هي لأغراض البحث العلمي فقط وسوف تحاط بسرية كامة ولن تعطي الى اي جهة اخرى.

الجزء الأول: معلومات شخصية

الجنسية: اللغة الام: العمر:

1. كم عدد سنوات الخبرة في السياقة خارج المملكة

❑ بدون خبرة ❑ بين 1-2 سنوات ❑ بين 3-5 سنوات ❑ اكثر من5 سنوات

2. المستوى التعلمي:

❑ أمي ❑ تقرأ و تكتب باللغة الام ❑ دون الجامعه ❑ جامعي أواعلى

3. هل تقراء وتفهم الإشارات المرورية المكتوبة باللغة العربية

❑ نعم ❑ بصعوبة ❑ لا

4. هل تقراء وتفهم الإشارات المرورية المكتوبة باللغة الإنجليزية

❑ نعم ❑ بصعوبة ❑ لا

5. هل انت سائق

❑ تكسي أجرة ❑ عائلة ❑ شركة ❑ حكومي ❑ أخرى: اذكرها ....

<u>معلومات عن الثقافة المروريه:</u>

س1: السرعة القصوى للمركبات الصغيرة داخل المدن في المملك في حالة عدم وجود اشارة لتحديد السرعة:

❑ 70 كم في الساعة. ❑ 60 كم في الساعة.

❑ 50 كم في الساعة. ❑ 80 كم في الساعة.

س2: رخصة القيادة الخصوصي خاصة بمن يقود مركبة خاصة لا يتجاوز وزنها عن ؟

❑ 5 طن. ❑ 3.5 طن. ❑ 1.5 طن. ❑ 10 طن.

س3: القواعد المرورية الامنة لتجاوز المركبات هي:

❑ التأكد من وجود مسافة امنة بين مركبتك و بين المركبة التي أمامك التي تريد تجاوزها.

- ❑ التأكد من خلو المسار الذي تريد الانتقال اليه من مركبات اخرى.
- ❑ اعط الاشارة المناسبة (يمينا او يسارا) طبقا للاتجاه المطلوب.
- ❑ جميع ما سبق.

س4: عندما ترغب في دخول طريق سريع فان عليك :

- ❑ زيادة السرعة تدرجيا بما يناسب حركة المرور على الطريق السريع واضاءة اشارة الانعطاف
- ❑ أخذ الحذر عند الانتقال الى المسار الايمن للطريق السريع و الاندماج مع المركبات بانسيابية.
- ❑ الاجابتين السابقتين.
- ❑ لا شي مما سبق.

س5: عند عبور منطقة عمل:

- ❑ تغير مسارك الى مسار اخر.
- ❑ تخفيف السرعه و الانتباه.
- ❑ التوقف عن السير.
- ❑ جميع ما سبق.

س6: عند رؤيتك لمركبة الطوارىء اثناء اضاءتها لأنوار الطوارىء او اطلاقها صوت الرنان يجب عليك:

- ❑ الثبات على نفس سرعة المركبة و عدم افساح الطريق.
- ❑ افساح الطريق امامها بما لا يعرضك و الاخرين للخطر.
- ❑ زيادة سرعة المركبة.
- ❑ لا شي مما سبق.

س7: عند الخروج من الطريق الرئيسي الى طريق الخدمة فالافضلية لمن هو:

- ❑ في طريق الرئيسي.
- ❑ للمركبة ذات السرعة الاعلى.
- ❑ في طريق الخدمة.
- ❑ لا شي مما سبق.

س8:عند حدوث انفجار اطار المركبة:

❑ ارفع قدمك عن دواسة الوقود و عدم استخدام المكابح.

❑ امساك المقود بثبات و حافظ على اتجاه المركبة في خط مستقيم حتى تقف.

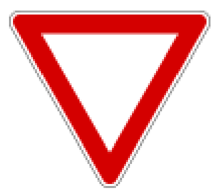
❑ الاجابتين السابقة.

❑ لا شي مما سبق.

س9:ماذا تعني هذه الاشارة:

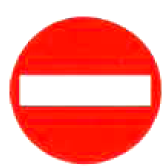
❑ قف ❑ السرعة القصوى ❑ الافضلية للطريق الذي امامك ❑ ممنوع الوقوف

س10:ماذا تعني هذه الاشارة:



❑ ممنوع التجاوز ❑ الافضلية للطريق الذي امامك ❑ ممنوع الدخول ❑ قف

س11:ماذا تعني هذه الاشارة:



❑ قف ❑ الافضلية للطريق الذي امامك ❑ ممنوع الدخول ❑ ممنوع الوقوف

س12:ماذا تعني هذه الاشارة:

❑ ممنوع التجاوز ❑ السرعة القصوى ❑ ممنوع الدخول ❑ ممنوع الوقوف

س13:ماذا تعني هذه الاشارة:

❑ ممنوع التجاوز ❑ قف ❑ ممنوع الدخول ❑ ممنوع الوقوف و الانتظار

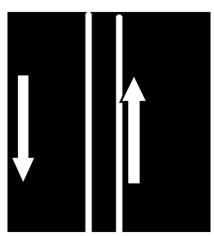
س14:ماذا تعني هذه الاشارة:

❑ ممنوع التجاوز ❑ قف ❑ ممنوع الدخول ❑ ممنوع الوقوف

س15:ماذا تعني هذي الاشارة:

❑ أنتبه امامك معبر مشأة ❑ انت عند معبر مشاة ❑ممنوع عبور المشأة ❑ قف

س16:ماذا تعني هذه العلامة على الطريق(الاسفلت):

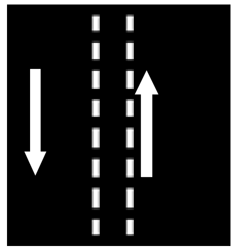


❑ممنوع التجاوز اوالدوران يسار ❑ ممنوع الدخول ❑ مسموح التجاوز ❑ممنوع الوقوف

س17:ماذا تعني هذي الاشارة:

❑ أنتبه امامك معبر مشأة ❑ انت عند معبر مشاة ❑ممنوع عبور المشأة ❑ قف

س18:ماذا تعني هذه العلامة على الطريق(الاسفلت):



❑ممنوع التجاوز اوالدوران يسار ❑ ممنوع الدخول ❑ مسموح التجاوز ❑ممنوع الوقوف

س19: عند قيادة المركبة في منحدر شديد وضع تعشيقة التروس:

❑ في تعشيقة مرتفعه (3 او 4).

❑ في تعشيقة منخفضة (1 او 2).

❑ في وضع العادي N .

❑ لا شي مما سبق.

س20: الضغط المثالي لأطار السيارة:

❑ الرقم الموجود في جانب الأطار.

❑ الرقم المؤصي به من قبل صانع المركبة(السيارة).

❑ بأخذ الرقم الاعلى من الاجابتين السابقين.

❑ 35 رطل/انش^2 للسيارة الصغيرة و 45 رطل/انش^2 للسيارة الكبيرة.

س21: إذا كان ضوء اشارة المرور لا يعمل ، يجب عليك :

❑ التوقف ثم المرور عندما يكون التقاطع امنا.

❑ عدم التوقف والدخول بسرعة للتقاطع.

❑ تخفيف سرعة المركبة.

❑ لا شي مما سبق.

س22: عند عبور المشأة الطريق و لم يكن هناك ممر للمشأة يجب عليك :

- ❑ تأكد من أن يراك المشاة والاستمرار في القيادة.
- ❑ تخفيف السرعة و المرور بجانب المشاة.
- ❑ التوقف والسماح للمشاة بعبور الشارع.
- ❑ لا شي مما سبق.

س23: أفضلية المرور على الدوار:

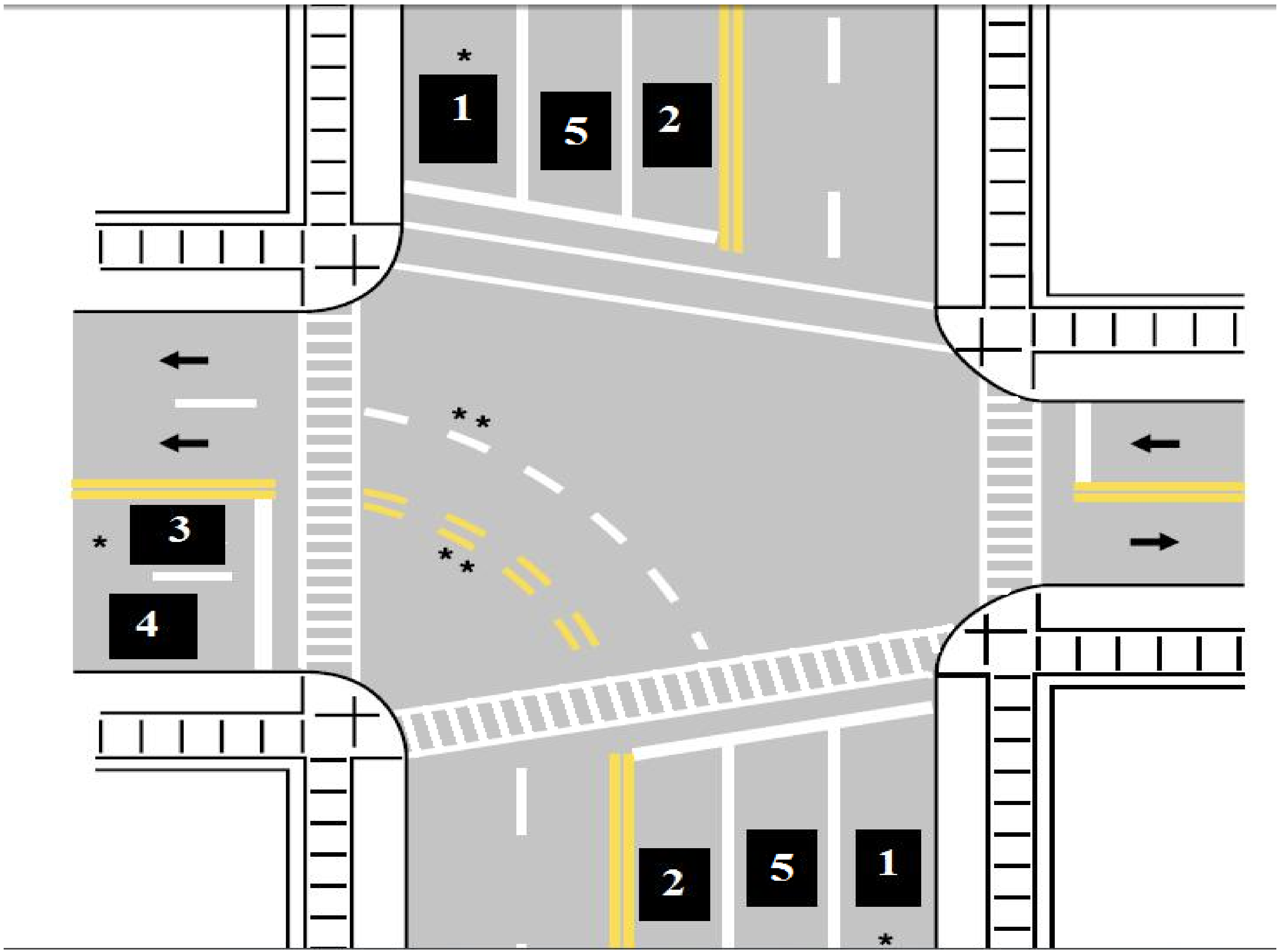
- ❑ لمن داخل الدوار(القادمين من اليسار).
- ❑ للداخلين الى الدوار.
- ❑ للطريق الاسرع.
- ❑ لا شي مما سبق.

س24: الطرق تصبح زلقة بعد أن يبدأ المطر بالأنـهمار. وعند ذالك يجب :

- ❑ تجنب الالتفاف بسرعة و التوقف بسرعة.
- ❑ اختبار جودة الاطارات الخاصة بمركبتك (سيارتك) .
- ❑ تقليل المسافة التي بينك و بين المركبة التي امامك.
- ❑ لا شي مما سبق.

س25: الحوداث ممكن ان تحدث غالباَ في الحالة التالية عندما:

- ❑ جميع المركبات تسير بنفس السرعة.
- ❑ مسار واحد من حركة المرور يسير بشكل أسرع من الممرات الأخرى.
- ❑ سيارة واحدة تسير أسرع أو أبطأ من تدفق حركة المرور.
- ❑ لا شي مما سبق.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1
5
2
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2
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1
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س26: يسمح في المسار الرقم 1 بالالتفاف:

- ❑ بالسير للامام فقط.
- ❑ بالسير للامام أو اليمين فقط.
- ❑ بالسير للامام أو اليسار أو اليمين.
- ❑ بالسير لليمين فقط.

س27: يسمح في المسار الرقم 2 بالالتفاف:

- ❑ بالسير لليسار فقط.
- ❑ بالسير للامام أو اليمين فقط.
- ❑ بالسير للامام أو اليسار فقط.
- ❑ بالسير للامام أو اليسار أو اليمين.

س28: يسمح في المسار الرقم 3 بالالتفاف:

- ❑ بالسير للامام أو اليسار فقط.
- ❑ بالسير للامام أو اليمين فقط.
- ❑ بالسير للامام أو اليسار أو اليمين.
- ❑ بالسير لليسار فقط.

س29: يسمح في المسار الرقم 4 بالالتفاف:

- ❑ بالسير للامام فقط.
- ❑ بالسير للامام أو اليمين فقط.
- ❑ بالسير للامام أو اليسار أو اليمين.
- ❑ بالسير لليمين فقط.

س30: يسمح في المسار الرقم 5 بالالتفاف:

- ❑ بالسير للامام أو اليسار فقط.
- ❑ بالسير للامام أو اليسار أو اليمين.
- ❑ بالسير للامام فقط.
- ❑ بالسير للامام أو اليمين فقط.

اختبار مستوى انطباع السائق عن المدرسة:

س1: يعرف المعلمون مادتهم الدراسية جيداً:
❑ اوافق بشدة ❑ اوافق ❑ لا اوافق ❑ لا اوافق بشدة

س2: يجتهد المعلمون في توصيل معلوماتهم إلى الدارسين
❑ اوافق بشدة ❑ اوافق ❑ لا اوافق ❑ لا اوافق بشدة

س3:توجد صعوبة في فهم ما يقصده المعلمون
❑ اوافق بشدة ❑ اوافق ❑ لا اوافق ❑ لا اوافق بشدة

س4: يميز المعلمون بعض الدارسين على حساب البعض الاخر:
❑ اوافق بشدة ❑ اوافق ❑ لا اوافق ❑ لا اوافق بشدة

س5:المعلمون يحافظون على النظام في اوقات الشرح:
❑ اوافق بشدة ❑ اوافق ❑ لا اوافق ❑ لا اوافق بشدة

س6: يلتزم المعلمون بالمواعيد المحددة:
❑ اوافق بشدة ❑ اوافق ❑ لا اوافق ❑ لا اوافق بشدة

س7:المعلمون لديهم المهارة في إلقاء الأسئلة وصيغتها لتلأم الدارسين:
❑ اوافق بشدة ❑ اوافق ❑ لا اوافق ❑ لا اوافق بشدة

س8:يتمتع المعلمون بأخلاق حسنة:
❑ اوافق بشدة ❑ اوافق ❑ لا اوافق ❑ لا اوافق بشدة

س9:يقوم المعلمون بحث الدارسين وتشجيعهم اثناء الحصص الدراسية:
❑ اوافق بشدة ❑ اوافق ❑ لا اوافق ❑ لا اوافق بشدة

س10:يتقبل المعلمون استفسارات الدارسين ويستمعون لهم :
❑ اوافق بشدة ❑ اوافق ❑ لا اوافق ❑ لا اوافق بشدة

س11:ينتقد المعلمون الدارسين ويهددونهم:
❑ اوافق بشدة ❑ اوافق ❑ لا اوافق ❑ لا اوافق بشدة

س12:يوجه المعلمون عبارات حادة غير لائقة للدارسين
❑ اوافق بشدة ❑ اوافق ❑ لا اوافق ❑ لا اوافق بشدة

d) Driving school questionnaire in English language

Dear student

This study, which is supported by Abdul-Aziz City for Science and Technology, aims to improve traffic safety and reduce number of accidents in Saudi Arabia. This questionnaire is for research purposes only. The information will be kept confidential and will not be given to any other party.

Part 1: Personal Information:

Nationality: Native language: Age:

1- Years of experience as a driver outside Saudi Arabia:

□ Less than 1 year □ 1-2 years □ 3-5 years □ More than 5 years.

2- Level of education:

□ illiterate □ Read and write in your native language □ under graduate □ post graduate

3- Do you read and understand traffic signs written in Arabic Language ?

□ Yes □ With Difficulty □ No

4- Do you read and understand traffic signs written in English Language ?

□ Yes □ With Difficulty □ No

5- What kind of drivers you are?

□ Taxi Driver □ Family Driver □ Company Driver □ Governmental Driver

□ Other(…………......)

Part 2: information about traffic knowledge:

1. **The maximum speed for small vehicles within the cities in the Kingdom with the absence of speed limit sign:**

□ 70 km/h □ 60 km/h □ 50 km/h □ 80 km/h

2. **Private driving license is for vehicle which is not weighting more than:**
   □ 5 tons □ 3.5 tons □ 1.5 tons □ 10 tons

3. **The traffic safety rules for passing vehicles are:**

□ Ensure a safe distance between your vehicle and the vehicle in front of you which you intend to pass.

□ Make sure that the lane which you want to move to it is free from other vehicles .

□ use you turning signal (right or left), as required.

□ All of the above

4. **When you intend to enter the freeway:**

□ Accelerate gradually to match the freeway traffic speed and use turning signal

□ Be cautious in entering the right lane of the freeway and merge smoothly with the traffic.

□ The two above answers

□ None of the above answers

5. **When crossing a work zone, you should do the following:**

□ Change your lane to another one.

□ Slow down and be alert

□ Stop driving

□ All of the above

6. **When you see an emergency vehicle coming from the back its flashing lights or the siren on, you should:**

□ Keep driving at the same speed and not allow it to pass you.

□ Open the way for it to pass you without dangering yourself or the other drivers

□ Increase your vehicle speed

□ None of the above answers

7. **In exiting a main road to service road, right-of-way is for vehicles in the:**

□ Vehicles on the main road

□ For the vehicles with high speed

□ Vehicles on the service road

□ None of the above answers

8. **When the tire of the vehicle explode:**

□ Lift your foot from accelerator and do not apply the brakes

□ Hold the steering wheel firmly and maintain the vehicle's direction in a straight line

□ The two above answers

□ None of the above answers

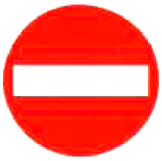
9. What does this traffic sign means?

□ Stop □ speed limit □ give away □ no parking

10. What does this traffic sign means?

□ No overtaking □ give away □ no entry □ stop

11. What does this traffic sign means?



□ stop □ give away □ no entry □ no parking

12. What does this traffic sign means?

□ no passing □ speed limit □ no entry □ no parking

13. What does this traffic sign means?

□ No passing □ stop □ no entry □ no waiting and parking

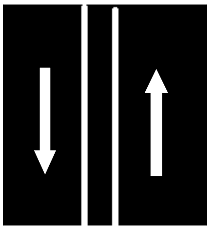
14. What does this traffic sign means?

□ No passing □ stop □ no entry □ no parking

15. What does this traffic sign means?

□ Pedestrian crossing ahead □ Pedestrian crossing □ pedestrian prohibited □ stop

16. What does this pavement marking means?

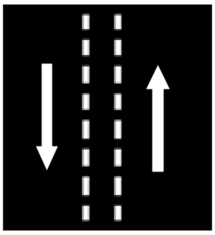


□ No overtaking or turning left □ No entry □ overtaking is allowed □ No stop

17. What does this traffic sign means?

□ Pedestrian crossing ahead □ Pedestrian crossing □ pedestrian prohibited □ stop

18. What does this pavement marking means?



□ No overtaking or turning left □ No entry □ overtaking is allowed □ No stop

19. When you drive the vehicle at a step slope, transmission gear should be set on:

□ High gear (3 or 4)

□ Low gear (1 or 2)

□ Natural gear (N)

□ None of the above

20. The ideal pressure for the tires is:

□ As indicated on the sidewall of the tire.

□ As recommended by the vehicle manufacturer

□ The highest number of the above answers

□ 35 psi for small vehicles and 45 psi for large vehicles

21. If the traffic signal light does not work, you must:

□ Stop the vehicle. And when it safe, pass.

□ Do not stop and enter the intersection quickly.

□ Reduce vehicle speed.

□ None of the above

22. When a pedestrian is crossing the road and there is no cross walk, you must:

□ Make sure the pedestrian sees you and continue driving.

□ reduce the speed and over taking the pedestrian.

□ stop and allow pedestrians to cross the street.

□ None of the above

23. The priority in the roundabout is for

□ The traffic inside the roundabout (coming from your left).
□ The traffic entering the roundabout.
□ The faster traffic.
□ None of the above

24. Roads become slippery after the rain starts. And you must:

□ Avoid turning and stop quickly.
□ Test the condition of the tires of your vehicle.
□ Reduce the distance between you and the vehicle in front.
□ None of the above

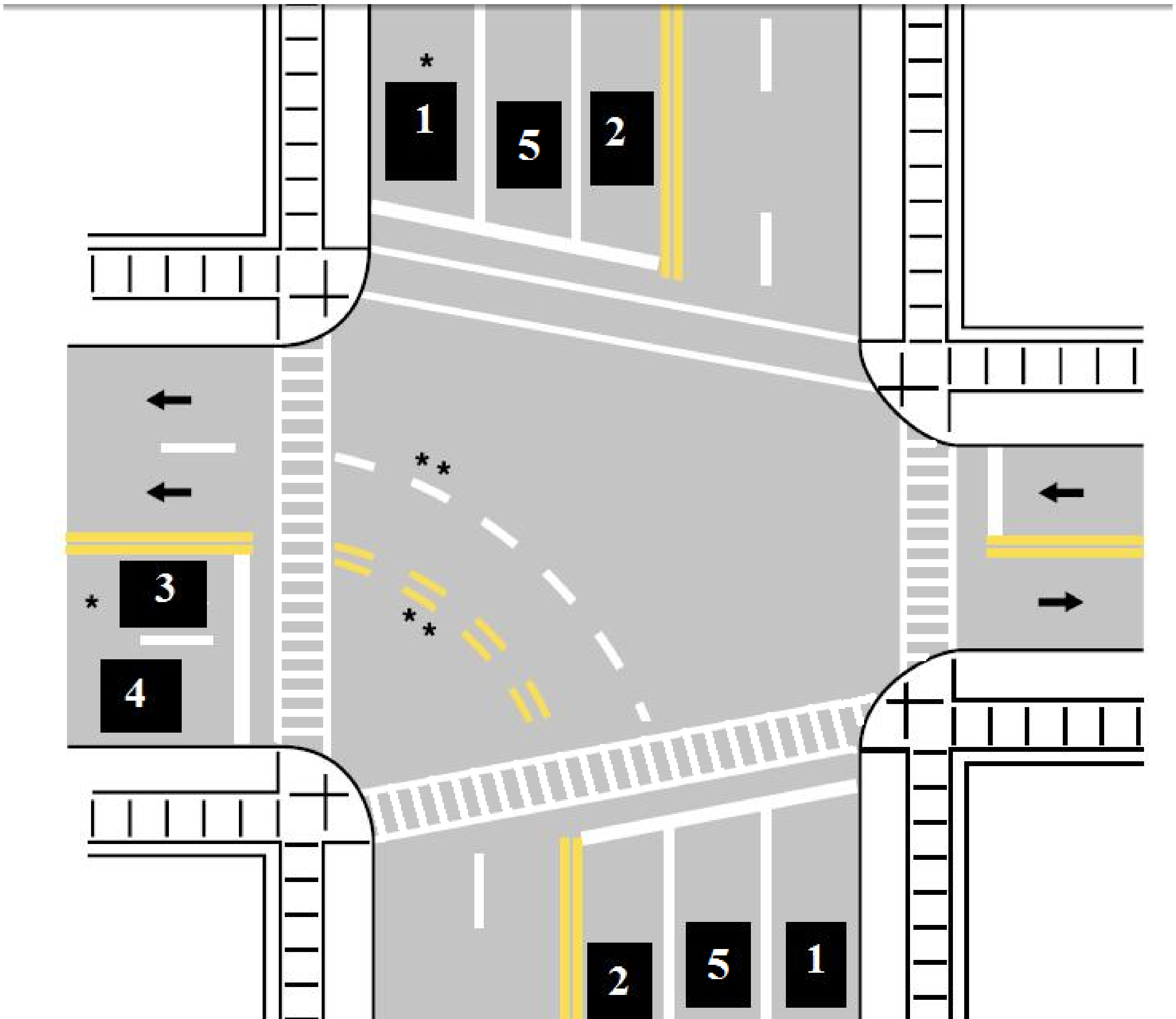
25. Accidents occur usually when:

□ All the vehicles drive at the same speed.

□ One lane of the traffic is moving faster than other lane.

□ One vehicles is moving faster or slower than the traffic.

□ None of the above



*
1
5
2
* *
3
*
* *
4
2
5
1

26. In the lane number 1, traffic is allowed to:

□ Proceed straight only.

□ Proceed straight or turning right only.

□ Turning right, left or proceed straight.

□ Turning right only.

27. In the lane number 2, traffic is allowed to:

□ Turning left.

□ Turning right or proceed straight only.

□ Turning left or proceed straight only.

□ Turning right, left or proceed straight.

28. In the lane number 3, traffic is allowed to:

□ Turning left or proceed straight only.

□ Turning right or proceed straight only.

□ Turning right, left or proceed straight

□ Turning left only.

29. In the lane number 4, traffic is allowed to:

□ proceed straight only.

□ Turning right or proceed straight only.

□ Turning right, left or proceed straight.

□ Turning right only.

30. In the lane number 5, traffic is allowed to:

□ Turning left or proceed straight only.

□ Turning right, left or going straight.

□ proceed straight only.

□ Turning right or going straight only.

Satisfaction questionnaires for the drivers about the school:

1. The teachers know their subject well:

□ strongly agree. □ agree □ disagree □ strongly disagree

2. Teachers strive (do their best) to delivery information to the students:

□ strongly agree. □ agree □ disagree □ strongly disagree

3. Students face difficulties in understanding teachers:

□ strongly agree. □ agree □ disagree □ strongly disagree

4. The teachers discriminate between the students:

□ strongly agree. □ agree □ disagree □ strongly disagree

5. Teachers maintain order during time of explanation:

□ strongly agree. □ agree □ disagree □ strongly disagree

6. Teachers adhere to class schedule:

□ strongly agree. □ agree □ disagree □ strongly disagree

7. Teachers have the skill to ask questions which can be easily understood by the students:

□ strongly agree. □ agree □ disagree □ strongly disagree

8. Teachers have good moral character and ethics:

□ strongly agree. □ agree □ disagree □ strongly disagree

9. Teachers encourage student's participation during class sessions:

□ strongly agree. □ agree □ disagree □ strongly disagree

10. Teachers respect student's questions and take them seriously

□ strongly agree. □ agree □ disagree □ strongly disagree

11. Teachers criticize students and threaten them:

□ strongly agree. □ agree □ disagree □ strongly disagree

12. Teachers use inappropriate words with students

□ strongly agree. □ agree □ disagree □ strongly disagree

The Minitab outputs of the statistical analyses

e) The analyses of traffic accidents

i) The coding

question	coding for questions	Options	coding for options
what is the percentage on the accident	y1 (percentage)	0	0
		25	1
		50	2
		75	3
		100	4
what is the percentage on the accident	y	involved	0
		netural	1
		not involved	2
age	x1	age < 30	0
		age (30 - 40)	1
		age (40-50)	2
		age > 50	3
job	x2	driver	0
		not driver	1
Nationality	x3	Saudi	0
	x3-1	Arabian	2
	x3-2	Indian	3
		Pakistani	4
		Bengali	5
		Afghan	6
		Indonesian	7
		Filipino	8
		Nepalese	11
		Other	13
type of accidents	x4	Property damage only	0
		minor injuries	1
		major injuries	2
the main cause of the accidents	x5	human factor	0
		vehicle	1
		road	2
		other	3
type of the vehicle	x6	sedan	0
		minibus	1
		bus	2
		light truck	3
		heavy truck	4
Years of experience as a driver outside Saudi Arabia	x7	no experience	0
		1-2 years	1
		3-5 years	2
		more than 5 years	3
Years of experience as a driver inside Saudi Arabia	x8	no experience	0
		1-2 years	1
		3-5 years	2
		more than 5 years	3
Did you get you first license from	x9	saudi arabia	0

		outside saudi arabia	1
If you've got your license from the kingdom, to what extent did you benefit from the Driving School	x10	Very good	0
		good	1
		weak	2
		Very weak	3
Do you read and understand traffic signs written in Arabic Language	x14	yes	0
		With Difficulty	1
		no	2
Do you read and understand traffic signs written in English Language	x15	yes	0
		With Difficulty	1
		no	2
type of the driver	x17	Taxi Driver	0
		Family Driver	1
		Company Driver	2
		Governmental Driver	3
		Non-chauffeur	4
Are you satisfied with your work ?	x18	yes	0
		no	1
Is your salary appropriate to your work hours	x19	yes	0
		no	1
Your health condition	x20	good	0
		not good	1
what does this traffic sign mean 1	x21	wrong	0
		right	1
what does this traffic sign mean 2	x22	wrong	0
		right	1
what does this traffic sign mean 3	x23	wrong	0
		right	1
what does this traffic sign mean 4	x24	wrong	0
		right	1
what does this traffic sign mean 5	x25	wrong	0
		right	1

ii) For all drivers

1. Tabulated statistics: y, x1

Rows: y   Columns: x1

	0	1	2	3	4
involved	50	445	393	231	105
	46.75	443.45	389.84	232.02	111.94
	0.2264	0.0054	0.0255	0.0045	0.4297
neutral	2	71	73	51	20
	8.29	78.62	69.11	41.13	19.84
	4.7703	0.7383	0.2184	2.3663	0.0012
not involved	57	518	443	259	136
	53.97	511.93	450.04	267.85	129.22
	0.1707	0.0720	0.1102	0.2922	0.3558

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 9.787, DF = 8, P-Value = 0.280
Likelihood Ratio Chi-Square = 11.756, DF = 8, P-Value = 0.162

2. Tabulated statistics: y, x2

Rows: y   Columns: x2

	driver	not driver
involved	364	1064
	353.4	1074.6
	0.31527	0.10370
neutral	65	203
	66.3	201.7
	0.02677	0.00881
not involved	391	1226
	400.2	1216.8
	0.21256	0.06991

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 0.737, DF = 2, P-Value = 0.692
Likelihood Ratio Chi-Square = 0.736, DF = 2, P-Value = 0.692

3. Tabulated statistics: y, x3

Rows: y Columns: x3

	Arabic	bangali	Filipino	Indian	other	Pakistani	saudi
involved	359	54	30	130	94	179	582
	371.98	53.45	25.00	137.07	87.50	173.27	579.73
	0.4528	0.0057	1.0001	0.3644	0.4830	0.1892	0.0089
neutral	80	9	5	27	14	38	95
	69.81	10.03	4.69	25.72	16.42	32.52	108.80
	1.4871	0.1059	0.0202	0.0633	0.3570	0.9237	1.7508
not involved	424	61	23	161	95	185	668
	421.21	60.52	28.31	155.21	99.08	196.21	656.46
	0.0185	0.0038	0.9955	0.2161	0.1680	0.6401	0.2027

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 9.457, DF = 12, P-Value = 0.663
Likelihood Ratio Chi-Square = 9.459, DF = 12, P-Value = 0.663

* NOTE * 1 cells with expected counts less than 5

4. Tabulated statistics: y, x3-1

Rows: y Columns: x3-1

	Arabic	other	saudi
involved	359	487	582
	372.0	476.3	579.7
	0.4528	0.2409	0.0089
neutral	80	93	95
	69.8	89.4	108.8
	1.4871	0.1460	1.7508
not involved	424	525	668
	421.2	539.3	656.5
	0.0185	0.3805	0.2027

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 4.688, DF = 4, P-Value = 0.321
Likelihood Ratio Chi-Square = 4.704, DF = 4, P-Value = 0.319

5. Tabulated statistics: y, x3-2

Rows: y   Columns: x3-2

	other	saudi
involved	846	582
	848.3	579.7
	0.0061	0.0089
neutral	173	95
	159.2	108.8
	1.1965	1.7508
not involved	949	668
	960.5	656.5
	0.1385	0.2027

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 3.303, DF = 2, P-Value = 0.192
Likelihood Ratio Chi-Square = 3.349, DF = 2, P-Value = 0.187

6. Tabulated statistics: y, x4

Rows: y   Columns: x4

	0	1	2
involved	1348	66	14
	1359.90	59.05	9.05
	0.1041	0.8177	2.7052
neutral	265	3	0
	255.22	11.08	1.70
	0.3749	5.8945	1.6988
not involved	1542	68	7
	1539.88	66.87	10.25
	0.0029	0.0192	1.0303

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 12.648, DF = 4, P-Value = 0.013
Likelihood Ratio Chi-Square = 16.481, DF = 4, P-Value = 0.002

* NOTE * 1 cells with expected counts less than 5

7. Tabulated statistics: y, x5

Rows: y   Columns: x5

	0	1	2	3
involved	1060	288	48	27
	1074.26	280.97	43.16	24.60
	0.1894	0.1757	0.5427	0.2338
neutral	214	37	10	5
	200.81	52.52	8.07	4.60
	0.8662	4.5874	0.4627	0.0350
not involved	1215	326	42	25
	1213.93	317.50	48.77	27.80
	0.0010	0.2274	0.9402	0.2820

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 8.543, DF = 6, P-Value = 0.201
Likelihood Ratio Chi-Square = 9.052, DF = 6, P-Value = 0.171

* NOTE * 1 cells with expected counts less than 5

8. Tabulated statistics: y, x6

Rows: y   Columns: x6

	0	1	2	3	4
involved	1054	128	26	128	84
	1110.4	111.0	19.9	112.7	65.9
	2.867	2.604	1.838	2.068	4.968
neutral	216	8	5	20	16
	207.2	20.7	3.7	21.0	12.3
	0.371	7.804	0.439	0.051	1.114
not involved	1291	120	15	112	52
	1243.4	124.3	22.3	126.2	73.8
	1.826	0.148	2.408	1.604	6.437

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 36.546, DF = 8, P-Value = 0.000
Likelihood Ratio Chi-Square = 39.188, DF = 8, P-Value = 0.000

* NOTE * 1 cells with expected counts less than 5

9. Tabulated statistics: x2, x3

Rows: x2   Columns: x3

	Arabic	bangali	Filipino	Indian	other	Pakistani	saudi
driver	172	73	31	196	84	232	32
	213.6	30.7	14.4	78.7	50.2	99.5	332.9
	8.10	58.32	19.30	174.79	22.68	176.45	271.98
not driver	691	51	27	122	119	170	1313
	649.4	93.3	43.6	239.3	152.8	302.5	1012.1
	2.66	19.18	6.35	57.49	7.46	58.04	89.46

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 972.263, DF = 6, P-Value = 0.000
Likelihood Ratio Chi-Square = 1048.665, DF = 6, P-Value = 0.000

10. Tabulated statistics: x2, x3-1

Rows: x2   Columns: x3-1

	Arabic	other	saudi
driver	172	616	32
	213.6	273.5	332.9
	8.10	428.91	271.98
not driver	691	489	1313
	649.4	831.5	1012.1
	2.66	141.08	89.46

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 942.196, DF = 2, P-Value = 0.000
Likelihood Ratio Chi-Square = 1026.050, DF = 2, P-Value = 0.000

11. Tabulated statistics: x2, x3-2

Rows: x2   Columns: x3-2

	other	saudi
driver	788	32
	487.1	332.9
	185.88	271.98
not driver	1180	1313
	1480.9	1012.1
	61.14	89.46

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 608.453, DF = 1, P-Value = 0.000
Likelihood Ratio Chi-Square = 755.683, DF = 1, P-Value = 0.000

12. Tabulated statistics: x2, x4

Rows: x2   Columns: x4

	0	1	2
driver	791	28	1
	780.89	33.91	5.20
	0.1308	1.0297	3.3901
not driver	2364	109	20
	2374.11	103.09	15.80
	0.0430	0.3387	1.1151

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 6.047, DF = 2, P-Value = 0.049
Likelihood Ratio Chi-Square = 7.728, DF = 2, P-Value = 0.021

13. Tabulated statistics: x2, x5

Rows: x2   Columns: x5

	0	1	2	3
driver	617	164	22	10
	613.8	160.5	24.7	14.1
	0.01713	0.07507	0.28668	1.17016
not driver	1872	487	78	47
	1875.2	490.5	75.3	42.9
	0.00561	0.02457	0.09383	0.38299

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 2.056, DF = 3, P-Value = 0.561
Likelihood Ratio Chi-Square = 2.186, DF = 3, P-Value = 0.535

14. Tabulated statistics: x2, x6

Rows: x2   Columns: x6

	0	1	2	3	4
driver	475	92	39	69	131
	630.3	63.0	11.3	64.0	37.4
	38.26	13.35	67.67	0.39	234.16
not driver	2086	164	7	191	21
	1930.7	193.0	34.7	196.0	114.6
	12.49	4.36	22.09	0.13	76.44

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 469.331, DF = 4, P-Value = 0.000
Likelihood Ratio Chi-Square = 401.968, DF = 4, P-Value = 0.000

15. Tabulated statistics: x3, x4

```
Rows: x3   Columns: x4

                  0        1        2

Arabic          832       28        3
             821.84    35.69     5.47
             0.1255   1.6558   1.1155

bangali         121        3        0
             118.09     5.13     0.79
             0.0719   0.8829   0.7860

Filipino         54        3        1
              55.23     2.40     0.37
             0.0276   0.1509   1.0877

Indian          307       10        1
             302.83    13.15     2.02
             0.0573   0.7546   0.5118

other           195        8        0
             193.32     8.39     1.29
             0.0146   0.0185   1.2867

Pakistani       381       18        3
             382.83    16.62     2.55
             0.0087   0.1140   0.0801

saudi          1265       67       13
            1280.86    55.62     8.53
             0.1963   2.3289   2.3484

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 13.624, DF = 12
Likelihood Ratio Chi-Square = 15.551, DF = 12

* WARNING * 2 cells with expected counts less than 1
* WARNING * Chi-Square approximation probably invalid

* NOTE * 6 cells with expected counts less than 5
```

16. Tabulated statistics: x3, x5

Rows: x3   Columns: x5

	0	1	2	3
Arabic	654	161	29	14
	647.73	169.41	26.02	14.83
	0.0607	0.4179	0.3404	0.0468
bangali	96	24	2	2
	93.61	24.48	3.76	2.14
	0.0610	0.0096	0.8245	0.0096
Filipino	45	13	0	0
	43.79	11.45	1.76	1.00
	0.0337	0.2092	1.7592	1.0027
Indian	243	62	7	5
	239.31	62.59	9.61	5.48
	0.0568	0.0056	0.7111	0.0421
other	161	31	4	3
	150.23	39.29	6.04	3.44
	0.7720	1.7503	0.6866	0.0564
Pakistani	310	76	9	4
	301.22	78.78	12.10	6.90
	0.2561	0.0983	0.7951	1.2176
saudi	980	284	49	29
	1013.11	264.98	40.70	23.20
	1.0824	1.3651	1.6910	1.4494

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 16.811, DF = 18, P-Value = 0.536
Likelihood Ratio Chi-Square = 20.087, DF = 18, P-Value = 0.328

* NOTE * 5 cells with expected counts less than 5

17. Tabulated statistics: x3, x6

Rows: x3   Columns: x6

	0	1	2	3	4
Arabic	648	76	13	91	28
	669.38	66.91	12.02	67.96	39.73
	0.683	1.234	0.079	7.813	3.463
bangali	86	10	0	19	8
	96.18	9.61	1.73	9.76	5.71
	1.078	0.015	1.728	8.734	0.920
Filipino	37	4	0	5	11
	44.57	4.46	0.80	4.53	2.65
	1.287	0.047	0.801	0.050	26.384
Indian	213	38	8	23	33
	246.33	24.62	4.42	25.01	14.62
	4.509	7.267	2.890	0.161	23.108
other	132	22	5	18	22
	155.61	15.56	2.80	15.80	9.24
	3.584	2.670	1.739	0.307	17.639
Pakistani	282	27	12	34	41
	309.67	30.95	5.56	31.44	18.38
	2.472	0.505	7.451	0.209	27.841
saudi	1163	79	8	70	9
	1039.26	103.89	18.67	105.51	61.68
	14.734	5.961	6.095	11.950	44.995

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 240.402, DF = 24
Likelihood Ratio Chi-Square = 235.887, DF = 24
* WARNING * 1 cells with expected counts less than 1
* WARNING * Chi-Square approximation probably invalid
* NOTE * 7 cells with expected counts less than 5

18. Tabulated statistics: x3-1, x4

Rows: x3-1   Columns: x4

	0	1	2
Arabic	832	28	3
	821.84	35.69	5.47
	0.1255	1.6558	1.1155
other	1058	42	5
	1052.30	45.69	7.00
	0.0309	0.2987	0.5735
saudi	1265	67	13
	1280.86	55.62	8.53
	0.1963	2.3289	2.3484

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 8.673, DF = 4, P-Value = 0.070
Likelihood Ratio Chi-Square = 8.628, DF = 4, P-Value = 0.071

19. Tabulated statistics: x3-1, x5

Rows: x3-1   Columns: x5

	0	1	2	3
Arabic	654	161	29	14
	647.7	169.4	26.0	14.8
	0.0607	0.4179	0.3404	0.0468
other	855	206	22	14
	828.2	216.6	33.3	19.0
	0.8701	0.5192	3.8191	1.3000
saudi	980	284	49	29
	1013.1	265.0	40.7	23.2
	1.0824	1.3651	1.6910	1.4494

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 12.962, DF = 6, P-Value = 0.044
Likelihood Ratio Chi-Square = 13.380, DF = 6, P-Value = 0.037

20. Tabulated statistics: x3-1, x6

Rows: x3-1   Columns: x6

	0	1	2	3	4
Arabic	648	76	13	91	28
	669.38	66.91	12.02	67.96	39.73
	0.683	1.234	0.079	7.813	3.463
other	750	101	25	99	115
	852.36	85.20	15.31	86.53	50.59
	12.293	2.929	6.133	1.796	82.008
saudi	1163	79	8	70	9
	1039.26	103.89	18.67	105.51	61.68
	14.734	5.961	6.095	11.950	44.995

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 202.167, DF = 8, P-Value = 0.000
Likelihood Ratio Chi-Square = 208.111, DF = 8, P-Value = 0.000

21. Tabulated statistics: x3-2, x4

Rows: x3-2   Columns: x4

	0	1	2
other	1890	70	8
	1874.14	81.38	12.47
	0.134	1.592	1.605
saudi	1265	67	13
	1280.86	55.62	8.53
	0.196	2.329	2.348

Cell Contents: Count
                    Expected count
                    Contribution to Chi-square

Pearson Chi-Square = 8.204, DF = 2, P-Value = 0.017
Likelihood Ratio Chi-Square = 8.048, DF = 2, P-Value = 0.018

22. Tabulated statistics: x3-2, x5

Rows: x3-2   Columns: x5

	0	1	2	3
other	1509	367	51	28
	1475.9	386.0	59.3	33.8
	0.743	0.937	1.161	0.995
saudi	980	284	49	29
	1013.1	265.0	40.7	23.2
	1.082	1.365	1.691	1.449

Cell Contents: Count
                    Expected count
                    Contribution to Chi-square

Pearson Chi-Square = 9.424, DF = 3, P-Value = 0.024
Likelihood Ratio Chi-Square = 9.323, DF = 3, P-Value = 0.025

23. Tabulated statistics: x3-2, x6

Rows: x3-2   Columns: x6

	0	1	2	3	4
other	1398	177	38	190	143
	1521.7	152.1	27.3	154.5	90.3
	10.062	4.071	4.163	8.161	30.729
saudi	1163	79	8	70	9
	1039.3	103.9	18.7	105.5	61.7
	14.734	5.961	6.095	11.950	44.995

Cell Contents: Count
                    Expected count
                    Contribution to Chi-square

Pearson Chi-Square = 140.922, DF = 4, P-Value = 0.000
Likelihood Ratio Chi-Square = 164.329, DF = 4, P-Value = 0.000

24. Tabulated statistics: x1, x2, y

Results for y = involved

```
Rows: x1   Columns: x2

     driver  not driver

0         0          50
      13.93       36.07
     13.930       5.379

1        95         350
     123.97      321.03
      6.772       2.615

2       131         262
     109.49      283.51
      4.227       1.632

3        80         151
      64.36      166.64
      3.803       1.469

4        35          70
      29.25       75.75
      1.129       0.436

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 41.392, DF = 4, P-Value = 0.000
Likelihood Ratio Chi-Square = 54.770, DF = 4, P-Value = 0.000
```

Results for y = neutral

```
Rows: x1   Columns: x2

     driver  not driver

0         0           2
       0.55        1.45
     0.5530      0.2113

1        11          60
      19.63       51.37
     3.7950      1.4503

2        29          44
      20.18       52.82
     3.8503      1.4715

3        17          34
      14.10       36.90
     0.5958      0.2277

4         3          17
       5.53       14.47
     1.1575      0.4423

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 13.755, DF = 4
Likelihood Ratio Chi-Square = 14.739, DF = 4

* WARNING * 1 cells with expected counts less than 1
* WARNING * Chi-Square approximation probably invalid

* NOTE * 2 cells with expected counts less than 5
```

Results for y = not involved

```
Rows: x1   Columns: x2

                not
     driver  driver

0         1      56
       15.0    42.0
     13.033   4.640

1        99     419
      136.0   382.0
     10.070   3.585

2       143     300
      116.3   326.7
      6.122   2.180

3        95     164
       68.0   191.0
     10.717   3.816

4        33     103
       35.7   100.3
      0.205   0.073

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 54.441, DF = 4, P-Value = 0.000
Likelihood Ratio Chi-Square = 63.088, DF = 4, P-Value = 0.000
```

25. Tabulated statistics: x1, x3, y

Results for y = involved

Rows: x1   Columns: x3

	Arabic	bangali	Filipino	Indian	other	Pakistani	saudi
0	5	0	0	0	1	0	44
	12.95	2.00	1.06	4.86	2.61	6.66	19.85
	4.880	2.002	1.062	4.861	0.997	6.658	29.370
1	121	13	4	29	17	45	216
	115.25	17.81	9.45	43.26	23.27	59.26	176.69
	0.287	1.301	3.145	4.703	1.688	3.432	8.745
2	92	22	10	51	24	65	129
	101.78	15.73	8.35	38.21	20.55	52.34	156.04
	0.940	2.497	0.327	4.282	0.580	3.064	4.687
3	69	13	4	30	13	39	63
	59.83	9.25	4.91	22.46	12.08	30.76	91.72
	1.407	1.523	0.168	2.533	0.070	2.206	8.993
4	30	1	8	9	9	14	34
	27.19	4.20	2.23	10.21	5.49	13.98	41.69
	0.290	2.441	14.925	0.143	2.244	0.000	1.419

Cell Contents: Count
                    Expected count
                    Contribution to Chi-square

Pearson Chi-Square = 127.869, DF = 24, P-Value = 0.000
Likelihood Ratio Chi-Square = 132.810, DF = 24, P-Value = 0.000

* NOTE * 7 cells with expected counts less than 5

Results for y = neutral

Rows: x1   Columns: x3

	Arabic	bangali	Filipino	Indian	other	Pakistani	saudi
0	0	0	0	0	0	0	2
	0.590	0.074	0.046	0.230	0.074	0.295	0.691
	0.5899	0.0737	0.0461	0.2304	0.0737	0.2949	2.4779
1	18	1	0	4	1	7	40
	20.940	2.618	1.636	8.180	2.618	10.470	24.539
	0.4128	0.9996	1.6359	2.1358	0.9996	1.1501	9.7410
2	22	4	3	16	1	13	14
	21.530	2.691	1.682	8.410	2.691	10.765	25.230
	0.0103	0.6364	1.0327	6.8496	1.0628	0.4640	4.9988
3	17	3	1	5	3	11	11
	15.041	1.880	1.175	5.876	1.880	7.521	17.627
	0.2550	0.6669	0.0261	0.1305	0.6669	1.6096	2.4913
4	7	0	1	0	3	1	8
	5.899	0.737	0.461	2.304	0.737	2.949	6.912
	0.2056	0.7373	0.6308	2.3041	6.9436	1.2884	0.1711

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 54.043, DF = 24
Likelihood Ratio Chi-Square = 55.654, DF = 24

* WARNING * 10 cells with expected counts less than 1
* WARNING * Chi-Square approximation probably invalid

* NOTE * 21 cells with expected counts less than 5

Results for y = not involved

```
Rows: x1   Columns: x3

     Arabic  bangali  Filipino  Indian  other  Pakistani   saudi

0         6        0         0       1      1          1      48
      15.37     2.18      0.93    5.97   2.70       6.62   23.24
      5.712    2.178     0.928   4.138  1.073      4.767  26.394

1       130       11         4      28     11         52     282
     139.67    19.80      8.43   54.26  24.56      60.12  211.16
      0.670    3.908     2.329  12.706  7.488      1.097  23.766

2       130       21        10      56     26         62     138
     119.45    16.93      7.21   46.40  21.01      51.42  180.59
      0.932    0.978     1.079   1.986  1.187      2.178  10.043

3        81       21         6      48     17         28      58
      69.84     9.90      4.22   27.13  12.28      30.06  105.58
      1.785   12.452     0.755  16.058  1.813      0.141  21.442

4        34        1         3      15     12         21      50
      36.67     5.20      2.21   14.24   6.45      15.78   55.44
      0.195    3.390     0.279   0.040  4.779      1.723   0.534

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 180.923, DF = 24
Likelihood Ratio Chi-Square = 187.267, DF = 24

* WARNING * 1 cells with expected counts less than 1
* WARNING * Chi-Square approximation probably invalid

* NOTE * 5 cells with expected counts less than 5
```

26. Tabulated statistics: x1, x3-1, y

Results for y = involved

```
Rows: x1   Columns: x3-1

     Arabic   other   saudi

0         5       1      44
      12.95   17.20   19.85
      4.880  15.256  29.370

1       121     108     216
     115.25  153.06  176.69
      0.287  13.265   8.745

2        92     172     129
     101.78  135.17  156.04
      0.940  10.033   4.687

3        69      99      63
      59.83   79.45   91.72
      1.407   4.809   8.993

4        30      41      34
      27.19   36.12   41.69
      0.290   0.661   1.419

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 105.041, DF = 8, P-Value = 0.000
Likelihood Ratio Chi-Square = 111.595, DF = 8, P-Value = 0.000
```

Results for y = neutral

```
Rows: x1   Columns: x3-1

     Arabic   other   saudi

0         0       0       2
      0.590   0.719   0.691
     0.5899  0.7189  2.4779

1        18      13      40
     20.940  25.521  24.539
     0.4128  6.1428  9.7410

2        22      37      14
     21.530  26.240  25.230
     0.0103  4.4126  4.9988

3        17      23      11
     15.041  18.332  17.627
     0.2550  1.1888  2.4913

4         7       5       8
      5.899   7.189   6.912
     0.2056  0.6665  0.1711

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square
```

```
Pearson Chi-Square = 34.483, DF = 8
Likelihood Ratio Chi-Square = 35.569, DF = 8

* WARNING * 3 cells with expected counts less than 1
* WARNING * Chi-Square approximation probably invalid

* NOTE * 3 cells with expected counts less than 5
```

Results for y = not involved

```
Rows: x1   Columns: x3-1

     Arabic   other   saudi

0         6       3      48
      15.37   18.39   23.24
      5.712  12.884  26.394

1       130     106     282
     139.67  167.17  211.16
      0.670  22.382  23.766

2       130     175     138
     119.45  142.96  180.59
      0.932   7.179  10.043

3        81     120      58
      69.84   83.58  105.58
      1.785  15.866  21.442

4        34      52      50
      36.67   43.89   55.44
      0.195   1.499   0.534

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 151.280, DF = 8, P-Value = 0.000
Likelihood Ratio Chi-Square = 157.443, DF = 8, P-Value = 0.000
```

27. Tabulated statistics: x1, x3-2, y

Results for y = involved

```
Rows: x1   Columns: x3-2

      other   saudi

0         6      44
      30.15   19.85
     19.341  29.370

1       229     216
     268.31  176.69
      5.759   8.745

2       264     129
     236.96  156.04
      3.087   4.687

3       168      63
     139.28   91.72
      5.922   8.993

4        71      34
      63.31   41.69
      0.934   1.419

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 88.258, DF = 4, P-Value = 0.000
Likelihood Ratio Chi-Square = 90.925, DF = 4, P-Value = 0.000
```

Results for y = neutral

```
Rows: x1   Columns: x3-2

     other  saudi

0        0      2
      1.31   0.69
     1.309  2.478

1       31     40
     46.46  24.54
     5.145  9.741

2       59     14
     47.77  25.23
     2.640  4.999

3       40     11
     33.37  17.63
     1.316  2.491

4       12      8
     13.09   6.91
     0.090  0.171

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 30.380, DF = 4
Likelihood Ratio Chi-Square = 31.048, DF = 4

* WARNING * 1 cells with expected counts less than 1
* WARNING * Chi-Square approximation probably invalid

* NOTE * 2 cells with expected counts less than 5
```

Results for y = not involved

```
Rows: x1   Columns: x3-2

      other   saudi

0         9      48
       33.8    23.2
     18.163  26.394

1       236     282
      306.8   211.2
     16.355  23.766

2       305     138
      262.4   180.6
      6.911  10.043

3       201      58
      153.4   105.6
     14.756  21.442

4        86      50
       80.6    55.4
      0.367   0.534

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 138.730, DF = 4, P-Value = 0.000
Likelihood Ratio Chi-Square = 142.633, DF = 4, P-Value = 0.000
```

28. Tabulated statistics: x1, x4, y

Results for y = involved

```
Rows: x1   Columns: x4

            0        1        2

0          47        2        1
        47.43     2.12     0.45
      0.00383  0.00726  0.67480

1         422       20        3
       422.10    18.91     4.00
      0.00002  0.06340  0.24964

2         372       19        2
       372.77    16.70     3.53
      0.00160  0.31792  0.66441

3         220        8        3
       219.11     9.81     2.08
      0.00361  0.33520  0.41128

4         100        3        2
        99.60     4.46     0.94
      0.00164  0.47837  1.18259

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 4.396, DF = 8
Likelihood Ratio Chi-Square = 4.098, DF = 8

* WARNING * 2 cells with expected counts less than 1
* WARNING * Chi-Square approximation probably invalid

* NOTE * 7 cells with expected counts less than 5
```

Results for y = neutral

```
Rows: x1   Columns: x4

            0         1  2

0           2         0  0
        1.991     0.009  *
     0.000043  0.009217  *

1          71         0  0
       70.673     0.327  *
     0.001515  0.327189  *

2          72         1  0
       72.664     0.336  *
     0.006060  1.309008  *

3          51         0  0
       50.765     0.235  *
     0.001088  0.235023  *

4          20         0  0
       19.908     0.092  *
     0.000427  0.092166  *

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 1.982, DF = 4
Likelihood Ratio Chi-Square = 2.188, DF = 4

* WARNING * 5 cells with expected counts less than 1
* WARNING * Chi-Square approximation probably invalid

* NOTE * 6 cells with expected counts less than 5
```

Results for y = not involved

```
Rows: x1   Columns: x4

          0       1       2

0        55       2       0
      54.50    2.30    0.20
     0.0046  0.0390  0.2017

1       489      25       4
     495.27   20.90    1.83
     0.0794  0.8060  2.5619

2       424      19       0
     423.56   17.87    1.57
     0.0005  0.0714  1.5676

3       250       9       0
     247.64   10.45    0.92
     0.0226  0.2007  0.9165

4       133       2       1
     130.03    5.49    0.48
     0.0677  2.2153  0.5592

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 9.314, DF = 8
Likelihood Ratio Chi-Square = 11.895, DF = 8

* WARNING * 3 cells with expected counts less than 1
* WARNING * Chi-Square approximation probably invalid

* NOTE * 6 cells with expected counts less than 5
```

29. Tabulated statistics: x1, x5, y

Results for y = involved

Rows: x1   Columns: x5

	0	1	2	3
0	39	9	1	1
	36.21	11.05	1.72	1.02
	0.2148	0.3795	0.3004	0.0005
1	330	83	21	10
	321.55	98.10	15.26	9.08
	0.2218	2.3247	2.1589	0.0925
2	284	87	14	8
	284.62	86.83	13.51	8.04
	0.0013	0.0003	0.0180	0.0002
3	152	70	4	5
	167.30	51.04	7.94	4.73
	1.3984	7.0438	1.9547	0.0159
4	80	21	2	1
	75.32	22.98	3.57	2.13
	0.2909	0.1704	0.6935	0.5977

Cell Contents: Count
                    Expected count
                    Contribution to Chi-square

Pearson Chi-Square = 17.878, DF = 12, P-Value = 0.119
Likelihood Ratio Chi-Square = 17.872, DF = 12, P-Value = 0.120

* NOTE * 5 cells with expected counts less than 5

Results for y = neutral

```
Rows: x1   Columns: x5

           0        1        2        3

0          2        0        0        0
       1.572    0.326    0.074    0.028
     0.11647  0.32558  0.07442  0.02791

1         53       14        3        1
      55.809   11.558    2.642    0.991
     0.14141  0.51589  0.04855  0.00009

2         56       10        4        1
      55.809   11.558    2.642    0.991
     0.00065  0.21005  0.69820  0.00009

3         41        8        1        1
      40.088    8.302    1.898    0.712
     0.02073  0.01101  0.42464  0.11686

4         17        3        0        0
      15.721    3.256    0.744    0.279
     0.10407  0.02010  0.74419  0.27907

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 3.880, DF = 12
Likelihood Ratio Chi-Square = 5.277, DF = 12

* WARNING * 8 cells with expected counts less than 1
* WARNING * Chi-Square approximation probably invalid

* NOTE * 13 cells with expected counts less than 5
```

Results for y = not involved

```
Rows: x1   Columns: x5

            0       1       2       3

0          33      22       1       1
        42.10   12.43    1.54    0.93
       1.9679  7.3717  0.1884  0.0051

1         379     110      22       7
       382.61  112.94   13.98    8.46
       0.0341  0.0768  4.6007  0.2525

2         324      97       9      10
       325.00   95.94   11.88    7.19
       0.0031  0.0118  0.6961  1.1005

3         198      49       6       4
       189.83   56.04    6.94    4.20
       0.3517  0.8835  0.1263  0.0094

4         106      29       0       1
       100.45   29.65    3.67    2.22
       0.3061  0.0144  3.6705  0.6717

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 22.342, DF = 12
Likelihood Ratio Chi-Square = 24.291, DF = 12

* WARNING * 1 cells with expected counts less than 1
* WARNING * Chi-Square approximation probably invalid

* NOTE * 5 cells with expected counts less than 5
```

30. Tabulated statistics: x1, x6, y

Results for y = involved

```
Rows: x1   Columns: x6

          0       1       2       3       4

0        41       4       1       4       0
      36.41    4.52    0.94    4.93    3.20
     0.5781  0.0589  0.0033  0.1741  3.2020

1       331      33       6      54      18
     321.88   39.92    8.35   43.55   28.31
     0.2582  1.1989  0.6597  2.5092  3.7520

2       282      36       8      30      34
     284.01   35.22    7.36   38.42   24.98
     0.0143  0.0172  0.0548  1.8467  3.2610

3       164      26       2      19      20
     168.22   20.86    4.36   22.76   14.79
     0.1061  1.2654  1.2791  0.6207  1.8327

4        69      11       6      13       6
      76.47    9.48    1.98   10.34    6.72
     0.7289  0.2428  8.1393  0.6815  0.0780

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 32.563, DF = 16
Likelihood Ratio Chi-Square = 33.266, DF = 16

* WARNING * 1 cells with expected counts less than 1
* WARNING * Chi-Square approximation probably invalid

* NOTE * 6 cells with expected counts less than 5
```

Results for y = neutral

Rows: x1   Columns: x6

	0	1	2	3	4
0	2	0	0	0	0
	1.598	0.056	0.047	0.178	0.121
	0.1011	0.0561	0.0467	0.1776	0.1215
1	61	2	1	7	0
	56.734	1.991	1.659	6.304	4.313
	0.3208	0.0000	0.2617	0.0769	4.3131
2	52	1	2	8	8
	56.734	1.991	1.659	6.304	4.313
	0.3950	0.4930	0.0701	0.4564	3.1517
3	40	1	2	4	4
	40.752	1.430	1.192	4.528	3.098
	0.0139	0.1293	0.5485	0.0616	0.2625
4	16	2	0	0	1
	15.182	0.533	0.444	1.687	1.154
	0.0440	4.0415	0.4439	1.6869	0.0206

Cell Contents: Count
                    Expected count
                    Contribution to Chi-square

Pearson Chi-Square = 17.294, DF = 16
Likelihood Ratio Chi-Square = 21.825, DF = 16

* WARNING * 6 cells with expected counts less than 1
* WARNING * Chi-Square approximation probably invalid

* NOTE * 19 cells with expected counts less than 5

Results for y = not involved

```
Rows: x1   Columns: x6

          0       1       2       3       4

0        54       1       0       2       0
      45.95    4.26    0.57    4.21    2.01
     1.4096  2.4906  0.5729  1.1637  2.0050

1       430      31       4      29      13
     408.73   37.85    5.10   37.49   17.83
     1.1069  1.2404  0.2355  1.9219  1.3104

2       353      32       8      31      18
     356.33   33.00    4.44   32.68   15.55
     0.0311  0.0303  2.8495  0.0866  0.3868

3       186      29       2      25      11
     203.96   18.89    2.54   18.71    8.90
     1.5818  5.4126  0.1158  2.1169  0.4958

4       100      11       0      16       7
     108.03   10.00    1.35    9.91    4.71
     0.5965  0.0991  1.3467  3.7455  1.1091

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 33.461, DF = 16
Likelihood Ratio Chi-Square = 36.856, DF = 16

* WARNING * 1 cells with expected counts less than 1
* WARNING * Chi-Square approximation probably invalid

* NOTE * 8 cells with expected counts less than 5
```

31. Tabulated statistics: x2, x3, y

Results for y = involved

Rows: x2 Columns: x3

	Arabic	bangali	Filipino	Indian	other	Pakistani	saudi
driver	74	31	17	80	43	105	14
	91.51	13.76	7.65	33.14	23.96	45.63	148.35
	3.35	21.58	11.44	66.27	15.13	77.26	121.67
not driver	285	23	13	50	51	74	568
	267.49	40.24	22.35	96.86	70.04	133.37	433.65
	1.15	7.38	3.91	22.67	5.18	26.43	41.63

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 425.051, DF = 6, P-Value = 0.000
Likelihood Ratio Chi-Square = 463.557, DF = 6, P-Value = 0.000

Results for y = neutral

Rows: x2 Columns: x3

	Arabic	bangali	Filipino	Indian	other	Pakistani	saudi
driver	16	6	2	16	3	21	1
	19.403	2.183	1.213	6.549	3.396	9.216	23.041
	0.597	6.675	0.511	13.641	0.046	15.066	21.084
not driver	64	3	3	11	11	17	94
	60.597	6.817	3.787	20.451	10.604	28.784	71.959
	0.191	2.137	0.164	4.368	0.015	4.824	6.751

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 76.071, DF = 6, P-Value = 0.000
Likelihood Ratio Chi-Square = 84.284, DF = 6, P-Value = 0.000

* NOTE * 4 cells with expected counts less than 5

Results for y = not involved

Rows: x2 Columns: x3

	Arabic	bangali	Filipino	Indian	other	Pakistani	saudi
driver	82	36	12	100	38	106	17
	102.53	14.75	5.56	38.93	22.97	44.73	161.53
	4.11	30.61	7.45	95.80	9.83	83.91	129.32
not driver	342	25	11	61	57	79	651
	321.47	46.25	17.44	122.07	72.03	140.27	506.47
	1.31	9.76	2.38	30.55	3.14	26.76	41.24

```
Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 476.169, DF = 6, P-Value = 0.000
Likelihood Ratio Chi-Square = 505.609, DF = 6, P-Value = 0.000
```

32. Tabulated statistics: x2, x3-1, y

Results for y = involved

Rows: x2 Columns: x3-1

	Arabic	other	saudi
driver	74	276	14
	91.5	124.1	148.4
	3.35	185.78	121.67
not driver	285	211	568
	267.5	362.9	433.6
	1.15	63.56	41.63

```
Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 417.133, DF = 2, P-Value = 0.000
Likelihood Ratio Chi-Square = 457.471, DF = 2, P-Value = 0.000
```

Results for y = neutral

```
Rows: x2   Columns: x3-1

              Arabic   other   saudi

driver            16      48       1
               19.40   22.56   23.04
               0.597  28.702  21.084

not driver        64      45      94
               60.60   70.44   71.96
               0.191   9.190   6.751

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 66.516, DF = 2, P-Value = 0.000
Likelihood Ratio Chi-Square = 76.947, DF = 2, P-Value = 0.000
```

Results for y = not involved

```
Rows: x2   Columns: x3-1

              Arabic   other   saudi

driver            82     292      17
               102.5   126.9   161.5
                4.11  214.59  129.32

not driver       342     233     651
               321.5   398.1   506.5
                1.31   68.44   41.24

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 459.008, DF = 2, P-Value = 0.000
Likelihood Ratio Chi-Square = 492.894, DF = 2, P-Value = 0.000
```

33. **Tabulated statistics: x2, x3-2, y**

Results for y = involved

```
Rows: x2   Columns: x3-2

              other   saudi

driver          350      14
              215.6   148.4
              83.70  121.67

not driver      496     568
              630.4   433.6
              28.64   41.63

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 275.640, DF = 1, P-Value = 0.000
Likelihood Ratio Chi-Square = 341.717, DF = 1, P-Value = 0.000
```

Results for y = neutral

```
Rows: x2   Columns: x3-2

               other   saudi

driver            64       1
               41.96   23.04
              11.578  21.084

not driver       109      94
              131.04   71.96
               3.707   6.751

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 43.121, DF = 1, P-Value = 0.000
Likelihood Ratio Chi-Square = 57.852, DF = 1, P-Value = 0.000
```

Results for y = not involved

```
Rows: x2   Columns: x3-2

              other   saudi

driver          374      17
              229.5   161.5
              91.03  129.32

not driver      575     651
              719.5   506.5
              29.03   41.24

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 290.612, DF = 1, P-Value = 0.000
Likelihood Ratio Chi-Square = 357.818, DF = 1, P-Value = 0.000
```

34. Tabulated statistics: x2, x4, y

Results for y = involved

```
Rows: x2   Columns: x4

                    0       1       2

driver            348      16       0
               343.61   16.82    3.57
               0.0561  0.0403  3.5686

not driver       1000      50      14
              1004.39   49.18   10.43
               0.0192  0.0138  1.2208

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 4.919, DF = 2, P-Value = 0.085
Likelihood Ratio Chi-Square = 8.369, DF = 2, P-Value = 0.015

* NOTE * 1 cells with expected counts less than 5
```

Results for y = neutral

```
Rows: x2   Columns: x4

                    0        1  2

driver             65        0  0
               64.272    0.728  *
              0.00824  0.72761  *

not driver        200        3  0
              200.728    2.272  *
              0.00264  0.23298  *

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 0.971, DF = 1
Likelihood Ratio Chi-Square = 1.678, DF = 1

* WARNING * 1 cells with expected counts less than 1
* WARNING * Chi-Square approximation probably invalid

* NOTE * 2 cells with expected counts less than 5
```

Results for y = not involved

```
Rows: x2   Columns: x4

                    0       1       2

driver            378      12       1
               372.86   16.44    1.69
               0.0707  1.2004  0.2834

not driver       1164      56       6
              1169.14   51.56    5.31
               0.0226  0.3828  0.0904

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 2.050, DF = 2, P-Value = 0.359
Likelihood Ratio Chi-Square = 2.211, DF = 2, P-Value = 0.331

* NOTE * 1 cells with expected counts less than 5
```

35. Tabulated statistics: x2, x5, y

Results for y = involved

```
Rows: x2   Columns: x5

                   0       1       2       3

driver           280      69       9       4
              269.66   73.26   12.21    6.87
              0.3968  0.2483  0.8443  1.1980

not driver       780     219      39      23
              790.34  214.74   35.79   20.13
              0.1354  0.0847  0.2881  0.4088

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 3.604, DF = 3, P-Value = 0.307
Likelihood Ratio Chi-Square = 3.877, DF = 3, P-Value = 0.275
```

Results for y = neutral

```
Rows: x2   Columns: x5

                    0       1       2       3

driver             45      13       3       2
               50.684   8.763   2.368   1.184
               0.6375  2.0484  0.1684  0.5620

not driver        169      24       7       3
              163.316  28.237   7.632   3.816
               0.1978  0.6357  0.0523  0.1744

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 4.477, DF = 3, P-Value = 0.214
Likelihood Ratio Chi-Square = 4.171, DF = 3, P-Value = 0.244

* NOTE * 3 cells with expected counts less than 5
```

Results for y = not involved

Rows: x2 Columns: x5

	0	1	2	3
driver	292	82	10	4
	293.17	78.66	10.13	6.03
	0.00468	0.14167	0.00178	0.68471
not driver	923	244	32	21
	921.83	247.34	31.87	18.97
	0.00149	0.04506	0.00057	0.21776

```
Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 1.098, DF = 3, P-Value = 0.778
Likelihood Ratio Chi-Square = 1.182, DF = 3, P-Value = 0.757
```

36. Tabulated statistics: x2, x6, y

Results for y = involved

Rows: x2 Columns: x6

	0	1	2	3	4
driver	183	45	23	35	73
	266.47	32.36	6.57	32.36	21.24
	26.146	4.937	41.051	0.215	126.171
not driver	871	83	3	93	11
	787.53	95.64	19.43	95.64	62.76
	8.847	1.670	13.890	0.073	42.691

```
Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 265.691, DF = 4, P-Value = 0.000
Likelihood Ratio Chi-Square = 232.748, DF = 4, P-Value = 0.000
```

Results for y = neutral

```
Rows: x2   Columns: x6

                    0       1       2       3        4

driver             38       3       4       5       14
               52.166   1.932   1.208   4.830    3.864
               3.8469  0.5903  6.4575  0.0060  26.5868

not driver        178       5       1      15        2
              163.834   6.068   3.792  15.170   12.136
               1.2249  0.1879  2.0561  0.0019   8.4655

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 49.424, DF = 4, P-Value = 0.000
Likelihood Ratio Chi-Square = 41.903, DF = 4, P-Value = 0.000

* NOTE * 5 cells with expected counts less than 5
```

Results for y = not involved

Rows: x2   Columns: x6

	0	1	2	3	4
driver	254	44	12	29	44
	310.98	28.91	3.61	26.98	12.53
	10.439	7.882	19.467	0.151	79.087
not driver	1037	76	3	83	8
	980.02	91.09	11.39	85.02	39.47
	3.313	2.501	6.177	0.048	25.096

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 154.161, DF = 4, P-Value = 0.000
Likelihood Ratio Chi-Square = 129.854, DF = 4, P-Value = 0.000

* NOTE * 1 cells with expected counts less than 5

37. Tabulated statistics: x3, x4, y

Results for y = involved

Rows: x3   Columns: x4

	0	1	2
Arabic	340	16	3
	338.888	16.592	3.520
	0.00365	0.02115	0.07671
bangali	52	2	0
	50.975	2.496	0.529
	0.02062	0.09849	0.52941
Filipino	27	2	1
	28.319	1.387	0.294
	0.06146	0.27140	1.69412
Indian	126	3	1
	122.717	6.008	1.275
	0.08782	1.50631	0.05913
other	90	4	0
	88.734	4.345	0.922
	0.01807	0.02732	0.92157
Pakistani	171	6	2
	168.972	8.273	1.755
	0.02434	0.62456	0.03423
saudi	542	33	7
	549.395	26.899	5.706
	0.09954	1.38370	0.29351

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 7.857, DF = 12
Likelihood Ratio Chi-Square = 8.928, DF = 12

* WARNING * 3 cells with expected counts less than 1
* WARNING * Chi-Square approximation probably invalid

* NOTE * 9 cells with expected counts less than 5

Results for y = neutral

Rows: x3   Columns: x4

	0	1	2
Arabic	80	0	0
	79.104	0.896	*
	0.01014	0.89552	*
bangali	9	0	0
	8.899	0.101	*
	0.00114	0.10075	*
Filipino	5	0	0
	4.944	0.056	*
	0.00063	0.05597	*
Indian	27	0	0
	26.698	0.302	*
	0.00342	0.30224	*
other	14	0	0
	13.843	0.157	*
	0.00177	0.15672	*
Pakistani	38	0	0
	37.575	0.425	*
	0.00482	0.42537	*
saudi	92	3	0
	93.937	1.063	*
	0.03992	3.52659	*

Cell Contents: Count
                    Expected count
                    Contribution to Chi-square

Pearson Chi-Square = 5.525, DF = 6
Likelihood Ratio Chi-Square = 6.285, DF = 6

* WARNING * 6 cells with expected counts less than 1
* WARNING * Chi-Square approximation probably invalid

* NOTE * 8 cells with expected counts less than 5

Results for y = not involved

Rows: x3   Columns: x4

	0	1	2
Arabic	412	12	0
	404.334	17.831	1.835
	0.14535	1.90658	1.83550
bangali	60	1	0
	58.171	2.565	0.264
	0.05753	0.95507	0.26407
Filipino	22	1	0
	21.933	0.967	0.100
	0.00020	0.00111	0.09957
Indian	154	7	0
	153.532	6.771	0.697
	0.00142	0.00778	0.69697
other	91	4	0
	90.594	3.995	0.411
	0.00182	0.00001	0.41126
Pakistani	172	12	1
	176.419	7.780	0.801
	0.11070	2.28922	0.04951
saudi	631	31	6
	637.017	28.092	2.892
	0.05683	0.30113	3.34088

Cell Contents: Count
                    Expected count
                    Contribution to Chi-square

Pearson Chi-Square = 12.532, DF = 12
Likelihood Ratio Chi-Square = 15.240, DF = 12

* WARNING * 6 cells with expected counts less than 1
* WARNING * Chi-Square approximation probably invalid

* NOTE * 10 cells with expected counts less than 5

38. Tabulated statistics: x3, x5, y

Results for y = involved

Rows: x3   Columns: x5

	0	1	2	3
Arabic	269	67	14	7
	265.93	72.25	12.04	6.77
	0.0354	0.3819	0.3183	0.0076
bangali	42	11	1	0
	40.22	10.93	1.82	1.02
	0.0783	0.0005	0.3705	1.0246
Filipino	22	8	0	0
	22.35	6.07	1.01	0.57
	0.0054	0.6124	1.0119	0.5692
Indian	102	25	3	0
	96.84	26.31	4.39	2.47
	0.2752	0.0653	0.4375	2.4666
other	72	15	2	3
	68.53	18.62	3.10	1.75
	0.1756	0.7037	0.3923	0.9014
Pakistani	138	33	5	2
	132.59	36.03	6.00	3.38
	0.2205	0.2541	0.1680	0.5617
saudi	415	129	23	15
	433.53	117.79	19.63	11.04
	0.7924	1.0667	0.5779	1.4180

```
Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 14.893, DF = 18
Likelihood Ratio Chi-Square = 19.886, DF = 18

* WARNING * 1 cells with expected counts less than 1
* WARNING * Chi-Square approximation probably invalid

* NOTE * 9 cells with expected counts less than 5
```

Results for y = neutral

```
Rows: x3   Columns: x5

                 0        1        2        3

Arabic          65       11        3        1
            64.361   11.128    3.008    1.504
           0.00635  0.00147  0.00002  0.16876

bangali          8        0        1        0
             7.241    1.252    0.338    0.169
           0.07965  1.25188  1.29390  0.16917

Filipino         4        1        0        0
             4.023    0.695    0.188    0.094
           0.00013  0.13333  0.18797  0.09398

Indian          21        4        0        1
            20.917    3.617    0.977    0.489
           0.00033  0.04066  0.97744  0.53488

other           11        2        0        0
            10.459    1.808    0.489    0.244
           0.02802  0.02033  0.48872  0.24436

Pakistani       28       10        0        0
            30.571    5.286    1.429    0.714
           0.21629  4.20463  1.42857  0.71429

saudi           77        9        6        3
            76.429   13.214    3.571    1.786
           0.00427  1.34402  1.65143  0.82571

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 16.111, DF = 18
Likelihood Ratio Chi-Square = 19.964, DF = 18

* WARNING * 10 cells with expected counts less than 1
* WARNING * Chi-Square approximation probably invalid

* NOTE * 19 cells with expected counts less than 5
```

Results for y = not involved

```
Rows: x3   Columns: x5

                  0       1       2       3

Arabic          320      83      12       6
             318.11   85.35   11.00    6.55
             0.0113  0.0648  0.0916  0.0454

bangali          46      13       0       2
              46.09   12.37    1.59    0.95
             0.0002  0.0324  1.5933  1.1661

Filipino         19       4       0       0
              17.38    4.66    0.60    0.36
             0.1512  0.0943  0.6007  0.3576

Indian          120      33       4       4
             121.65   32.64    4.21    2.50
             0.0224  0.0040  0.0100  0.8952

other            78      14       2       0
              71.03   19.06    2.46    1.46
             0.6847  1.3420  0.0844  1.4614

Pakistani       144      33       4       2
             138.27   37.10    4.78    2.85
             0.2371  0.4533  0.1272  0.2511

saudi           488     146      20      11
             502.47  134.82   17.37   10.34
             0.4168  0.9272  0.3984  0.0423

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 11.566, DF = 18
Likelihood Ratio Chi-Square = 15.288, DF = 18

* WARNING * 3 cells with expected counts less than 1
* WARNING * Chi-Square approximation probably invalid

* NOTE * 11 cells with expected counts less than 5
```

39. Tabulated statistics: x3, x6, y

Results for y = involved

Rows: x3   Columns: x6

	0	1	2	3	4
Arabic	258	39	5	46	9
	264.98	32.18	6.54	32.18	21.12
	0.184	1.445	0.361	5.935	6.954
bangali	33	8	0	9	4
	40.08	4.87	0.99	4.87	3.19
	1.251	2.016	0.989	3.508	0.203
Filipino	18	2	0	2	8
	22.27	2.70	0.55	2.70	1.77
	0.818	0.183	0.549	0.183	21.838
Indian	71	18	5	12	22
	95.01	11.54	2.34	11.54	7.57
	6.067	3.619	3.011	0.018	27.493
other	59	10	3	8	13
	69.03	8.38	1.70	8.38	5.50
	1.457	0.312	0.988	0.018	10.221
Pakistani	116	15	7	16	23
	131.38	15.95	3.24	15.95	10.47
	1.800	0.057	4.360	0.000	14.994
saudi	499	36	6	35	5
	431.25	52.37	10.64	52.37	34.37
	10.644	5.118	2.022	5.762	25.096

Cell Contents: Count
                    Expected count
                    Contribution to Chi-square

Pearson Chi-Square = 169.476, DF = 24
Likelihood Ratio Chi-Square = 158.770, DF = 24

* WARNING * 2 cells with expected counts less than 1
* WARNING * Chi-Square approximation probably invalid

* NOTE * 11 cells with expected counts less than 5

Results for y = neutral

Rows: x3   Columns: x6

	0	1	2	3	4
Arabic	58	3	2	9	7
	64.392	2.385	1.491	5.962	4.770
	0.6346	0.1586	0.1741	1.5477	1.0428
bangali	4	0	0	4	1
	7.336	0.272	0.170	0.679	0.543
	1.5169	0.2717	0.1698	16.2348	0.3837
Filipino	4	1	0	0	0
	4.075	0.151	0.094	0.377	0.302
	0.0014	4.7759	0.0943	0.3774	0.3019
Indian	22	1	0	1	2
	21.192	0.785	0.491	1.962	1.570
	0.0308	0.0589	0.4906	0.4719	0.1179
other	10	1	0	1	1
	10.596	0.392	0.245	0.981	0.785
	0.0335	0.9405	0.2453	0.0004	0.0589
Pakistani	29	1	3	0	5
	30.974	1.147	0.717	2.868	2.294
	0.1258	0.0189	7.2696	2.8679	3.1907
saudi	89	1	0	5	0
	77.434	2.868	1.792	7.170	5.736
	1.7276	1.2166	1.7925	0.6567	5.7358

Cell Contents: Count
                    Expected count
                    Contribution to Chi-square

Pearson Chi-Square = 54.736, DF = 24
Likelihood Ratio Chi-Square = 51.729, DF = 24

* WARNING * 15 cells with expected counts less than 1
* WARNING * Chi-Square approximation probably invalid

* NOTE * 26 cells with expected counts less than 5

Results for y = not involved

Rows: x3   Columns: x6

	0	1	2	3	4
Arabic	332	34	6	36	12
	341.019	31.698	3.962	29.585	13.736
	0.2385	0.1672	1.0480	1.3910	0.2194
bangali	49	2	0	6	3
	48.717	4.528	0.566	4.226	1.962
	0.0016	1.4116	0.5660	0.7443	0.5488
Filipino	15	1	0	3	3
	17.863	1.660	0.208	1.550	0.719
	0.4588	0.2627	0.2075	1.3573	7.2282
Indian	120	19	3	10	9
	130.724	12.151	1.519	11.341	5.265
	0.8797	3.8606	1.4443	0.1585	2.6488
other	63	11	2	9	8
	75.511	7.019	0.877	6.551	3.042
	2.0730	2.2581	1.4365	0.9156	8.0837
Pakistani	137	11	2	18	13
	146.963	13.660	1.708	12.750	5.919
	0.6754	0.5181	0.0501	2.1621	8.4692
saudi	575	42	2	30	4
	530.203	49.283	6.160	45.997	21.356
	3.7849	1.0763	2.8097	5.5638	14.1052

Cell Contents: Count
                    Expected count
                    Contribution to Chi-square

Pearson Chi-Square = 78.825, DF = 24
Likelihood Ratio Chi-Square = 78.173, DF = 24

* WARNING * 4 cells with expected counts less than 1
* WARNING * Chi-Square approximation probably invalid

* NOTE * 13 cells with expected counts less than 5

40. Tabulated statistics: x3-1, x4, y

Results for y = involved

Rows: x3-1   Columns: x4

	0	1	2
Arabic	340	16	3
	338.89	16.59	3.52
	0.0036	0.0212	0.0767
other	466	17	4
	459.72	22.51	4.77
	0.0859	1.3481	0.1256
saudi	542	33	7
	549.39	26.90	5.71
	0.0995	1.3837	0.2935

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 3.438, DF = 4, P-Value = 0.487
Likelihood Ratio Chi-Square = 3.461, DF = 4, P-Value = 0.484

* NOTE * 2 cells with expected counts less than 5

Results for y = neutral

Rows: x3-1   Columns: x4

	0	1	2
Arabic	80	0	0
	79.104	0.896	*
	0.0101	0.8955	*
other	93	0	0
	91.959	1.041	*
	0.0118	1.0410	*
saudi	92	3	0
	93.937	1.063	*
	0.0399	3.5266	*

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 5.525, DF = 2
Likelihood Ratio Chi-Square = 6.285, DF = 2

* WARNING * 1 cells with expected counts less than 1
* WARNING * Chi-Square approximation probably invalid

* NOTE * 3 cells with expected counts less than 5

Results for y = not involved

Rows: x3-1   Columns: x4

	0	1	2
Arabic	412	12	0
	404.33	17.83	1.84
	0.1453	1.9066	1.8355
other	499	25	1
	500.65	22.08	2.27
	0.0054	0.3867	0.7127
saudi	631	31	6
	637.02	28.09	2.89
	0.0568	0.3011	3.3409

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 8.691, DF = 4, P-Value = 0.069
Likelihood Ratio Chi-Square = 10.143, DF = 4, P-Value = 0.038

* NOTE * 3 cells with expected counts less than 5

41. Tabulated statistics: x3-1, x5, y

Results for y = involved

Rows: x3-1   Columns: x5

	0	1	2	3
Arabic	269	67	14	7
	265.93	72.25	12.04	6.77
	0.0354	0.3819	0.3183	0.0076
other	376	92	11	5
	360.53	97.96	16.33	9.18
	0.6634	0.3622	1.7375	1.9057
saudi	415	129	23	15
	433.53	117.79	19.63	11.04
	0.7924	1.0667	0.5779	1.4180

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 9.267, DF = 6, P-Value = 0.159
Likelihood Ratio Chi-Square = 9.672, DF = 6, P-Value = 0.139

Results for y = neutral

Rows: x3-1   Columns: x5

	0	1	2	3
Arabic	65	11	3	1
	64.361	11.128	3.008	1.504
	0.00635	0.00147	0.00002	0.16876
other	72	17	1	1
	73.211	12.658	3.421	1.711
	0.02002	1.48950	1.71336	0.29514
saudi	77	9	6	3
	76.429	13.214	3.571	1.786
	0.00427	1.34402	1.65143	0.82571

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 7.520, DF = 6, P-Value = 0.275
Likelihood Ratio Chi-Square = 7.865, DF = 6, P-Value = 0.248

* NOTE * 6 cells with expected counts less than 5

Results for y = not involved

Rows: x3-1   Columns: x5

	0	1	2	3
Arabic	320	83	12	6
	318.11	85.35	11.00	6.55
	0.01127	0.06481	0.09162	0.04545
other	407	97	10	8
	394.42	105.83	13.63	8.12
	0.40113	0.73647	0.96876	0.00165
saudi	488	146	20	11
	502.47	134.82	17.37	10.34
	0.41682	0.92717	0.39840	0.04227

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 4.106, DF = 6, P-Value = 0.662
Likelihood Ratio Chi-Square = 4.182, DF = 6, P-Value = 0.652

42. Tabulated statistics: x3-1, x6, y

Results for y = involved

Rows: x3-1 Columns: x6

	0	1	2	3	4
Arabic	258	39	5	46	9
	264.98	32.18	6.54	32.18	21.12
	0.184	1.445	0.361	5.935	6.954
other	297	53	15	47	70
	357.77	43.45	8.83	43.45	28.51
	10.321	2.100	4.320	0.290	60.366
saudi	499	36	6	35	5
	431.25	52.37	10.64	52.37	34.37
	10.644	5.118	2.022	5.762	25.096

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 140.920, DF = 8, P-Value = 0.000
Likelihood Ratio Chi-Square = 139.859, DF = 8, P-Value = 0.000

Results for y = neutral

Rows: x3-1 Columns: x6

	0	1	2	3	4
Arabic	58	3	2	9	7
	64.392	2.385	1.491	5.962	4.770
	0.6346	0.1586	0.1741	1.5477	1.0428
other	69	4	3	6	9
	74.174	2.747	1.717	6.868	5.494
	0.3609	0.5713	0.9587	0.1097	2.2368
saudi	89	1	0	5	0
	77.434	2.868	1.792	7.170	5.736
	1.7276	1.2166	1.7925	0.6567	5.7358

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 18.924, DF = 8, P-Value = 0.015
Likelihood Ratio Chi-Square = 25.913, DF = 8, P-Value = 0.001

* NOTE * 7 cells with expected counts less than 5

Results for y = not involved

Rows: x3-1   Columns: x6

	0	1	2	3	4
Arabic	332	34	6	36	12
	341.02	31.70	3.96	29.58	13.74
	0.239	0.167	1.048	1.391	0.219
other	384	44	7	46	36
	419.78	39.02	4.88	36.42	16.91
	3.049	0.636	0.924	2.521	21.557
saudi	575	42	2	30	4
	530.20	49.28	6.16	46.00	21.36
	3.785	1.076	2.810	5.564	14.105

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 59.092, DF = 8, P-Value = 0.000
Likelihood Ratio Chi-Square = 62.254, DF = 8, P-Value = 0.000

* NOTE * 2 cells with expected counts less than 5

43. Tabulated statistics: x3-2, x4, y

Results for y = involved

```
Rows: x3-2   Columns: x4

              0       1       2

other       806      33       7
         798.61   39.10    8.29
         0.0685  0.9519  0.2019

saudi       542      33       7
         549.39   26.90    5.71
         0.0995  1.3837  0.2935

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 2.999, DF = 2, P-Value = 0.223
Likelihood Ratio Chi-Square = 2.950, DF = 2, P-Value = 0.229
```

Results for y = neutral

```
Rows: x3-2   Columns: x4

              0       1  2

other       173       0  0
         171.06    1.94  *
         0.0219  1.9366  *

saudi        92       3  0
          93.94    1.06  *
         0.0399  3.5266  *

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 5.525, DF = 1, P-Value = 0.019
Likelihood Ratio Chi-Square = 6.285, DF = 1, P-Value = 0.012

* NOTE * 2 cells with expected counts less than 5
```

Results for y = not involved

```
Rows: x3-2   Columns: x4

              0       1       2

other       911      37       1
         904.98   39.91    4.11
         0.0400  0.2120  2.3516

saudi       631      31       6
         637.02   28.09    2.89
         0.0568  0.3011  3.3409

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 6.302, DF = 2, P-Value = 0.043
Likelihood Ratio Chi-Square = 6.538, DF = 2, P-Value = 0.038

* NOTE * 2 cells with expected counts less than 5
```

44. Tabulated statistics: x3-2, x5, y

Results for y = involved

```
Rows: x3-2   Columns: x5

              0       1       2       3

other       645     159      25      12
         626.47  170.21   28.37   15.96
         0.5484  0.7382  0.3999  0.9813

saudi       415     129      23      15
         433.53  117.79   19.63   11.04
         0.7924  1.0667  0.5779  1.4180

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 6.523, DF = 3, P-Value = 0.089
Likelihood Ratio Chi-Square = 6.449, DF = 3, P-Value = 0.092
```

Results for y = neutral

```
Rows: x3-2   Columns: x5

             0       1       2       3

other      137      28       4       2
        137.57   23.79    6.43    3.21
        0.0024  0.7467  0.9175  0.4587

saudi       77       9       6       3
         76.43   13.21    3.57    1.79
        0.0043  1.3440  1.6514  0.8257

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 5.951, DF = 3, P-Value = 0.114
Likelihood Ratio Chi-Square = 5.873, DF = 3, P-Value = 0.118

* NOTE * 3 cells with expected counts less than 5
```

Results for y = not involved

```
Rows: x3-2   Columns: x5

             0       1       2       3

other      727     180      22      14
        712.53  191.18   24.63   14.66
        0.2939  0.6538  0.2810  0.0298

saudi      488     146      20      11
        502.47  134.82   17.37   10.34
        0.4168  0.9272  0.3984  0.0423

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 3.043, DF = 3, P-Value = 0.385
Likelihood Ratio Chi-Square = 3.025, DF = 3, P-Value = 0.388
```

45. Tabulated statistics: x3-2, x6, y

Results for y = involved

```
Rows: x3-2   Columns: x6

              0      1      2      3       4

other       555     92     20     93      79
         622.75  75.63  15.36  75.63   49.63
          7.371  3.544  1.400  3.990  17.379

saudi       499     36      6     35       5
         431.25  52.37  10.64  52.37   34.37
         10.644  5.118  2.022  5.762  25.096

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 82.327, DF = 4, P-Value = 0.000
Likelihood Ratio Chi-Square = 94.943, DF = 4, P-Value = 0.000
```

Results for y = neutral

```
Rows: x3-2   Columns: x6

               0      1      2       3       4

other        127      7      5      15      16
         138.566  5.132  3.208  12.830  10.264
           0.965  0.680  1.002   0.367   3.205

saudi         89      1      0       5       0
          77.434  2.868  1.792   7.170   5.736
           1.728  1.217  1.792   0.657   5.736

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 17.348, DF = 4, P-Value = 0.002
Likelihood Ratio Chi-Square = 24.608, DF = 4, P-Value = 0.000

* NOTE * 3 cells with expected counts less than 5
```

Results for y = not involved

Rows: x3-2   Columns: x6

	0	1	2	3	4
other	716	78	13	82	48
	760.80	70.72	8.84	66.00	30.64
	2.638	0.750	1.958	3.877	9.830
saudi	575	42	2	30	4
	530.20	49.28	6.16	46.00	21.36
	3.785	1.076	2.810	5.564	14.105

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 46.393, DF = 4, P-Value = 0.000
Likelihood Ratio Chi-Square = 53.391, DF = 4, P-Value = 0.000

iii) For all chauffeurs

1. Tabulated statistics: y, x1

Rows: y   Columns: x1

	1	2	3	4
involved	95	131	80	35
	90.99	133.84	84.81	31.36
	0.1765	0.0602	0.2726	0.4222
neutral	11	29	17	3
	16.01	23.55	14.92	5.52
	1.5680	1.2617	0.2893	1.1491
not involved	100	143	95	33
	99.00	145.61	92.27	34.12
	0.0102	0.0469	0.0808	0.0368

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 5.374, DF = 6, P-Value = 0.497
Likelihood Ratio Chi-Square = 5.688, DF = 6, P-Value = 0.459

2. Tabulated statistics: y, x3

Rows: y   Columns: x3

	Arabic	bangali	Filipino	Indian	other	Pakistani
involved	74	31	17	80	43	105
	76.35	32.40	13.76	87.00	37.29	102.99
	0.07241	0.06091	0.76239	0.56397	0.87506	0.03941
neutral	16	6	2	16	3	21
	13.63	5.79	2.46	15.54	6.66	18.39
	0.41053	0.00787	0.08511	0.01382	2.01018	0.37035
not involved	82	36	12	100	38	106
	82.01	34.81	14.78	93.46	40.05	110.62
	0.00000	0.04078	0.52348	0.45786	0.10530	0.19331

	saudi
involved	14
	14.20
	0.00295
neutral	1
	2.54
	0.93082
not involved	17
	15.26
	0.19875

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 7.725, DF = 12, P-Value = 0.806
Likelihood Ratio Chi-Square = 8.442, DF = 12, P-Value = 0.750

3. Tabulated statistics: y, x3-1

Rows: y Columns: x3-1

	Arabic	other	saudi
involved	74	276	14
	76.35	273.44	14.20
	0.07241	0.02389	0.00295
neutral	16	48	1
	13.63	48.83	2.54
	0.41053	0.01408	0.93082
not involved	82	292	17
	82.01	293.73	15.26
	0.00000	0.01015	0.19875

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 1.664, DF = 4, P-Value = 0.797
Likelihood Ratio Chi-Square = 1.916, DF = 4, P-Value = 0.751

4. Tabulated statistics: y, x3-2

Rows: y Columns: x3-2

	other	saudi
involved	350	14
	349.80	14.20
	0.00012	0.00295
neutral	64	1
	62.46	2.54
	0.03780	0.93082
not involved	374	17
	375.74	15.26
	0.00807	0.19875

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 1.179, DF = 2, P-Value = 0.555
Likelihood Ratio Chi-Square = 1.452, DF = 2, P-Value = 0.484

* NOTE * 1 cells with expected counts less than 5

Tabulated statistics: y, x4

```
Rows: y   Columns: x4

                      0        1

involved            348       16
                 351.13    12.87
                0.02784  0.75949

neutral              65        0
                  62.70     2.30
                0.08428  2.29878

not involved        378       13
                 377.17    13.83
                0.00182  0.04959

Cell Contents:       Count
                     Expected count
                     Contribution to Chi-square


Pearson Chi-Square = 3.222, DF = 2, P-Value = 0.200
Likelihood Ratio Chi-Square = 5.466, DF = 2, P-Value = 0.065
```

5. Tabulated statistics: y, x5

```
Rows: y   Columns: x5

                     0       1       2

involved           280      69      13
                274.73   73.02   14.25
                0.1012  0.2217  0.1094

neutral             45      13       5
                 47.81   12.71    2.48
                0.1654  0.0067  2.5616

not involved       292      82      14
                294.46   78.27   15.27
                0.0206  0.1779  0.1059

Cell Contents:       Count
                     Expected count
                     Contribution to Chi-square


Pearson Chi-Square = 3.470, DF = 4, P-Value = 0.482
Likelihood Ratio Chi-Square = 2.892, DF = 4, P-Value = 0.576
```

6. Tabulated statistics: y, x6

Rows: y   Columns: x6

	0	1	2	3	4
involved	183	45	23	35	73
	211.57	40.98	17.37	30.73	58.35
	3.8579	0.3948	1.8241	0.5924	3.6790
neutral	38	3	4	5	14
	37.72	7.31	3.10	5.48	10.40
	0.0021	2.5372	0.2634	0.0419	1.2445
not involved	254	44	12	29	44
	225.71	43.72	18.53	32.79	62.25
	3.5449	0.0018	2.3025	0.4376	5.3501

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 26.074, DF = 8, P-Value = 0.001
Likelihood Ratio Chi-Square = 27.194, DF = 8, P-Value = 0.001

7. Tabulated statistics: y, x7

Rows: y   Columns: x7

	0	1	2	3
involved	31	47	75	175
	37.73	37.28	68.35	184.64
	1.1994	2.5326	0.6466	0.5032
neutral	6	5	8	36
	6.33	6.25	11.46	30.96
	0.0168	0.2506	1.0454	0.8202
not involved	48	32	71	205
	40.95	40.47	74.19	200.40
	1.2148	1.7710	0.1369	0.1056

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 10.243, DF = 6, P-Value = 0.115
Likelihood Ratio Chi-Square = 10.293, DF = 6, P-Value = 0.113

8. Tabulated statistics: y, x8

Rows: y   Columns: x8

	0	1	2	3
involved	35	87	74	136
	31.91	74.02	70.92	155.14
	0.2983	2.2746	0.1337	2.3614
neutral	5	12	8	29
	5.19	12.04	11.54	25.23
	0.0070	0.0001	1.0835	0.5622
not involved	32	68	78	185
	34.89	80.94	77.54	169.63
	0.2401	2.0675	0.0027	1.3934

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 10.425, DF = 6, P-Value = 0.108
Likelihood Ratio Chi-Square = 10.587, DF = 6, P-Value = 0.102

9. Tabulated statistics: y, x9

Rows: y   Columns: x9

	0	1
involved	128	196
	130.0	194.0
	0.0294	0.0197
neutral	16	35
	20.5	30.5
	0.9705	0.6500
not involved	150	208
	143.6	214.4
	0.2861	0.1916

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 2.147, DF = 2, P-Value = 0.342
Likelihood Ratio Chi-Square = 2.195, DF = 2, P-Value = 0.334

10. Tabulated statistics: y, x10

Rows: y   Columns: x10

	0	1	2
involved	170	88	20
	168.83	91.49	17.68
	0.00807	0.13299	0.30475
neutral	25	14	4
	26.11	14.15	2.73
	0.04756	0.00161	0.58566
not involved	187	105	16
	187.05	101.36	19.59
	0.00001	0.13065	0.65678

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 1.868, DF = 4, P-Value = 0.760
Likelihood Ratio Chi-Square = 1.827, DF = 4, P-Value = 0.768

11. Tabulated statistics: y, x11

Rows: y   Columns: x11

	0	1	2	3
involved	164	62	15	22
	176.65	54.63	13.66	18.06
	0.9066	0.9953	0.1321	0.8586
neutral	34	4	4	4
	30.90	9.55	2.39	3.16
	0.3115	3.2291	1.0871	0.2238
not involved	203	58	12	15
	193.45	59.82	14.95	19.78
	0.4717	0.0553	0.5838	1.1547

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 10.010, DF = 6, P-Value = 0.124
Likelihood Ratio Chi-Square = 10.773, DF = 6, P-Value = 0.096

12. Tabulated statistics: y, x12

Rows: y   Columns: x12

	0	1	2	3	4	5
involved	86	85	47	38	18	27
	81.65	86.95	50.31	40.16	19.86	22.07
	0.2318	0.0435	0.2183	0.1165	0.1743	1.1025
neutral	10	12	12	5	4	5
	13.02	13.87	8.02	6.40	3.17	3.52
	0.7007	0.2509	1.9708	0.3081	0.2190	0.6232
not involved	89	100	55	48	23	18
	90.33	96.19	55.66	44.43	21.97	24.41
	0.0196	0.1510	0.0079	0.2864	0.0481	1.6848

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 8.157, DF = 10, P-Value = 0.613
Likelihood Ratio Chi-Square = 8.000, DF = 10, P-Value = 0.629

13. Tabulated statistics: y, x13

Rows: y   Columns: x13

	0	1	2	3	4
involved	30	73	126	73	6
	29.29	83.88	120.71	65.68	8.43
	0.0172	1.4110	0.2314	0.8151	0.7016
neutral	8	15	14	10	2
	4.66	13.34	19.20	10.45	1.34
	2.3940	0.2054	1.4105	0.0193	0.3232
not involved	28	101	132	65	11
	32.05	91.78	132.08	71.87	9.23
	0.5115	0.9269	0.0000	0.6562	0.3410

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 9.965, DF = 8, P-Value = 0.268
Likelihood Ratio Chi-Square = 9.743, DF = 8, P-Value = 0.284

14. Tabulated statistics: y, x14

```
Rows: y   Columns: x14

                    0       1       2

involved          205      58      67
               222.22   56.77   51.01
               1.3341  0.0265  5.0138

neutral            44       8       3
                37.04    9.46    8.50
               1.3093  0.2260  3.5600

not involved      252      62      45
               241.75   61.76   55.49
               0.4349  0.0009  1.9833

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 13.889, DF = 4, P-Value = 0.008
Likelihood Ratio Chi-Square = 14.733, DF = 4, P-Value = 0.005
```

15. Tabulated statistics: y, x15

```
Rows: y   Columns: x15

                    0       1       2

involved          195      60      82
               212.42   57.36   67.22
               1.4282  0.1213  3.2494

neutral            37      12       5
                34.04    9.19   10.77
               0.2579  0.8582  3.0923

not involved      242      56      63
               227.55   61.45   72.01
               0.9182  0.4828  1.1269

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 11.535, DF = 4, P-Value = 0.021
Likelihood Ratio Chi-Square = 12.098, DF = 4, P-Value = 0.017
```

16. Tabulated statistics: y, x16

Rows: y   Columns: x16

	0	1	2
involved	218	19	38
	217.82	20.42	36.76
	0.00015	0.09885	0.04200
neutral	29	4	8
	32.48	3.04	5.48
	0.37189	0.29984	1.15861
not involved	233	22	35
	229.70	21.53	38.76
	0.04732	0.01006	0.36519

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 2.394, DF = 4, P-Value = 0.664
Likelihood Ratio Chi-Square = 2.249, DF = 4, P-Value = 0.690

17. Tabulated statistics: y, x17

Rows: y   Columns: x17

	0	1	2	3
involved	68	62	160	42
	79.32	71.30	146.17	35.21
	1.616	1.214	1.309	1.311
neutral	14	9	25	4
	12.42	11.17	22.89	5.51
	0.200	0.421	0.194	0.416
not involved	96	89	143	33
	86.25	77.53	158.94	38.28
	1.102	1.697	1.598	0.728

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 11.805, DF = 6, P-Value = 0.066
Likelihood Ratio Chi-Square = 11.864, DF = 6, P-Value = 0.065

18. Tabulated statistics: y, x18

```
Rows: y   Columns: x18

                      0       1

involved            312      20
                 313.02   18.98
                 0.0033  0.0544

neutral              48       7
                  51.86    3.14
                 0.2866  4.7255

not involved        349      16
                 344.13   20.87
                 0.0689  1.1368

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 6.276, DF = 2, P-Value = 0.043
Likelihood Ratio Chi-Square = 5.148, DF = 2, P-Value = 0.076
```

19. Tabulated statistics: y, x19

```
Rows: y   Columns: x19

                       0        1

involved             294       39
                  297.83    35.17
                 0.04926  0.41713

neutral               48        7
                   49.19     5.81
                 0.02884  0.24427

not involved         327       33
                  321.98    38.02
                 0.07831  0.66316

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 1.481, DF = 2, P-Value = 0.477
Likelihood Ratio Chi-Square = 1.483, DF = 2, P-Value = 0.476
```

20. Tabulated statistics: y, x20

```
Rows: y   Columns: x20

                       0        1

involved             328        6
                  328.23     5.77
                 0.00017  0.00947

neutral               52        2
                   53.07     0.93
                 0.02148  1.22287

not involved         360        5
                  358.70     6.30
                 0.00472  0.26879

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 1.528, DF = 2
Likelihood Ratio Chi-Square = 1.243, DF = 2
```

21. Tabulated statistics: x3-2, x1

```
Rows: x3-2   Columns: x1

                1        2        3        4

other         196      292      188       67
           198.26   291.62   184.79    68.33
          0.02580  0.00050  0.05585  0.02600

saudi          10       11        4        4
             7.74    11.38     7.21     2.67
          0.66101  0.01283  1.43083  0.66613

Cell Contents:      Count
                    Expected count
                    Contribution to Chi-square


Pearson Chi-Square = 2.879, DF = 3, P-Value = 0.411
Likelihood Ratio Chi-Square = 3.011, DF = 3, P-Value = 0.390
```

22. Tabulated statistics: x3-2, x5

Rows: x3-2   Columns: x5

	0	1	2
other	598	156	27
	592.71	157.54	30.74
	0.0471	0.0151	0.4551
saudi	19	8	5
	24.29	6.46	1.26
	1.1503	0.3697	11.1082

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 13.146, DF = 2, P-Value = 0.001
Likelihood Ratio Chi-Square = 8.431, DF = 2, P-Value = 0.015

23. Tabulated statistics: x3-2, x7

Rows: x3-2   Columns: x7

	0	1	2	3
other	79	83	150	410
	83.04	82.07	150.46	406.43
	0.1970	0.0106	0.0014	0.0314
saudi	6	1	4	6
	1.96	1.93	3.54	9.57
	8.3664	0.4498	0.0590	1.3316

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 10.447, DF = 3, P-Value = 0.015
Likelihood Ratio Chi-Square = 7.750, DF = 3, P-Value = 0.051

24. Tabulated statistics: x3-2, x7

Rows: x3-2   Columns: x7

	0	1	2	3
other	79	83	150	410
	83.04	82.07	150.46	406.43
	0.1970	0.0106	0.0014	0.0314
saudi	6	1	4	6
	1.96	1.93	3.54	9.57
	8.3664	0.4498	0.0590	1.3316

Cell Contents: Count
                    Expected count
                    Contribution to Chi-square

Pearson Chi-Square = 10.447, DF = 3, P-Value = 0.015
Likelihood Ratio Chi-Square = 7.750, DF = 3, P-Value = 0.051

Tabulated statistics: x3-2, x8

Rows: x3-2   Columns: x8

	0	1	2	3
other	71	165	155	333
	69.60	161.43	154.66	338.32
	0.02829	0.07913	0.00075	0.08359
saudi	1	2	5	17
	2.40	5.57	5.34	11.68
	0.81932	2.29170	0.02170	2.42064

Cell Contents: Count
                    Expected count
                    Contribution to Chi-square

Pearson Chi-Square = 5.745, DF = 3, P-Value = 0.125
Likelihood Ratio Chi-Square = 6.434, DF = 3, P-Value = 0.092

25. Tabulated statistics: x3-2, x10

Rows: x3-2   Columns: x10

	0	1	2
other	363	201	39
	366.21	198.44	38.35
	0.02813	0.03293	0.01113
saudi	19	6	1
	15.79	8.56	1.65
	0.65251	0.76380	0.25823

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 1.747, DF = 2, P-Value = 0.418
Likelihood Ratio Chi-Square = 1.839, DF = 2, P-Value = 0.399

26. Tabulated statistics: x3-2, x11

Rows: x3-2   Columns: x11

	0	1	2	3
other	393	112	31	40
	386.89	119.64	29.91	39.56
	0.0964	0.4877	0.0398	0.0049
saudi	8	12	0	1
	14.11	4.36	1.09	1.44
	2.6428	13.3756	1.0905	0.1356

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 17.873, DF = 3, P-Value = 0.000
Likelihood Ratio Chi-Square = 15.121, DF = 3, P-Value = 0.002

27. Tabulated statistics: x3-2, x12

Rows: x3-2 Columns: x12

	0	1	2	3	4	5
other	177	187	113	89	44	49
	178.76	190.36	110.16	87.93	43.48	48.31
	0.01735	0.05918	0.07346	0.01299	0.00616	0.00975
saudi	8	10	1	2	1	1
	6.24	6.64	3.84	3.07	1.52	1.69
	0.49705	1.69556	2.10468	0.37231	0.17653	0.27926

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 5.304, DF = 5, P-Value = 0.380
Likelihood Ratio Chi-Square = 6.050, DF = 5, P-Value = 0.301

28. Tabulated statistics: x3-2, x13

Rows: x3-2 Columns: x13

	0	1	2	3	4
other	62	178	267	144	18
	63.62	182.19	262.20	142.67	18.32
	0.0414	0.0964	0.0878	0.0124	0.0054
saudi	4	11	5	4	1
	2.38	6.81	9.80	5.33	0.68
	1.1072	2.5806	2.3497	0.3325	0.1455

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 6.759, DF = 4
Likelihood Ratio Chi-Square = 6.692, DF = 4

29. Tabulated statistics: x3-2, x14

Rows: x3-2   Columns: x14

	0	1	2
other	473	128	115
	482.15	123.18	110.67
	0.1735	0.1884	0.1692
saudi	28	0	0
	18.85	4.82	4.33
	4.4357	4.8172	4.3280

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 14.112, DF = 2, P-Value = 0.001
Likelihood Ratio Chi-Square = 22.672, DF = 2, P-Value = 0.000

30. Tabulated statistics: x3-2, x15

Rows: x3-2   Columns: x15

	0	1	2
other	460	121	143
	456.35	123.23	144.41
	0.0292	0.0405	0.0139
saudi	14	7	7
	17.65	4.77	5.59
	0.7544	1.0472	0.3584

Cell Contents: Count
Expected count
Contribution to Chi-square

Pearson Chi-Square = 2.244, DF = 2, P-Value = 0.326
Likelihood Ratio Chi-Square = 2.142, DF = 2, P-Value = 0.343

f) The analyses of driving schools

1. Testing equality of the means of scores of drivers before enrollment for driving schools

```
Source         DF      SS    MS     F      P
school          4    62.8  15.7  1.08  0.366
Error         507  7366.2  14.5
Total         511  7429.0

S = 3.812   R-Sq = 0.84%   R-Sq(adj) = 0.06%


                           Individual 95% CIs For Mean Based on
                           Pooled StDev
Level           N    Mean  StDev  ---------+---------+---------+---------+
dammam        100  17.130  3.743    (-----------*------------)
khobar        131  16.939  3.914  (----------*----------)
jubal         113  17.637  3.725             (-----------*-----------)
riyadh         69  17.493  4.259        (--------------*--------------)
jeddah         99  17.859  3.499                (------------*-----------)
                           ---------+---------+---------+---------+
                                16.80     17.40     18.00     18.60

Pooled StDev = 3.812


Grouping Information Using Tukey Method


school          N    Mean  Grouping
jeddah         99  17.859  A
jubal         113  17.637  A
riyadh         69  17.493  A
dammam        100  17.130  A
khobar        131  16.939  A

Means that do not share a letter are significantly different.


Tukey 95% Simultaneous Confidence Intervals
All Pairwise Comparisons among Levels of school

Individual confidence level = 99.34%
```

2. Analyzing mean scores of drivers before enrollment to driving school

Mean of scores vs. nationality

```
Source    DF      SS     MS      F      P
الجنسيه    6  1622.2  270.4  23.51  0.000
Error    505  5806.8   11.5
Total    511  7429.0

S = 3.391   R-Sq = 21.84%   R-Sq(adj) = 20.91%


                           Individual 95% CIs For Mean Based on Pooled StDev
Level    N    Mean  StDev     +---------+---------+---------+---------
 0      61  18.984  3.041                                  (---*---)
 2     120  19.325  3.149                                     (--*--)
 3     111  17.153  4.010                          (--*--)
 4      64  15.125  2.930              (----*---)
 5      22  13.500  2.907     (-------*-------)
 8      43  19.023  2.739                                 (----*----)
13      91  15.780  3.756                  (---*--)
                              +---------+---------+---------+---------
                           12.0      14.0      16.0      18.0

Pooled StDev = 3.391


Grouping Information Using Tukey Method

الجنسيه     N    Mean  Grouping
 2       120  19.325  A
 8        43  19.023  A
 0        61  18.984  A
 3       111  17.153    B
13        91  15.780      C
 4        64  15.125      C D
 5        22  13.500        D

Means that do not share a letter are significantly different.


Tukey 90% Simultaneous Confidence Intervals
All Pairwise Comparisons among Levels of الجنسيه

Individual confidence level = 99.27%


الجنسيه =  0 subtracted from:

الجنسيه   Lower  Center   Upper     +---------+---------+---------+---------
 2       -1.095   0.341   1.778                     (---*--)
 3       -3.286  -1.830  -0.374                (--*---)
 4       -5.493  -3.859  -2.224          (---*---)
 5       -7.756  -5.484  -3.212     (----*-----)
 8       -1.779   0.040   1.859                    (---*----)
13       -4.715  -3.203  -1.692            (---*---)
                                    +---------+---------+---------+---------
                                 -8.0      -4.0       0.0       4.0
```

```
الجنسيه =  2 subtracted from:

الجنسيه   Lower  Center   Upper     +---------+---------+---------+---------
 3       -3.375  -2.172  -0.969                (--*--)
 4       -5.614  -4.200  -2.786          (---*--)
 5       -7.944  -5.825  -3.706     (----*-----)
 8       -1.925  -0.302   1.322                   (---*---)
13       -4.815  -3.545  -2.275            (--*--)
                                    +---------+---------+---------+---------
                                 -8.0      -4.0       0.0       4.0


الجنسيه =  3 subtracted from:

الجنسيه   Lower  Center   Upper     +---------+---------+---------+---------
 4       -3.462  -2.028  -0.594               (---*---)
 5       -5.785  -3.653  -1.521          (----*----)
 8        0.229   1.870   3.511                        (---*---)
13       -2.665  -1.373  -0.081                 (---*--)
                                    +---------+---------+---------+---------
                                 -8.0      -4.0       0.0       4.0


الجنسيه =  4 subtracted from:

الجنسيه   Lower  Center  Upper     +---------+---------+---------+---------
 5       -3.883  -1.625  0.633              (-----*-----)
 8        2.097   3.898  5.700                             (----*---)
13       -0.835   0.655  2.146                      (---*--)
                                   +---------+---------+---------+---------
                                -8.0      -4.0       0.0       4.0


الجنسيه =  5 subtracted from:

الجنسيه  Lower  Center  Upper     +---------+---------+---------+---------
 8       3.129   5.523  7.918                                (-----*-----)
13       0.110   2.280  4.451                        (-----*----)
                                  +---------+---------+---------+---------
                               -8.0      -4.0       0.0       4.0


الجنسيه =  8 subtracted from:

الجنسيه   Lower  Center   Upper     +---------+---------+---------+---------
13       -4.934  -3.243  -1.552            (---*---)
                                    +---------+---------+---------+---------
                                 -8.0      -4.0       0.0       4.0
```

Mean of scores vs. Native language

```
Source   DF      SS     MS      F      P
اللغه      8  1352.2  169.0  15.88  0.000
Error   454  4833.5   10.6
Total   462  6185.8

S = 3.263   R-Sq = 21.86%   R-Sq(adj) = 20.48%


                           Individual 95% CIs For Mean Based on
                           Pooled StDev
Level    N    Mean  StDev  ---------+---------+---------+---------+
 0     185  19.151  3.138                                 (--*-)
 1      10  17.200  3.765                (---------*---------)
 2      55  16.655  4.111                   (---*----)
 3      75  15.493  2.906              (--*---)
 4      22  13.500  2.907  (------*-----)
 5      16  15.875  3.704            (-------*-------)
 6      48  18.125  3.330                          (----*---)
 8      42  19.000  2.767                              (----*----)
11      10  16.500  3.923             (----------*---------)
                           ---------+---------+---------+---------+
                                 14.0      16.0      18.0      20.0

Pooled StDev = 3.263


Grouping Information Using Tukey Method

اللغه    N    Mean  Grouping
 0     185  19.151  A
 8      42  19.000  A
 6      48  18.125  A B
 1      10  17.200  A B C
 2      55  16.655    B C
11      10  16.500  A B C D
 5      16  15.875    B C D
 3      75  15.493      C D
 4      22  13.500        D

Means that do not share a letter are significantly different.


Tukey 90% Simultaneous Confidence Intervals
All Pairwise Comparisons among Levels of اللغه

Individual confidence level = 99.55%


اللغه =  0 subtracted from:

اللغه   Lower  Center   Upper     +---------+---------+---------+---------
 1     -4.978  -1.951   1.075             (------*-------)
 2     -3.928  -2.497  -1.065               (---*--)
 3     -4.934  -3.658  -2.382             (--*--)
 4     -7.753  -5.651  -3.549      (----*----)
 5     -5.705  -3.276  -0.847           (-----*-----)
 6     -2.536  -1.026   0.484                   (--*---)
 8     -1.745  -0.151   1.442                     (---*---)
11     -5.678  -2.651   0.375           (------*-------)
                                  +---------+---------+---------+---------
                               -8.0      -4.0       0.0       4.0
```

```
اللغه =  1 subtracted from:

اللغه   Lower  Center   Upper     +---------+---------+---------+---------
 2     -3.750  -0.545   2.659               (-------*-------)
 3     -4.845  -1.707   1.431            (-------*-------)
 4     -7.255  -3.700  -0.145      (--------*--------)
 5     -5.082  -1.325   2.432           (---------*--------)
 6     -2.315   0.925   4.165                  (-------*-------)
 8     -1.480   1.800   5.080                    (--------*-------)
11     -4.869  -0.700   3.469            (---------*----------)
                                  +---------+---------+---------+---------
                               -8.0      -4.0       0.0       4.0

اللغه =  2 subtracted from:

اللغه   Lower  Center   Upper     +---------+---------+---------+---------
 3     -2.816  -1.161   0.494                 (---*---)
 4     -5.506  -3.155  -0.803          (-----*-----)
 5     -3.427  -0.780   1.868               (------*------)
 6     -0.371   1.470   3.312                       (----*---)
 8      0.435   2.345   4.256                         (----*----)
11     -3.359  -0.155   3.050                (-------*-------)
                                  +---------+---------+---------+---------
                               -8.0      -4.0       0.0       4.0

اللغه =  3 subtracted from:

اللغه   Lower  Center  Upper     +---------+---------+---------+---------
 4     -4.253  -1.993  0.267              (-----*-----)
 5     -2.185   0.382  2.949                    (-----*-----)
 6      0.909   2.632  4.355                           (----*---)
 8      1.710   3.507  5.303                             (----*---)
11     -2.131   1.007  4.145                    (-------*------)
                                 +---------+---------+---------+---------
                              -8.0      -4.0       0.0       4.0

اللغه =  4 subtracted from:

اللغه   Lower  Center  Upper     +---------+---------+---------+---------
 5     -0.688   2.375  5.438                       (-------*-------)
 6      2.225   4.625  7.025                               (-----*-----)
 8      3.047   5.500  7.953                                 (-----*-----)
11     -0.555   3.000  6.555                        (-------*--------)
                                 +---------+---------+---------+---------
                              -8.0      -4.0       0.0       4.0

اللغه =  5 subtracted from:

اللغه   Lower  Center  Upper     +---------+---------+---------+---------
 6     -0.441   2.250  4.941                        (------*-----)
 8      0.387   3.125  5.863                          (------*------)
11     -3.132   0.625  4.382                 (---------*--------)
                                 +---------+---------+---------+---------
                              -8.0      -4.0       0.0       4.0
```

```
اللغه =  6 subtracted from:

اللغه   Lower  Center  Upper     +---------+---------+---------+---------
 8     -1.094   0.875  2.844                      (----*----)
11     -4.865  -1.625  1.615             (-------*-------)
                                 +---------+---------+---------+---------
                              -8.0      -4.0       0.0       4.0


اللغه =  8 subtracted from:

اللغه   Lower  Center  Upper     +---------+---------+---------+---------
11     -5.780  -2.500  0.780           (-------*-------)
                                 +---------+---------+---------+---------
                              -8.0      -4.0       0.0       4.0
```

Mean of scores vs. Level of education

```
Source              DF      SS     MS      F      P
المستوى التعليمي     3  1082.4  360.8  28.62  0.000
Error              475  5987.1   12.6
Total              478  7069.5

S = 3.550   R-Sq = 15.31%   R-Sq(adj) = 14.78%


                           Individual 95% CIs For Mean Based on
                           Pooled StDev
Level    N    Mean  StDev  ------+---------+---------+---------+---
0       12  13.000  4.000  (-------*-------)
1      130  15.800  3.915                  (-*--)
2      178  17.455  3.518                         (-*-)
3      159  19.208  3.226                                (-*-)
                           ------+---------+---------+---------+---
                              12.5      15.0      17.5      20.0

Pooled StDev = 3.550


Grouping Information Using Tukey Method

المستوى
التعليمي    N    Mean  Grouping
3         159  19.208  A
2         178  17.455    B
1         130  15.800      C
0          12  13.000        D

Means that do not share a letter are significantly different.


Tukey 90% Simultaneous Confidence Intervals
All Pairwise Comparisons among Levels of المستوى التعليمي

Individual confidence level = 97.76%
```

```
المستوى التعليمي = 0 subtracted from:

المستوى
التعليمي  Lower  Center  Upper   --+---------+---------+---------+-------
1         0.346   2.800  5.254             (------*------)
2         2.029   4.455  6.881                 (------*------)
3         3.773   6.208  8.643                     (------*------)
                                 --+---------+---------+---------+-------
                                 -3.5       0.0       3.5       7.0


المستوى التعليمي = 1 subtracted from:

المستوى
التعليمي  Lower  Center  Upper   --+---------+---------+---------+-------
2         0.717   1.655  2.593              (--*-)
3         2.446   3.408  4.369                  (--*-)
                                 --+---------+---------+---------+-------
                                 -3.5       0.0       3.5       7.0


المستوى التعليمي = 2 subtracted from:

المستوى
التعليمي  Lower  Center  Upper   --+---------+---------+---------+-------
3         0.865   1.752  2.640              (--*--)
                                 --+---------+---------+---------+-------
                                 -3.5       0.0       3.5       7.0
```

Mean of scores vs. age

```
Source   DF      SS    MS     F      P
age       5    53.2  10.6  0.77  0.569
Error   425  5844.7  13.8
Total   430  5897.9

S = 3.708   R-Sq = 0.90%   R-Sq(adj) = 0.00%


                           Individual 95% CIs For Mean Based on
                           Pooled StDev
Level    N    Mean  StDev  -------+---------+---------+---------+--
0       45  18.711  3.520                 (-----*----)
1       17  18.529  3.625             (--------*-------)
2      221  17.724  3.913               (--*-)
3      106  17.594  3.337             (---*---)
4       37  17.622  3.336           (-----*-----)
5        5  17.800  6.140  (---------------*---------------)
                           -------+---------+---------+---------+--
                               16.0      18.0      20.0      22.0

Pooled StDev = 3.708

Grouping Information Using Tukey Method

age    N    Mean  Grouping
0     45  18.711  A
1     17  18.529  A
5      5  17.800  A
2    221  17.724  A
4     37  17.622  A
3    106  17.594  A
```

Means that do not share a letter are significantly different.

Tukey 95% Simultaneous Confidence Intervals
All Pairwise Comparisons among Levels of age

Individual confidence level = 99.54%

age = 0 subtracted from:

```
age   Lower  Center  Upper  ---------+---------+---------+---------+
1    -3.190  -0.182  2.827            (-------*--------)
2    -2.715  -0.987  0.741             (----*----)
3    -2.997  -1.117  0.763            (-----*----)
4    -3.435  -1.089  1.256           (------*------)
5    -5.893  -0.911  4.071    (-------------*--------------)
                            ---------+---------+---------+---------+
                                  -3.5       0.0       3.5       7.0
```

age = 1 subtracted from:

```
age   Lower  Center  Upper  ---------+---------+---------+---------+
2    -3.465  -0.805  1.854           (-------*------)
3    -3.696  -0.935  1.826          (-------*-------)
4    -4.004  -0.908  2.189          (-------*--------)
5    -6.106  -0.729  4.647    (--------------*--------------)
                            ---------+---------+---------+---------+
                                  -3.5       0.0       3.5       7.0
```

age = 2 subtracted from:

```
age   Lower  Center  Upper  ---------+---------+---------+---------+
3    -1.378  -0.130  1.119                 (---*--)
4    -1.979  -0.102  1.775               (-----*----)
5    -4.703   0.076  4.855        (------------*-------------)
                            ---------+---------+---------+---------+
                                  -3.5       0.0       3.5       7.0
```

age = 3 subtracted from:

```
age   Lower  Center  Upper  ---------+---------+---------+---------+
4    -1.991   0.027  2.045               (-----*-----)
5    -4.630   0.206  5.042        (-------------*------------)
                            ---------+---------+---------+---------+
                                  -3.5       0.0       3.5       7.0
```

age = 4 subtracted from:

```
age   Lower  Center  Upper  ---------+---------+---------+---------+
5    -4.857   0.178  5.214       (--------------*-------------)
                            ---------+---------+---------+---------+
                                  -3.5       0.0       3.5       7.0
```

Mean of scores vs. Degree of reading and understanding traffic signs in Arabic

```
Source              DF      SS     MS      F      P
فهم اللغه العربيه    2   496.1  248.1  17.96  0.000
Error              494  6823.7   13.8
Total              496  7319.8

S = 3.717   R-Sq = 6.78%   R-Sq(adj) = 6.40%


                           Individual 95% CIs For Mean Based on
                           Pooled StDev
Level    N    Mean  StDev  ------+---------+---------+---------+---
0      270  18.293  3.447                         (----*---)
1      115  16.522  4.012      (------*------)
2      112  16.089  4.019  (------*------)
                           ------+---------+---------+---------+---
                              16.0      17.0      18.0      19.0

Pooled StDev = 3.717


Grouping Information Using Tukey Method

فهم اللغه
العربيه      N    Mean  Grouping
0          270  18.293  A
1          115  16.522    B
2          112  16.089    B

Means that do not share a letter are significantly different.


Tukey 90% Simultaneous Confidence Intervals
All Pairwise Comparisons among Levels of فهم اللغه العربيه

Individual confidence level = 95.92%


فهم اللغه العربيه = 0 subtracted from:

فهم اللغه
العربيه      Lower  Center   Upper  -----+---------+---------+---------+----
1          -2.620  -1.771  -0.922     (------*------)
2          -3.060  -2.203  -1.347  (------*------)
                                   -----+---------+---------+---------+----
                                      -2.4      -1.2       0.0       1.2


فهم اللغه العربيه = 1 subtracted from:

فهم اللغه
العربيه      Lower  Center  Upper  -----+---------+---------+---------+----
2          -1.444  -0.432  0.579              (-------*--------)
                                  -----+---------+---------+---------+----
                                     -2.4      -1.2       0.0       1.2
```

Mean of scores vs. Degree of reading and understanding traffic signs in English

```
Source                 DF      SS    MS     F      P
فهم اللغه الانجليزيه     2   128.0  64.0  4.41  0.013
Error                 502  7282.5  14.5
Total                 504  7410.6

S = 3.809   R-Sq = 1.73%   R-Sq(adj) = 1.34%


                           Individual 95% CIs For Mean Based on Pooled StDev
Level    N    Mean  StDev     +---------+---------+---------+---------
0      370  17.576  3.772                          (---*---)
1       78  17.564  3.860                     (--------*-------)
2       57  15.982  3.975     (---------*---------)
                              +---------+---------+---------+---------
                           15.0      16.0      17.0      18.0

Pooled StDev = 3.809


Grouping Information Using Tukey Method

اللغه فهم
الانجليزيه     N    Mean  Grouping
0            370  17.576  A
1             78  17.564  A
2             57  15.982    B

Means that do not share a letter are significantly different.


Tukey 90% Simultaneous Confidence Intervals
All Pairwise Comparisons among Levels of فهم اللغه الانجليزيه

Individual confidence level = 95.92%


فهم اللغه الانجليزيه = 0 subtracted from:

اللغه فهم
الانجليزيه   Lower  Center   Upper  +---------+---------+---------+---------
1            -0.985  -0.012   0.962              (------*-----)
2            -2.705  -1.593  -0.482   (------*-------)
                                    +---------+---------+---------+---------
                                    -3.0      -1.5       0.0       1.5


فهم اللغه الانجليزيه = 1 subtracted from:

اللغه فهم
الانجليزيه   Lower  Center   Upper  +---------+---------+---------+---------
2            -2.943  -1.582  -0.221  (--------*---------)
                                    +---------+---------+---------+---------
                                    -3.0      -1.5       0.0       1.5
```

Mean of scores vs. type of driver

```
Source        DF      SS     MS     F      P
نوع السائق     4   514.6  128.6  9.51  0.000
Error        493  6672.3   13.5
Total        497  7186.9

S = 3.679   R-Sq = 7.16%   R-Sq(adj) = 6.41%


                           Individual 95% CIs For Mean Based on
                           Pooled StDev
Level    N    Mean  StDev  -------+---------+---------+---------+--
0       13  16.000  4.123  (-------------*-------------)
1      141  17.021  3.813                  (---*----)
2      133  16.241  3.621             (---*---)
3       11  16.273  6.358   (-------------*--------------)
4      200  18.575  3.399                              (---*--)
                           -------+---------+---------+---------+--
                               15.0      16.5      18.0      19.5

Pooled StDev = 3.679


Grouping Information Using Tukey Method

نوع
السائق    N    Mean  Grouping
4       200  18.575  A
1       141  17.021    B
3        11  16.273  A B
2       133  16.241    B
0        13  16.000  A B

Means that do not share a letter are significantly different.


Tukey 90% Simultaneous Confidence Intervals
All Pairwise Comparisons among Levels of نوع السائق

Individual confidence level = 98.58%


نوع السائق = 0 subtracted from:

نوع
السائق    Lower  Center  Upper  -------+---------+---------+---------+--
1       -1.603   1.021  3.645            (--------*--------)
2       -2.390   0.241  2.871         (---------*--------)
3       -3.436   0.273  3.981      (-----------*-----------)
4       -0.016   2.575  5.166                 (---------*-------)
                                -------+---------+---------+---------+--
                                    -3.0       0.0       3.0       6.0


نوع السائق = 1 subtracted from:

نوع
السائق    Lower  Center  Upper  -------+---------+---------+---------+--
2       -1.875  -0.781  0.314           (--*---)
3       -3.583  -0.749  2.085     (---------*--------)
4        0.558   1.554  2.549                   (--*--)
                                -------+---------+---------+---------+--
                                    -3.0       0.0       3.0       6.0
```

```
نوع السائق = 2 subtracted from:

نوع
السائق   Lower  Center  Upper  -------+---------+---------+---------+--
3       -2.808   0.032  2.872          (--------*---------)
4        1.322   2.334  3.347                      (---*--)
                               -------+---------+---------+---------+--
                                   -3.0       0.0       3.0       6.0

نوع السائق = 3 subtracted from:

نوع
السائق   Lower  Center  Upper  -------+---------+---------+---------+--
4       -0.501   2.302  5.106               (---------*--------)
                               -------+---------+---------+---------+--
                                   -3.0       0.0       3.0       6.0
```

3. Analyzing mean of scores of drivers after graduation from driving school

Mean of scores vs. nationality

```
Source    DF      SS     MS      F      P
الجنسيه    6   904.4  150.7  11.94  0.000
Error    494  6234.1   12.6
Total    500  7138.5

S = 3.552   R-Sq = 12.67%   R-Sq(adj) = 11.61%


                           Individual 95% CIs For Mean Based on
                           Pooled StDev
Level    N    Mean  StDev  -------+---------+---------+---------+--
 0      78  17.859  3.234                         (---*---)
 2     145  19.614  3.065                                   (--*--)
 3      92  18.207  4.018                           (---*---)
 4      58  16.172  3.681                (----*---)
 5      13  14.462  2.904  (---------*---------)
 8      41  17.366  3.625                     (-----*----)
13      74  16.568  4.068                   (---*---)
                           -------+---------+---------+---------+--
                               14.0      16.0      18.0      20.0

Pooled StDev = 3.552


Grouping Information Using Tukey Method

الجنسيه    N    Mean  Grouping
 2       145  19.614  A
 3        92  18.207    B
 0        78  17.859    B C
 8        41  17.366    B C D
13        74  16.568      C D
 4        58  16.172        D
 5        13  14.462        D

Means that do not share a letter are significantly different.


Tukey 90% Simultaneous Confidence Intervals
All Pairwise Comparisons among Levels of الجنسيه

Individual confidence level = 99.27%


الجنسيه =  0 subtracted from:

الجنسيه   Lower  Center   Upper     +---------+---------+---------+---------
 2        0.411   1.755   3.099                         (--*---)
 3       -1.125   0.348   1.821                      (---*---)
 4       -3.346  -1.687  -0.027                 (---*---)
 5       -6.264  -3.397  -0.530         (-------*------)
 8       -2.339  -0.493   1.353                   (----*---)
13       -2.844  -1.291   0.262                  (---*---)
                                    +---------+---------+---------+---------
                                 -8.0      -4.0       0.0       4.0
```

```
الجنسيه =  2 subtracted from:

الجنسيه   Lower  Center   Upper     +---------+---------+---------+---------
 3       -2.683  -1.407  -0.132                 (--*---)
 4       -4.928  -3.441  -1.954            (--*---)
 5       -7.923  -5.152  -2.381     (------*------)
 8       -3.941  -2.248  -0.555              (---*----)
13       -4.413  -3.046  -1.679             (--*---)
                                    +---------+---------+---------+---------
                                 -8.0      -4.0       0.0       4.0


الجنسيه =  3 subtracted from:

الجنسيه   Lower  Center   Upper     +---------+---------+---------+---------
 4       -3.639  -2.034  -0.429               (---*---)
 5       -6.581  -3.745  -0.909         (------*------)
 8       -2.638  -0.841   0.956                 (----*---)
13       -3.133  -1.639  -0.145                (---*---)
                                    +---------+---------+---------+---------
                                 -8.0      -4.0       0.0       4.0


الجنسيه =  4 subtracted from:

الجنسيه   Lower  Center  Upper     +---------+---------+---------+---------
 5       -4.648  -1.711  1.226             (-------*------)
 8       -0.759   1.193  3.146                       (----*----)
13       -1.283   0.395  2.074                      (---*---)
                                   +---------+---------+---------+---------
                                -8.0      -4.0       0.0       4.0


الجنسيه =  5 subtracted from:

الجنسيه   Lower  Center  Upper     +---------+---------+---------+---------
 8       -0.142   2.904  5.951                         (------*-------)
13       -0.772   2.106  4.984                       (------*------)
                                   +---------+---------+---------+---------
                                -8.0      -4.0       0.0       4.0


الجنسيه =  8 subtracted from:

الجنسيه   Lower  Center  Upper     +---------+---------+---------+---------
13       -2.662  -0.798  1.065                 (----*----)
                                   +---------+---------+---------+---------
                                -8.0      -4.0       0.0       4.0
```

Mean of scores vs. Native language

```
Source   DF      SS    MS     F      P
اللغه      8   535.9  67.0  5.04  0.000
Error   449  5970.3  13.3
Total   457  6506.2

S = 3.646   R-Sq = 8.24%   R-Sq(adj) = 6.60%


                           Individual 95% CIs For Mean Based on Pooled StDev
Level    N    Mean  StDev    +---------+---------+---------+---------
 0     228  19.009  3.257                        (-*-)
 1      13  18.077  5.008              (-------*-------)
 2      48  17.854  4.744                 (---*----)
 3      73  16.507  3.738             (--*--)
 4      11  14.727  3.069    (---------*---------)
 5      19  16.842  4.425           (-----*------)
 6      27  17.852  3.047                (----*-----)
 8      33  17.848  3.563                (----*----)
11       6  17.833  4.535          (----------*-----------)
                             +---------+---------+---------+---------
                          12.5      15.0      17.5      20.0

Pooled StDev = 3.646


Grouping Information Using Tukey Method

اللغه     N    Mean  Grouping
 0     228  19.009  A
 1      13  18.077  A B
 2      48  17.854  A B
 6      27  17.852  A B
 8      33  17.848  A B
11       6  17.833  A B
 5      19  16.842  A B
 3      73  16.507    B
 4      11  14.727    B

Means that do not share a letter are significantly different.


Tukey 90% Simultaneous Confidence Intervals
All Pairwise Comparisons among Levels of اللغه

Individual confidence level = 99.55%


اللغه =  0 subtracted from:

اللغه   Lower  Center   Upper  -------+---------+---------+---------+--
 1     -3.902  -0.932   2.039          (-----*-----)
 2     -2.809  -1.155   0.500            (---*--)
 3     -3.903  -2.502  -1.101          (--*--)
 4     -7.497  -4.281  -1.066   (-----*------)
 5     -4.654  -2.167   0.321         (----*----)
 6     -3.277  -1.157   0.963           (----*---)
 8     -3.100  -1.160   0.780            (---*---)
11     -5.484  -1.175   3.133       (--------*-------)
                               -------+---------+---------+---------+--
                                   -5.0       0.0       5.0      10.0
```

```
اللغه =  1 subtracted from:

اللغه   Lower  Center  Upper    -------+---------+---------+---------+--
 2     -3.480  -0.223  3.034              (------*-----)
 3     -4.706  -1.570  1.566            (-----*-----)
 4     -7.617  -3.350  0.918      (-------*--------)
 5     -4.984  -1.235  2.515           (-------*------)
 6     -3.742  -0.225  3.291              (------*------)
 8     -3.640  -0.228  3.183              (------*-----)
11     -5.385  -0.244  4.898          (----------*---------)
                                -------+---------+---------+---------+--
                                     -5.0       0.0       5.0      10.0


اللغه =  2 subtracted from:

اللغه   Lower  Center  Upper    -------+---------+---------+---------+--
 3     -3.283  -1.347  0.588              (---*---)
 4     -6.609  -3.127  0.355        (------*------)
 5     -3.836  -1.012  1.811             (-----*-----)
 6     -2.508  -0.002  2.504                (----*----)
 8     -2.361  -0.006  2.350                (----*----)
11     -4.532  -0.021  4.490            (--------*--------)
                                -------+---------+---------+---------+--
                                     -5.0       0.0       5.0      10.0


اللغه =  3 subtracted from:

اللغه   Lower  Center  Upper    -------+---------+---------+---------+--
 4     -5.149  -1.780  1.590           (-----*------)
 5     -2.348   0.335  3.018                (-----*----)
 6     -1.001   1.345  3.691                   (----*---)
 8     -0.843   1.342  3.527                   (----*---)
11     -3.098   1.326  5.751               (--------*--------)
                                -------+---------+---------+---------+--
                                     -5.0       0.0       5.0      10.0


اللغه =  4 subtracted from:

اللغه   Lower  Center  Upper    -------+---------+---------+---------+--
 5     -1.832   2.115  6.061                 (-------*-------)
 6     -0.602   3.125  6.851                    (------*-------)
 8     -0.506   3.121  6.748                    (------*------)
11     -2.181   3.106  8.393                 (---------*----------)
                                -------+---------+---------+---------+--
                                     -5.0       0.0       5.0      10.0


اللغه =  5 subtracted from:

اللغه   Lower  Center  Upper    -------+---------+---------+---------+--
 6     -2.110   1.010  4.129                 (-----*-----)
 8     -1.994   1.006  4.006                 (-----*-----)
11     -3.887   0.991  5.869             (---------*---------)
                                -------+---------+---------+---------+--
                                     -5.0       0.0       5.0      10.0


اللغه =  6 subtracted from:

اللغه   Lower  Center  Upper    -------+---------+---------+---------+--
 8     -2.707  -0.003  2.700                (----*----)
11     -4.720  -0.019  4.683            (--------*--------)
                                -------+---------+---------+---------+--
                                     -5.0       0.0       5.0      10.0
```

```
اللغه =  8 subtracted from:

اللغه   Lower  Center  Upper  -------+---------+---------+---------+--
11     -4.638  -0.015  4.608          (--------*--------)
                              -------+---------+---------+---------+--
                                   -5.0       0.0       5.0      10.0
```

Mean of scores vs. Level of education

One-way ANOVA: المجموع versus المستوى التعليمي

```
Source             DF      SS     MS      F      P
المستوى التعليمي    3   700.4  233.5  17.95  0.000
Error             467  6072.2   13.0
Total             470  6772.6

S = 3.606   R-Sq = 10.34%   R-Sq(adj) = 9.77%


                           Individual 95% CIs For Mean Based on
                           Pooled StDev
Level    N    Mean  StDev  --------+---------+---------+---------+-
0       11  14.545  4.228  (----------*---------)
1      110  16.309  3.993                 (---*--)
2      176  18.347  3.798                            (--*-)
3      174  19.167  3.072                                (--*--)
                           --------+---------+---------+---------+-
                               14.0      16.0      18.0      20.0

Pooled StDev = 3.606


Grouping Information Using Tukey Method

المستوى
التعليمي    N    Mean  Grouping
3         174  19.167  A
2         176  18.347  A
1         110  16.309    B
0          11  14.545    B

Means that do not share a letter are significantly different.


Tukey 90% Simultaneous Confidence Intervals
All Pairwise Comparisons among Levels of المستوى التعليمي

Individual confidence level = 97.76%
```

```
المستوى التعليمي = 0 subtracted from:

المستوى
التعليمي   Lower  Center  Upper  ---+---------+---------+---------+------
1         -0.849   1.764  4.376            (---------*---------)
2          1.234   3.801  6.369                  (---------*--------)
3          2.053   4.621  7.190                     (--------*---------)
                                 ---+---------+---------+---------+------
                                 -3.0       0.0       3.0       6.0


المستوى التعليمي = 1 subtracted from:

المستوى
التعليمي  Lower  Center  Upper  ---+---------+---------+---------+------
2         1.033   2.038  3.042                (---*--)
3         1.851   2.858  3.864                   (---*--)
                                ---+---------+---------+---------+------
                                -3.0       0.0       3.0       6.0


المستوى التعليمي = 2 subtracted from:

المستوى
التعليمي   Lower  Center  Upper  ---+---------+---------+---------+------
3         -0.063   0.820  1.703              (--*--)
                                 ---+---------+---------+---------+------
                                 -3.0       0.0       3.0       6.0
```

Mean of scores vs. age

```
Source   DF      SS    MS     F      P
age       5    26.0   5.2  0.38  0.862
Error   419  5715.8  13.6
Total   424  5741.8

S = 3.693   R-Sq = 0.45%   R-Sq(adj) = 0.00%


                           Individual 95% CIs For Mean Based on
                           Pooled StDev
Level    N    Mean  StDev  -----+---------+---------+---------+----
0       41  18.512  3.310          (-----------*-----------)
1       25  18.520  4.001       (--------------*---------------)
2      180  18.356  3.551              (-----*----)
3      123  17.854  4.085        (------*-----)
4       38  18.316  3.289       (------------*-----------)
5       18  18.167  3.434  (-----------------*-----------------)
                           -----+---------+---------+---------+----
                             17.0      18.0      19.0      20.0

Pooled StDev = 3.693


Grouping Information Using Tukey Method

age    N    Mean  Grouping
1     25  18.520  A
0     41  18.512  A
2    180  18.356  A
4     38  18.316  A
5     18  18.167  A
3    123  17.854  A
```

```
Means that do not share a letter are significantly different.


Tukey 95% Simultaneous Confidence Intervals
All Pairwise Comparisons among Levels of age

Individual confidence level = 99.54%


age = 0 subtracted from:

age   Lower  Center  Upper  --------+---------+---------+---------+-
1    -2.663   0.008  2.679       (------------*------------)
2    -1.978  -0.157  1.665          (--------*--------)
3    -2.557  -0.659  1.239       (---------*--------)
4    -2.566  -0.196  2.174       (-----------*-----------)
5    -3.321  -0.346  2.630   (--------------*--------------)
                            --------+---------+---------+---------+-
                                 -2.0       0.0       2.0       4.0


age = 1 subtracted from:

age   Lower  Center  Upper  --------+---------+---------+---------+-
2    -2.411  -0.164  2.082        (----------*----------)
3    -2.975  -0.666  1.643     (-----------*----------)
4    -2.915  -0.204  2.506     (-------------*-------------)
5    -3.607  -0.353  2.900  (---------------*----------------)
                            --------+---------+---------+---------+-
                                 -2.0       0.0       2.0       4.0


age = 2 subtracted from:

age   Lower  Center  Upper  --------+---------+---------+---------+-
3    -1.733  -0.502  0.729           (-----*------)
4    -1.919  -0.040  1.839          (---------*--------)
5    -2.791  -0.189  2.413      (------------*------------)
                            --------+---------+---------+---------+-
                                 -2.0       0.0       2.0       4.0


age = 3 subtracted from:

age   Lower  Center  Upper  --------+---------+---------+---------+-
4    -1.491   0.462  2.416             (--------*---------)
5    -2.343   0.313  2.969        (-------------*------------)
                            --------+---------+---------+---------+-
                                 -2.0       0.0       2.0       4.0


age = 4 subtracted from:

age   Lower  Center  Upper  --------+---------+---------+---------+-
5    -3.161  -0.149  2.862    (--------------*--------------)
                            --------+---------+---------+---------+-
                                 -2.0       0.0       2.0       4.0
```

Mean of scores vs. Degree of reading and understanding traffic signs in Arabic

```
Source              DF      SS     MS      F      P
فهم اللغه العربيه    2   365.4  182.7  13.67  0.000
Error              492  6574.2   13.4
Total              494  6939.6

S = 3.655   R-Sq = 5.27%   R-Sq(adj) = 4.88%


                           Individual 95% CIs For Mean Based on
                           Pooled StDev
Level    N    Mean  StDev   --+---------+---------+---------+-------
0      326  18.589  3.376                               (----*----)
1       97  16.866  4.135       (--------*--------)
2       72  16.667  4.159   (---------*----------)
                            --+---------+---------+---------+-------
                           16.00     16.80     17.60     18.40

Pooled StDev = 3.655


Grouping Information Using Tukey Method

فهم اللغه
العربيه      N    Mean  Grouping
0          326  18.589  A
1           97  16.866    B
2           72  16.667    B

Means that do not share a letter are significantly different.


Tukey 90% Simultaneous Confidence Intervals
All Pairwise Comparisons among Levels of فهم اللغه العربيه

Individual confidence level = 95.92%


فهم اللغه العربيه = 0 subtracted from:

فهم اللغه
العربيه      Lower  Center   Upper  ----+---------+---------+---------+-----
1          -2.590  -1.723  -0.856    (-------*------)
2          -2.898  -1.922  -0.946  (-------*-------)
                                    ----+---------+---------+---------+-----
                                     -2.4      -1.2       0.0       1.2


فهم اللغه العربيه = 1 subtracted from:

فهم اللغه
العربيه      Lower  Center  Upper  ----+---------+---------+---------+-----
2          -1.365  -0.199  0.967              (--------*---------)
                                   ----+---------+---------+---------+-----
                                    -2.4      -1.2       0.0       1.2
```

Mean of scores vs. Degree of reading and understanding traffic signs in English

```
Source                  DF      SS    MS     F      P
فهم اللغه الانجليزيه     2   111.1  55.6  3.98  0.019
Error                  493  6887.9  14.0
Total                  495  6999.1

S = 3.738   R-Sq = 1.59%   R-Sq(adj) = 1.19%


                           Individual 95% CIs For Mean Based on
                           Pooled StDev
Level    N    Mean  StDev  ----+---------+---------+---------+-----
0      404  18.163  3.721                            (----*----)
1       59  16.932  3.704      (-----------*-----------)
2       33  16.970  4.004  (---------------*---------------)
                           ----+---------+---------+---------+-----
                            16.00     16.80     17.60     18.40

Pooled StDev = 3.738


Grouping Information Using Tukey Method

فهم اللغه
الانجليزيه    N    Mean  Grouping
0           404  18.163  A
2            33  16.970  A B
1            59  16.932    B

Means that do not share a letter are significantly different.


Tukey 90% Simultaneous Confidence Intervals
All Pairwise Comparisons among Levels of فهم اللغه الانجليزيه

Individual confidence level = 95.92%


فهم اللغه الانجليزيه = 0 subtracted from:

فهم اللغه
الانجليزيه   Lower  Center   Upper   --+---------+---------+---------+-------
1           -2.299  -1.231  -0.163      (--------*--------)
2           -2.581  -1.194   0.194   (-----------*-----------)
                                      --+---------+---------+---------+------
-
                                    -2.4      -1.2       0.0       1.2


فهم اللغه الانجليزيه = 1 subtracted from:

فهم اللغه
الانجليزيه   Lower  Center  Upper   --+---------+---------+---------+-------
2           -1.629   0.037  1.704          (-------------*-------------)
                                     --+---------+---------+---------+-------
                                   -2.4      -1.2       0.0       1.2
```

Mean of scores vs. type of driver

```
Source       DF      SS    MS     F      P
السائق نوع     4   349.0  87.2  6.49  0.000
Error       478  6429.9  13.5
Total       482  6778.9

S = 3.668   R-Sq = 5.15%   R-Sq(adj) = 4.35%


                           Individual 95% CIs For Mean Based on Pooled StDev
Level    N    Mean  StDev     +---------+---------+---------+---------
0       14  15.857  3.255               (---------*---------)
1      113  17.558  3.598                             (---*--)
2      126  17.127  3.921                           (---*--)
3        9  14.444  3.909     (-----------*-----------)
4      221  18.570  3.566                                   (--*-)
                              +---------+---------+---------+---------
                           12.0      14.0      16.0      18.0

Pooled StDev = 3.668


Grouping Information Using Tukey Method

نوع
السائق    N    Mean  Grouping
4       221  18.570  A
1       113  17.558  A B
2       126  17.127    B
0        14  15.857    B
3         9  14.444    B

Means that do not share a letter are significantly different.


Tukey 90% Simultaneous Confidence Intervals
All Pairwise Comparisons among Levels of السائق نوع

Individual confidence level = 98.58%


السائق نوع = 0 subtracted from:

نوع
السائق   Lower  Center  Upper  --------+---------+---------+---------+-
1       -0.857   1.700  4.258                (-----*------)
2       -1.273   1.270  3.812               (-----*------)
3       -5.269  -1.413  2.443      (--------*---------)
4        0.226   2.713  5.200                   (-----*-----)
                               --------+---------+---------+---------+-
                                    -4.0       0.0       4.0       8.0


السائق نوع = 1 subtracted from:

نوع
السائق   Lower  Center  Upper  --------+---------+---------+---------+-
2       -1.600  -0.431  0.739              (--*--)
3       -6.239  -3.113  0.013   (-------*-------)
4       -0.031   1.013  2.056                  (--*-)
                               --------+---------+---------+---------+-
                                    -4.0       0.0       4.0       8.0
```

```
نوع السائق = 2 subtracted from:

نوع
السائق    Lower  Center  Upper  ---------+---------+---------+---------+-
3        -5.797  -2.683  0.431      (------*-------)
4         0.436   1.443  2.451                      (--*-)
                                ---------+---------+---------+---------+-
                                      -4.0       0.0       4.0       8.0


نوع السائق = 3 subtracted from:

نوع
السائق   Lower  Center  Upper  ---------+---------+---------+---------+-
4        1.057   4.126  7.195                         (------*-------)
                               ---------+---------+---------+---------+-
                                     -4.0       0.0       4.0       8.0
```

Vitae

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