

Drivers' Perceptions of Unsafe Driving Behaviors and Their Countermeasures: A Study in Saudi Arabia

Tanweer Hasan^{a*}, Ishtiaque Ahmed^b, Hamid O. Al-Bar^c

^aDepartment of Civil Engineering, Bangladesh University of Engineering and Technology (BUET), Dhaka 1000, Bangladesh

^bFaculty of Civil Engineering, Universiti Teknologi Malaysia, 81310 UTM Johor Bahru, Johor, Malaysia

^cDepartment of Civil Engineering, King Abdulaziz University, Kingdom of Saudi Arabia

*Corresponding author: ishtiaque@utm.my

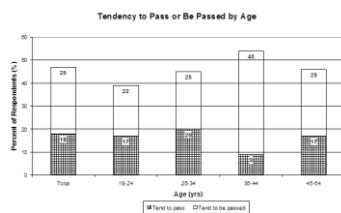
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Graphical abstract



Abstract

There is an increased public concern about the role of aggressive driving and "road rage" in crashes and traffic fatalities. There is no general agreement as to what constitutes aggressive driving. Consequently, the objective of the study was to survey of the perceptions on the specific unsafe driving acts. Perceptions and beliefs of drivers about unsafe and aggressive driving actions and their countermeasures are presented in this paper. The study primarily looked at the wide range of driver attitudes about speeding and other forms of unsafe driving behavior. The study was conducted in Jeddah, the second largest city of Saudi Arabia by interviewing a sample of 300 drivers. The results indicated that the drivers, in general, prefer to drive at higher speeds and could be considered as more aggressive compared to the drivers in the United States. The most dangerous reported driving act was "drive thru red light", followed by "racing another driver". Only 23% of the drivers thought that it was dangerous to drive over 30 km of the legal speed limits. The most often seen unsafe driving action was "speeding (70%)", followed by "driving too closely (57%)", "failing to use turn signals (53%)", "drive inattentively (50%)", and "running red lights (43%)". The main causes of unsafe driving behaviors were "being in a hurry/time pressure (66%)", "aggressive behavior of others (52%)", and "refusing traffic rules (51%)". The countermeasure that was viewed to be the most effective in reducing unsafe driving behaviors was assigning more traffic police officers (66%). The study revealed that, more than half the drivers believed that more frequent ticketing (60%), doubling or tripling fines (54%), and doubling the length of imprisonment (53%) would be effective in reducing unsafe driving behaviors.

Keywords: Unsafe driver behavior; driver fatigue; fatigue countermeasures; truck driver behaviors, driver perceptions

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1.0 INTRODUCTION

The Kingdom of Saudi Arabia, in common with many countries throughout the Middle East, has a serious road accident problem. Compared with other countries in the region, road accident fatality rates and risk levels show an increasing trend over the years. About 30 per cent of accidents occurring in the Kingdom of Saudi Arabia occur within the city limits. The fatalities resulted from the road accidents occurred in the capital city of the Kingdom are reported to be more than 21 per cent of the Kingdom's total fatalities [1].

While road users are only one component in a complex interacting system, they nevertheless determine to a very large degree the level of road safety that could be achieved. The personal attributes of drivers, along with their abilities and limitations, have significant effects on the number and type of crashes that occur. For example, it is known that young males, as a group, are overrepresented in crash statistics [2].

The unsafe driving behaviors examined in the survey, including tailgating, weaving, and making obscene gestures to

other drivers, are sometimes used as examples of "aggressive driving." There is increased public concern about the role of aggressive driving and "road rage" in crashes and traffic fatalities. Unfortunately, there is no general agreement among traffic safety experts as to what constitutes aggressive driving [3]. Consequently, the survey focuses on specific unsafe driving acts including aggressive driving and aggressive acts.

2.0 SURVEY QUESTIONNAIRE AND ADMINISTRATION

Several past studies [3–6] were reviewed to develop the survey questionnaire for this study. The survey form contained a) questions about basic demographic data, driving experience, accident record, as well as the type of vehicle used by the respondent, b) questions about how the respondents perceive and judge other drivers with regard to aggressive driving, c) questions about how the respondents perceive and judge themselves with regard to aggression, d) questions about emotional reactions given to aggressive behavior, description of the respondent's driving

style, etc, and e) questions about the possible causes of aggressive behavior as seen by the respondents and their recommendations to restrict aggressive driving. Initially a set of 50 questions were prepared and upon review and scrutiny and considering the relevance and suitability of the questions, a total of 26 questions were included in the survey questionnaire. The survey was conducted by interviewing drivers in Jeddah, the second largest city of the Kingdom. Though more number of respondents would be preferred for achieving better accuracy of the data, however, considering the limitations of the resources and availability of the respondents, a total of 300 valid survey responses were used in the analyses. The respondents were allowed to choose more than one answer. Therefore, total percentage of responses sums equals to greater than 100% in many cases. The respondents were chosen in such a way that the sample would be unbiased and representation of the driver community in Jeddah as much as

possible. It is notable here that based on the Saudi norm, no female driver could be surveyed.

■3.0 DESCRIPTION OF THE RESPONDENTS

The analyses of the survey data revealed that most of the survey respondents were young. Nearly 3 out of 4 respondents (76%) were aged between 18 to 35 years (see Table 1). Note that almost 50 percent of the Saudi population is less than 20 years of age [7]. The results also showed that 46% of the respondents were students and 42% of the respondents were employed full time. Most of the survey respondents (97%) were graduated from high school, and of these 97%, 30% had bachelor's degrees and 5% had post-graduate (Master's or Ph.D.) degrees (see Table 1).

Table 1 Demographic characteristics of the survey respondents

	% of Respondents (Number)	
Age (yrs.)	Less than 17	1 (2)
	18-24	41 (125)
	25-34	35 (106)
	35-44	16 (47)
	45-54	4 (12)
	55-64	2 (5)
	Over 65	1 (2)
	Total	100 (299)
Occupation	Employed full time	42 (126)
	Employed part time	7 (21)
	Unemployed and looking for work	3 (8)
	Retired	2 (5)
	Student	46 (140)
	Total	100 (300)
Education	No formal schooling	0 (1)
	Primary school	3 (8)
	High School	62 (184)
	Four-Year college graduate (Bachelor's)	30 (89)
	Post graduate degree (Master's or Ph.D.)	5 (15)
	Total	100 (297)

More than 9 out of 10 (93%) survey respondents mentioned that they drove almost every day (see Table 2). Only 17% of the respondents had a driving experience of less than 5 years, and one in four (24%) respondents had a driving experience of more than 15 years. Almost nine out of ten (87%) respondents used to drive a passenger car. The second most often driven car was SUV (7%). 24% of the motor vehicles driven most often were from the last three model years (2005-2007). An additional 38% of the motor vehicles were 4 to 6 years old. Altogether, 86% of the motor vehicles were less than 10 years old at the time of the study (see Table 2). Nearly half (48%) of the respondents mentioned that used to wear seat belt while driving (see Table 2). Exactly one in four (25%) respondents mentioned that they wore seat belt, and 20% of the survey respondents rarely or never wore seat belt during driving.

■4.0 DRIVERS' ATTITUDES TOWARD SPEED AND SPEEDING

One possible indicator of aggressive driving is the tendency to pass other drivers on the road. Overall, only 18% of drivers reported that they tend to pass other cars more than other cars tend to pass them (see Figure 1). 29% drivers reported that other drivers tended to pass them more often than they pass others.

Majority (53%) of the drivers, however, said it was about even, as far as passing or being passed.

The results did not show any pattern of inverse relationship between the tendency to pass and age, that is, as age increases the tendency to pass decreases. Except the 35 to 44 Year age group, almost one in four drivers mentioned that they tend to pass. The results, however, showed that the aged drivers tend to be passed more often as compared to the young drivers (see Figure 1).

Drivers were also asked if they tended to stay with slower moving traffic or keep up with the faster traffic. About 36% of the drivers reported they keep up with the faster traffic and 21% reported they stay with the slower moving traffic (see Figure 2). Two drivers in five (43%) said it was about equal. The percentage of drivers who keep up with the faster traffic decreased steadily as age increases.

Table 2 Driving characteristics of the survey respondents

	% of Respondents (Number)	
<u>Driving Frequency</u>	Almost every day	93 (278)
	A few days a week	5 (14)
	A few days a month	2 (7)
	A few times a year	0 (1)
	Never	0 (0)
	Total	100 (300)
<u>Driving Experience (yrs)</u>	1-5	17 (51)
	6-10	37 (109)
	11-15	22 (66)
	16-20	11 (32)
	More than 20	13 (41)
	Total	100 (299)
<u>Type of Vehicle</u>	Car	87 (256)
	Van or minivan	2 (6)
	Sport utility vehicle	7 (22)
	Pickup truck	2 (6)
	Other truck	1 (2)
	Motorcycle	0 (0)
	Other	1 (3)
		Total
<u>Vehicle Model Year</u>	1980 – 1984	2 (5)
	1985 – 1988	2 (5)
	1989 – 1992	6 (19)
	1993 – 1996	4 (11)
	1997- 2000	24 (69)
	2001 – 2004	38 (112)
	2005 – 2007	24 (71)
	Total	100 (292)
<u>Use of Seat Belt</u>	All of the time	25 (75)
	Most of the time	23 (69)
	Some of the time	32 (95)
	Rarely	13 (39)
	Never	7 (22)
	Total	100 (300)

Tendency to Pass or Be Passed by Age

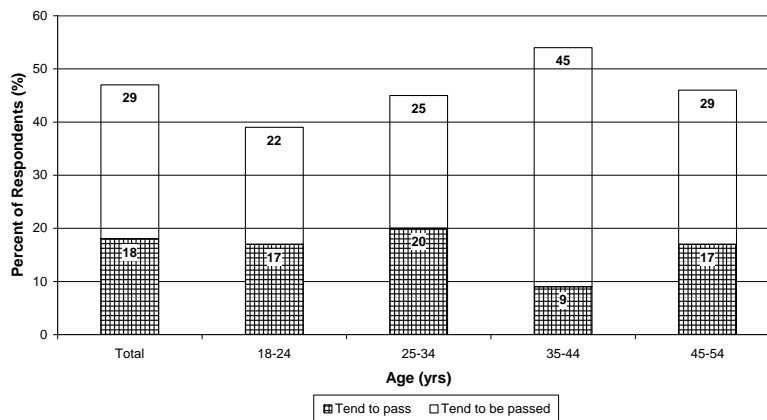


Figure 1 Driver attitude: tendency to pass or be passed

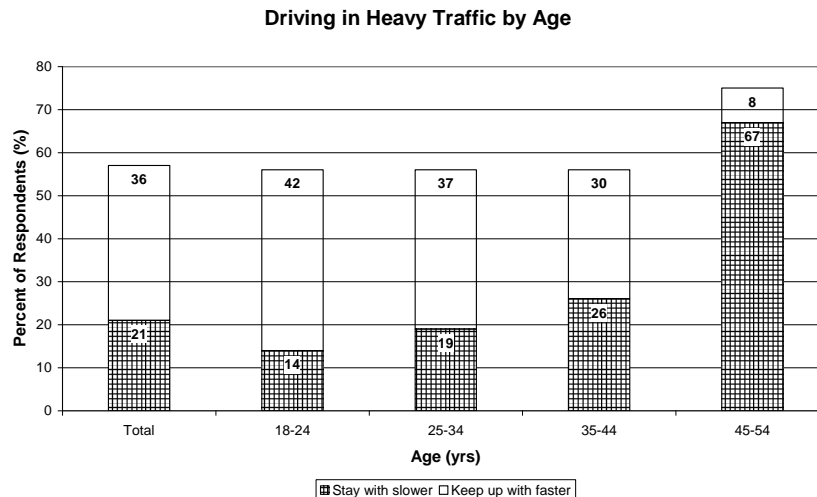


Figure 2 Driver attitude: driving in heavy traffic condition

Drivers were asked if they agreed or disagreed with a series of seven statements dealing with driving and speed. The first of these was "I enjoy the feeling of speed." Overall two thirds of the drivers (67%) either strongly agree (42%) or somewhat agree (25%) with this statement (see Figure 3). The results revealed that almost half of the drivers, irrespective of their age, strongly agreed that they enjoyed the feeling of speed. While the overall average was 42% (see Figure 3), drivers aged between 45 and 54 years had the highest percentage (50%). This is apparently not in agreement with the results of other studies³ which found that the agreement with this statement was inversely related to age.

Two thirds of the drivers (68%) strongly agreed (43%) or somewhat agreed (25%) with the statement, "the faster I drive the more alert I am" (see Figure 4). The agreement with this statement, however, decreases with increase in driver's age. While 75% of the drivers in age group 18-24 agreed or somewhat agreed with this statement, the amount of driver agreement in age group 45-54 was 58%.

The third statement in this series was, "I often get impatient with slower drivers." Nearly three drivers in four (73%) either strongly (35%) or somewhat (38%) agreed with this statement (see Figure 5). There is a clear relationship between responses to this statement and age. The only deviation from the pattern was among drivers in the 18 to 24 age group who were in slightly less agreement with the statement than were drivers in the 25 to 34 age group (see Figure 5). This could possibly be a reflection that many of the younger drivers are relatively new drivers and may be slow drivers themselves.

Nearly three drivers in four (72%) either strongly (33%) or somewhat (39%) agreed with the statement, "I try to get where I am going as fast as I can" (see Figure 6). It is interesting to note that the percentage of strong agreement with this statement increases with age across the age groups between 18 and 44 years. The strong or somewhat agreement with this statement for 45-54 age group (42%) had a sharp drop as compared to that of 35-44 for age group (81%).

The fifth statement in this series was, "I worry a lot about having a crash." Fully three in five drivers (60%) agreed with this statement (see Figure 7). The percentage of agreement with this

statement increased steadily with age (53% for age group 18-24 to 68% for age group 35-44). This is worthy to note that the majority of the young drivers (age group 18-24) said that they enjoyed the feeling of speed (see Figure 3) and became more alert when driving at a higher speed (see Figure 4), but at the same time this age group drivers said that they worried least about having a crash (see Figure 7). Another noteworthy point was that even though the 35-44 age group drivers worried most about having a crash (see Figure 7), the highest percentage of drivers who mentioned that they tried to reach their destination as fast they could was from this 35-44 year age group (see Figure 6). These two noteworthy revelations showed that a) the young drivers liked to drive at a higher speed and did not believe that it could lead them to a crash, and b) the mid-aged (35-44) and presumably more experienced drivers used to drive as fast as they could knowing that it could lead them to a crash. The general conclusions are that the young drivers, in general, are aggressive, and the middle-aged drivers do not drive sensibly.

The sixth and seventh statements in this series were "I always follow the traffic rules" and "I drive carefully keeping in mind that other drivers may make mistakes". More than 70% of the drivers across the age groups mentioned that they always followed traffic rules (see Figure 8). More than three in four (77%) drivers said that while driving they drove carefully keeping in mind that other drivers could make mistakes. As a matter of fact, the agreement about careful driving across the age groups was 70% and higher (see Figure 9). The last statement was included to see if the drivers drove defensively. However, tendency of the drivers to drive at higher speeds, as discussed before, contradicts the findings of high agreement in drivers about defensive driving.

Comparisons of driver attitudes found in this study with those of a similar study conducted in the United States [3] show that the Saudi drivers have more tendency for over-speeding. For example, among the Saudi drivers, 67% said that they enjoyed the feeling of speed, 72% said they tried to get where they were going as fast as they could, and 73% said they got impatient with slower drivers. The corresponding values for the U.S. drivers were 39%, 30%, and 60%, respectively.

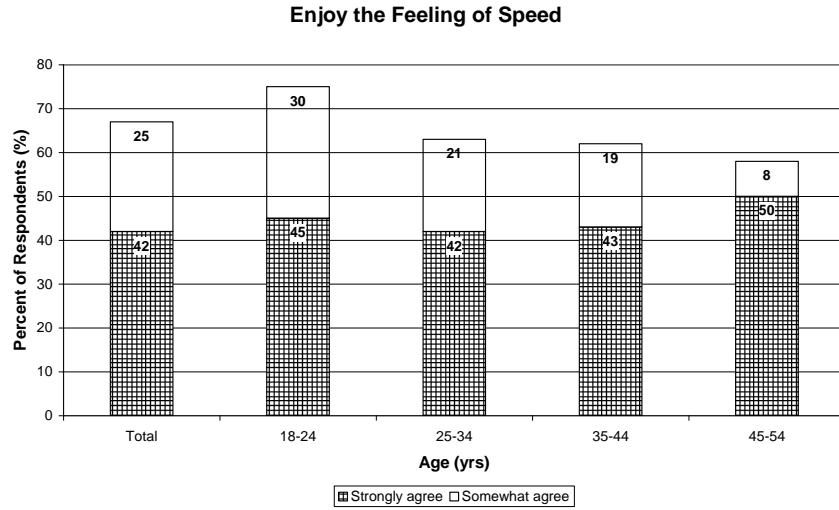


Figure 3 Driver attitude: enjoy the feeling of speed

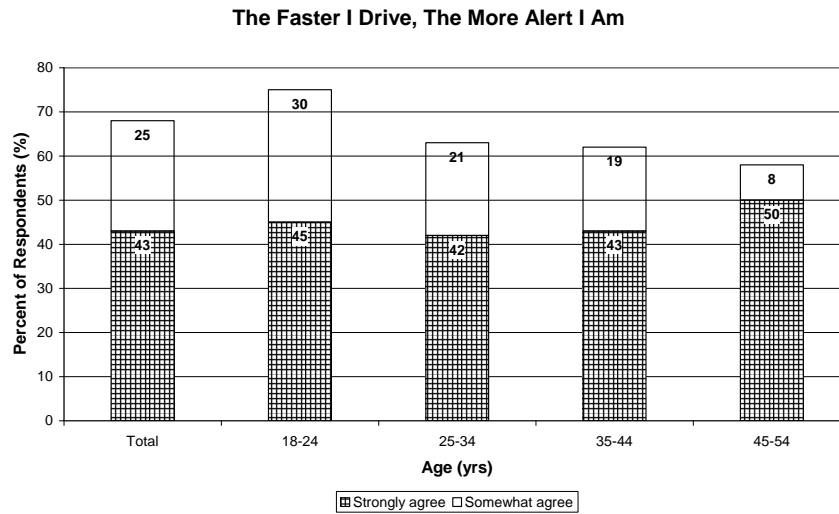


Figure 4 Driver attitude: alertness with increasing speed

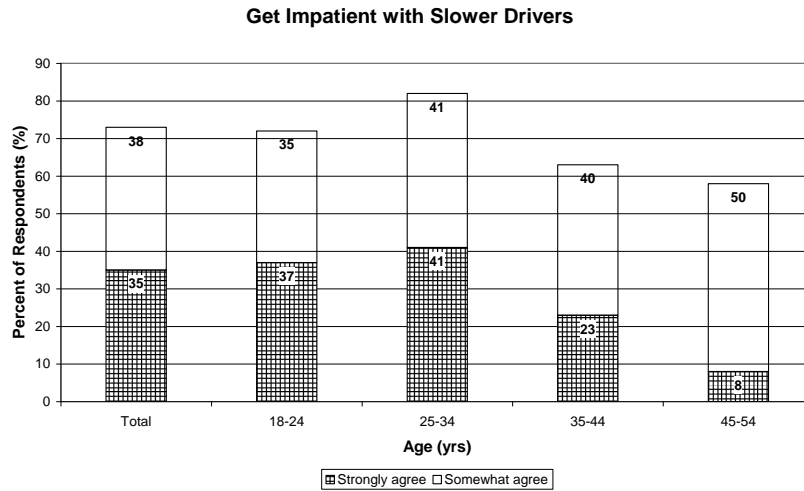


Figure 5 Driver attitude: get impatient with slower drivers

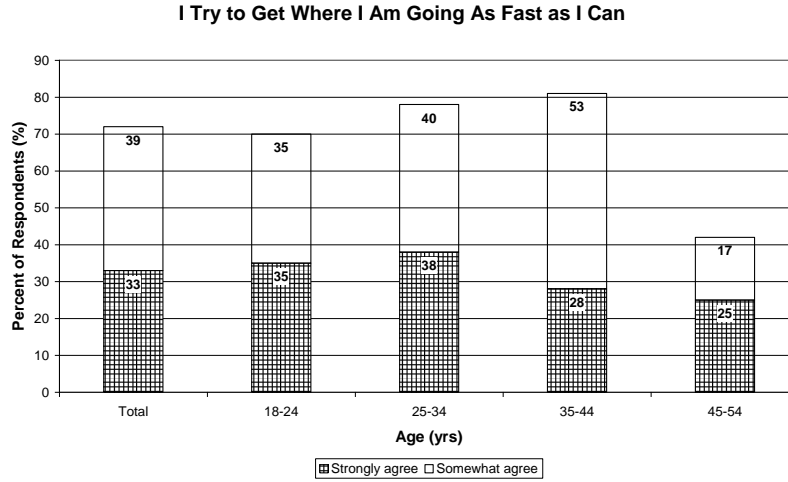


Figure 6 Driver attitude: get to destination as fast as possible

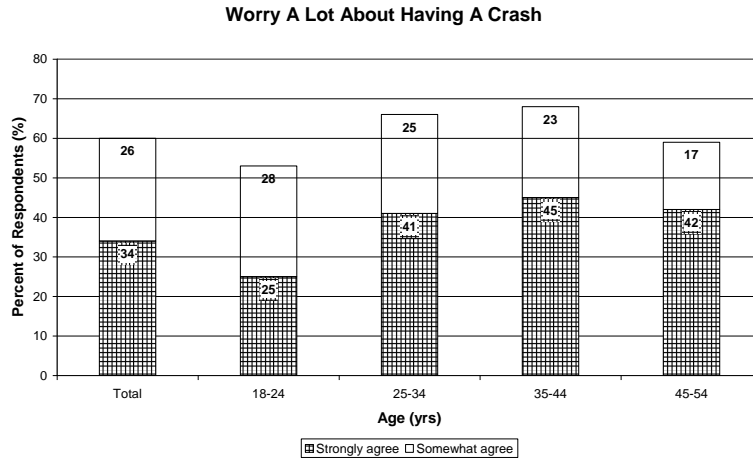


Figure 7 Driver attitude: worry about having a crash

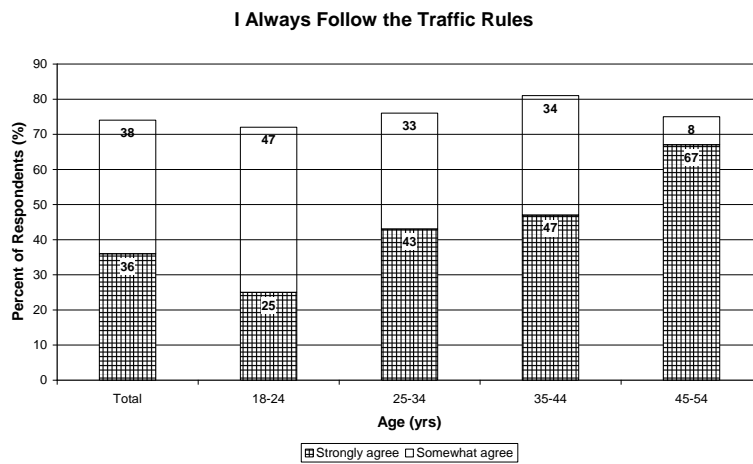


Figure 8 Driver attitude: follow the traffic rules

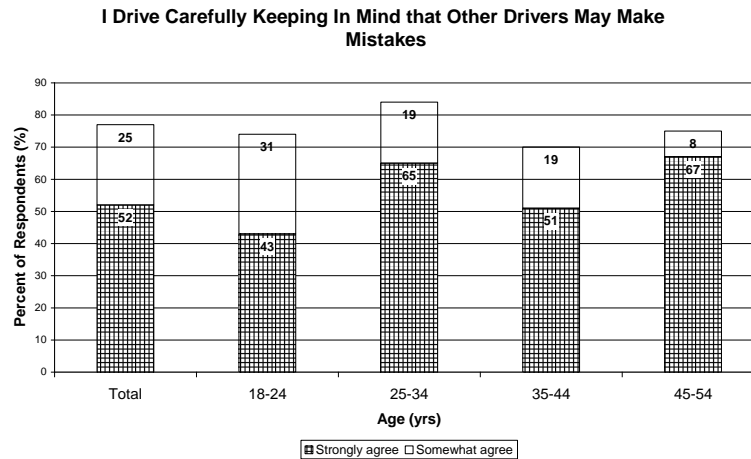


Figure 9 Driver attitude: drive defensively

5.0 DRIVERS' BELIEFS ABOUT UNSAFE DRIVING ACTIONS

To explore public attitudes and behaviors related to unsafe driving practices, the drivers were asked how safe or dangerous they felt a set of driving behaviors usually were. A total of 16 driving actions were included in the survey questionnaire (see Figure 10). The most dangerous driving act was "drive thru red light" (62%), followed by "racing another driver" (53%), "not yielding at roundabout" (43%), "illegal U-turn" (42%), "switch back and forth" (41%), "angry, insulting gesture" (35%), and "small gap following another car" (34%). Only 23% of the drivers thought that it was dangerous to drive over 30 km of the legal speed limits. The same percentage (23%) of the drivers also thought that it was not dangerous to use mobile phone while driving. The least "extremely dangerous" driving action, as rated by the drivers, was driving over 20 km over the speed limit (see Figure 10).

The drivers generally, as shown in Figure 10, did not consider driving well over the speed limit to be extremely dangerous. Almost half the drivers (46%), however, indicated that the speed limits were just right (46%), and while responding to another question, half the drivers (48%) said that the roads would be more dangerous if the speed limits were increased by 20 to 30 km. This was in contrary to what they thought about driving well over the speed limits. The drivers had feelings, as expected, that increasing the speed limit would encourage driving at higher speeds and thus would make the roads more dangerous. However, at the same time, drivers assess the roadway geometry and the driving environment to select their speed, and may be they found that the conditions were so favorable that driving at well over the

speed limit was not at all dangerous. As a matter of fact, to be effective, the speed limits should be so selected that they represent the prevailing roadway and traffic conditions.

From a list of 11 unsafe driving actions, the drivers were asked to select: a) which driving actions they often saw in "other" drivers, and b) which driving actions they often performed "themselves" (see Figure 11). The most often seen unsafe driving action reported by the drivers was "speeding (70%)", and it was followed by "driving too closely (57%)", "failing to use turn signals (53%)", "drive inattentively (50%)", and "running red lights (43%)". However, as expected, the drivers said that they seldom performed those unsafe driving acts while driving (see Figure 11). The drivers were also asked to identify the causes of unsafe and aggressive driving behaviors. Most of the drivers said that the main causes of unsafe/aggressive driving behaviors were "being in a hurry/time pressure (66%)", "aggressive behavior of others (52%)", and "refusing traffic rules (51%)" (see Figure 12). Nearly four in ten (35%) drivers thought that the causes of unsafe/aggressive behavior were "competition on the road" and "influence of movies".

6.0 COUNTERMEASURES FOR REDUCING UNSAFE DRIVING BEHAVIORS

When asked, 61% of the drivers said that the driving was more dangerous compared to a year ago. They (86%) also felt that unsafe driving behaviors were a major threat to themselves and also to their families. Almost all the drivers (96%) believed that "something" should be done to reduce unsafe driving.

Rating of Driving Behaviors

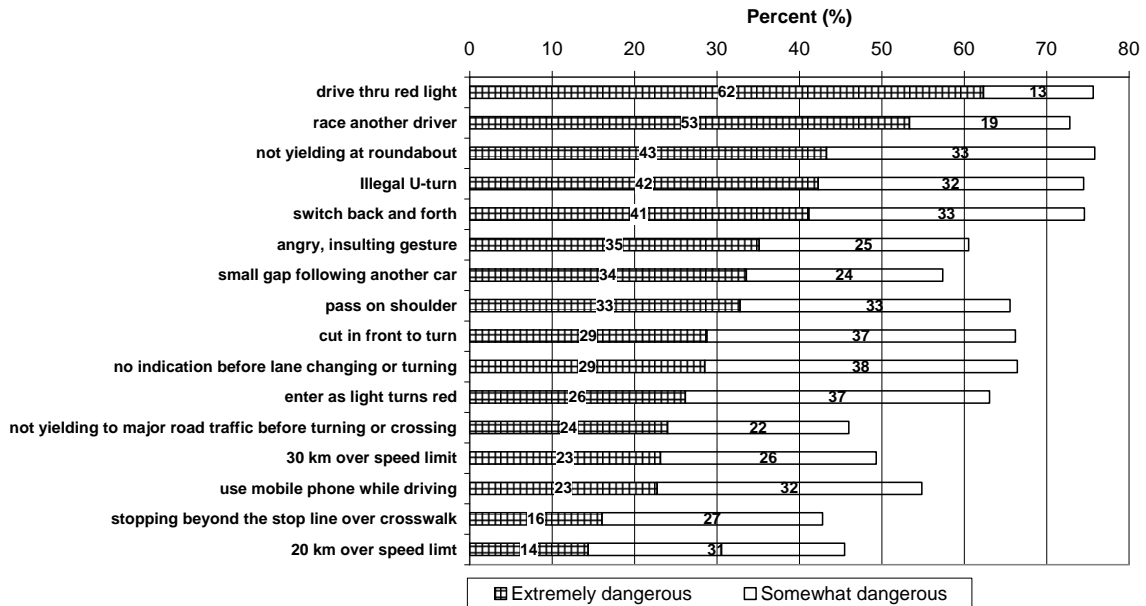


Figure 10 Driver behavior: perceived driving acts

Unsafe Driving Acts: "Other Driver" vs "Self"

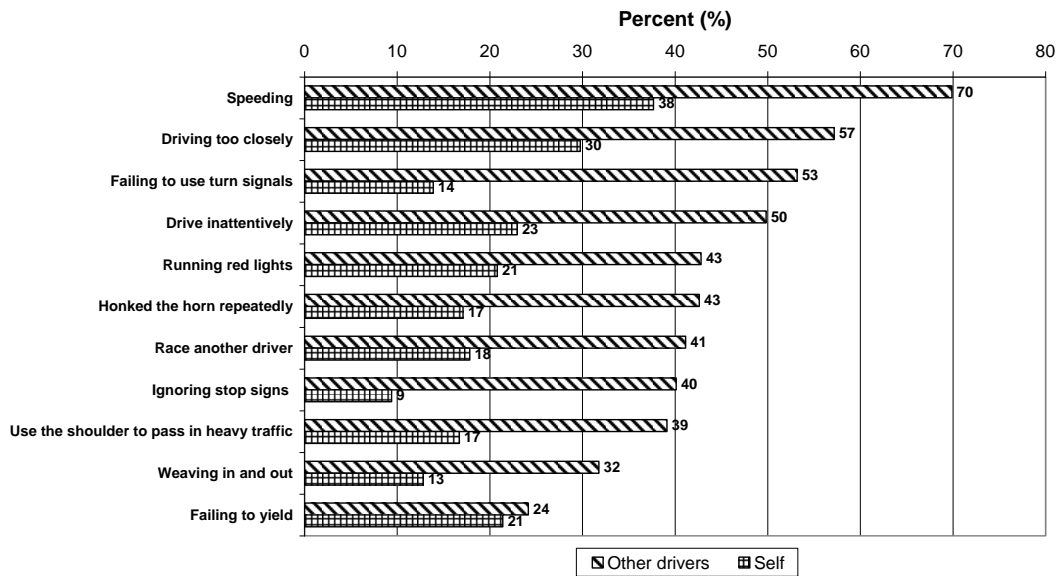


Figure 11 Driver behavior: perceived unsafe driving acts: "others" vs "self"

Causes of Unsafe/Aggressive Driving Behavior

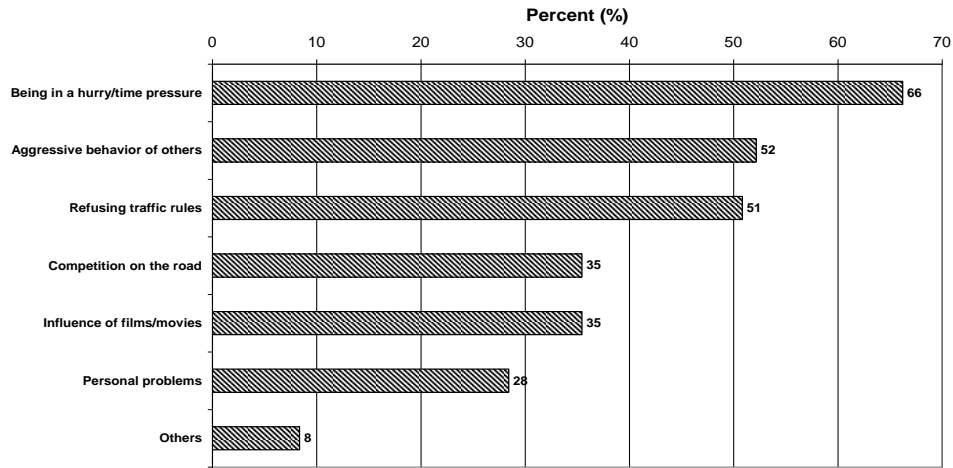


Figure 12 Driver attitude: causes of unsafe/aggressive driving behavior

Consequently, drivers were asked to rate the effectiveness of eleven different countermeasures for reducing unsafe and aggressive driving. The countermeasure that was viewed to be the most effective in reducing unsafe driving behaviors was assigning more police officers to traffic duty (66%). This is expected, because while answering to a different question, only 30% of the drivers said that the level of police enforcement was right, and 44% said that the level of police enforcement was low. More than half of the drivers said that that more frequent ticketing (60%), doubling or tripling fines (54%), and doubling the length of imprisonment (53%) would be effective in reducing unsafe driving behaviors (see Figure 13). Note that the local regulations allow the police officers to put the drivers caught with serious offences like speeding and red light running into jail for 24 hours. About half the drivers (49%) thought citizens' participation by

reporting aggressive drivers to the law enforcing authorities and parental advice for young drivers (43%) could also effectively reduce unsafe driving behaviors.

7.0 CONCLUSIONS

This driver behavior study was conducted in Jeddah, the second largest city of the Kingdom of Saudi Arabia. The study primarily looked at the wide range of driver attitudes about speeding and other forms of unsafe driving behavior, commonly occurring situations in which unsafe driving occurs, driver characteristics associated with those who commit these types of infractions, and the types of countermeasures the public believes are acceptable and effective for countering such behaviors.

Effectiveness of Countermeasures in Reducing Unsafe Driving

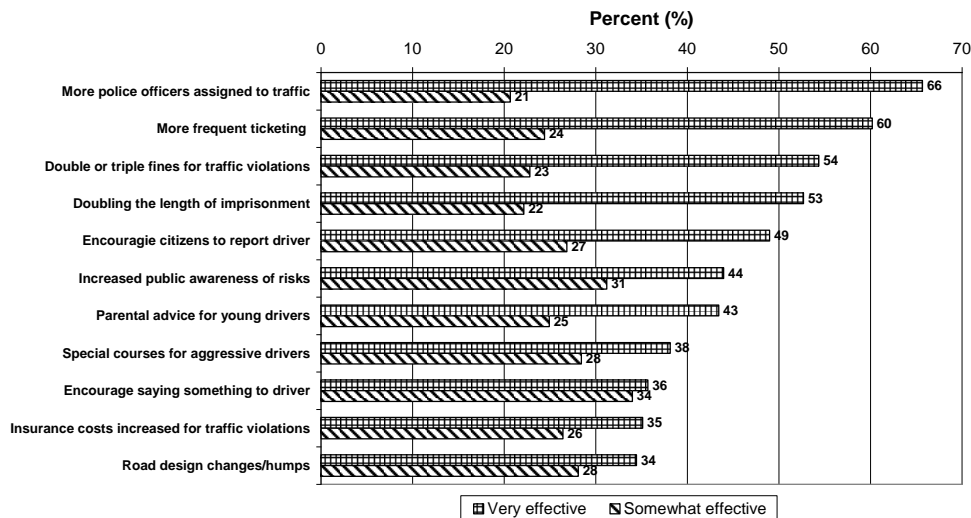


Figure 13 Driver's attitude: effectiveness of countermeasures in reducing unsafe driving

Two in three (67%) drivers said that they enjoyed the feeling of speed, and three in four drivers said that they drove as fast as they could to reach their destinations (72%) and got impatient with slower drivers (73%). These facts indicated that the drivers, in general, liked to drive at higher speeds. A brief comparison of the study results with those conducted in the United States revealed that the Saudi drivers were more aggressive compared to the drivers in the United States as far as speeding was concerned.

The most dangerous driving act, as rated by the drivers, was "drive thru red light" (62%), followed by "racing another driver" (53%), "not yielding at roundabout" (43%), "illegal U-turn" (42%), "switch back and forth" (41%), "angry, insulting gesture" (35%), and "small gap following another car" (34%). Only 23% of the drivers thought that it was dangerous to drive over 30 km of the legal speed limits. The same percentage (23%) of the drivers also thought that it was not dangerous to use mobile phone while driving. The least "extremely dangerous" driving action, as rated by the drivers, was driving over 20 km over the speed limit.

The most often seen unsafe driving action reported by the drivers was "speeding (70%), and it was followed by "driving too closely (57%), "failing to use turn signals (53%), "drive inattentively (50%)", and "running red lights (43%)". However, as expected, the drivers said that they themselves seldom performed those unsafe driving acts while driving. The main causes of unsafe/aggressive driving behaviors, as reported by the drivers, were "being in a hurry/time pressure (66%)", "aggressive behavior of others (52%)", and "refusing traffic rules (51%)". Nearly four in ten (35%) drivers thought that the causes of unsafe/aggressive behavior were "competition on the road" and "influence of movies".

Almost all the drivers (96%) believed that "something" should be done to reduce unsafe driving. The countermeasure that was viewed to be the most effective in reducing unsafe driving behaviors was assigning more police officers to traffic duty (66%). More than half the drivers said that that more frequent ticketing (60%), doubling or tripling fines (54%), and doubling the length of imprisonment (53%) would be effective in reducing unsafe driving behaviors. About half the drivers (49%) thought citizens' participation by reporting aggressive drivers to the law enforcing authorities and parental advice for young drivers (43%) could also effectively reduce unsafe driving behaviors.

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