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Risky Driving Behavior Relating to Accident Involvement: Investigating Some Identified Factors in An Iranian Sample

Zahra Tabibi, PhD[*]
Department of Psychology
Ferdowsi University of Mashhad

Iran has one of the highest rates of road traffic injury (RTI) in the world. Males suffer RTI 4 times more likely as compared with females. There is a peak for people aged 21-30 years for RTI. The aim of the current study was to examine the relationship between the identified risk factors (age, gender) in accident involvement and different types of aberrant driving behavior, considering the intervening variables of educational level, experience, the exposure rate, self-assessment of driving skill. Three hundred and sixty drivers participated in the study and filled the Driver Behavior Questionnaire (DBQ) and reporting their relevant demographic features. The Principal Component Analysis of DBQ revealed four factors, namely, ordinary violations, errors, lapses and aggressive violations. Multiple linear regressions indicated that gender (male), lower experience (young ones) and a higher exposure rate predicted ordinary violations of traffic rules. Also, self-report competent drivers made more violation of traffic rules, and self-report incompetent drivers made more driving errors and lapses. Young novice drivers made more driving errors compared to experienced ones. All the four factors of DBQ, alongside the self-report driving incompetence, a higher exposure rate and gender (female) could significantly predict accident involvement. Results indicated that all groups exhibit, in one way or another, risky driving behavior relating to accident involvement. However, young novice drivers are the most at risk group. Therefore, a multifaceted intervention program targeting each group (with young novice group as the priority) in an appropriate way should be developed.

∗ Email: tabibi@um.ac.ir

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Iran has alarming high rates of road traffic injuries (RTI) and traffic offences. After cardiovascular disease and cerebrovascular accidents, RTI was the third cause of mortality, in 2005 (Naghavi, Shahraz, Bhalla, Jafari, Pourmalek, Bartels, et al., 2009). Fatal RTI rate was estimated 44 in 100,000, one of the highest rates in the world (Naghavi, et al., 2009). Non-fatal rate was reported as much as 393 per 100,000 (Rasouli, Nouri, Zarie, Saadat, Rahimi-Movaghar, 2008). Road traffic deaths account for 10.3% of all deaths (Naghavi, et al., 2009) and 55% of all unintentional injury deaths (Akbari, Naghavi, Soori, 2006). In Iran the burden of traffic injuries in terms of DALYs is 1300181 years lost in the year of 2005 (Naghavi, et al., 2009). The economic cost of traffic accidents has been estimated over 3.5% of the gross national product in the year of 2001, over $4,000 million (Ayati, 2002).

Comparing these rates with that of the world population, the magnitude of the problem becomes more evident. The global death rate due to traffic injuries is estimated 19 in 100,000 people (Naghavi, et al., 2009) and ranks ninth as cause of mortality in 2002, worldwide (WHO, 2004). Road traffic death accounts for 2.1% of all deaths and 23% of all injury deaths (WHO, 2004).

Several epidemiological studies identify those who are at high risk of RTIs. In Iran, males are nearly 4 times more likely to suffer RTIs as compared to females (Rasouli, et al., 2008). Young novice drivers in the second and third decades of their life represent the majority of RTIs (Mohammadi, 2008; Roudsari, Sharzei, Zargar, 2004). These gender and age-group differences have been explained partly by attitudes, exposure rate, knowledge of traffic laws, proneness to risk taking behavior, and inexperience (Zadeh, Vahabi, Nazparvar, Amoei, 2002; Majdzadeh, Khalagi, Naraghi, Motevalian, Eshraghian, 2008; Roudsari, et al., 2004).

These studies have reached a common conclusion that the existing unacceptable level of compliance with traffic regulations is one of the

main issues in RTIs, necessitating the launch of health education campaigns for preventing road accidents and in changing this "culture" of traffic violations. However, it is argued that because of the differing causes of injury and the different social and economic context in which they occur, importing injury control techniques from developed to developing countries would not accomplish much. Instead there is a need for local adaptation and even development of completely new strategies.

However, there is a need, beforehand, to scientifically study behavioral factors in relation to the identified risk factors in the community. Akbari, et al. (2006) noted that the context of social and behavior is rarely addressed in relation to unintentional injuries in Iran. The current study aims to explore the pattern of high-risk behaviors among the identified high risk groups. This study will be accomplished among drivers; a. because they shape the largest group negotiating traffic system, b. mass production of automobiles within the past decades has gone up (Naghavi, et al., 2009), c. Iran has a relatively youthful population, which means more young drivers on the road in the coming years.

Several studies have explored the interaction of risk factors including, gender, age, the exposure rate, driving experience, and social status to influence RTIs (WHO, 2004). For example, Lourens, Vissers, Jessurun's (1999) study took the exposure rate into account, and found that 18 to 24 year-old drivers followed by 25 to 35 year-olds had the highest scores of accident involvement, in the Netherlands. However, in this study, the effect of education in accident involvement was not significant, when the exposure rate was kept constant in the analysis. Lourens, et al. (1999) concluded that drivers who prominently commit driving violations are more often involved in traffic accidents; and the relationship between violation and accidents is independent of exposure. On the other hand, evidence suggests that drivers with lower level of education and low status occupations have a higher chance of being involved in traffic accidents, even when the rate of exposure are accounted for (WHO, 2004).

Other studies in accident-related behaviors have demonstrated the tendency of accident-involved drivers to high risk behaviors or unsafe road practices (Chliaoutakis, Demakakos, Tzamalouka, Bakou, Koumaki, Darviri, 2002, Ivers, Senserrick, Boufous, Stevenson, Chen, Woodward, et al., 2009; Maier, Blakemore, Koivisto, 2000; McKenna and Horswill, 1999; Sümer, 2003). An approach to study accident-related driving behaviors was developed by Reason, Manstead, Stradling, Baxter, Campbell (1990). According to Reason et al., accident-related behaviors have resulted from errors and/or violations; two separate psychological processes. That is, drivers lack the skills and experiences required for driving and/or they select a risky driving style. Driving skills involve perceptual/motor skills and the ability to perceive danger and to process relevant information. Driving styles involve attitudes, values, motivation, personal characteristics and life styles (Sundström, 2008).

Accordingly, Driver Behaviour Questionnaire (DBQ) has been developed to assess different types of aberrant driving behaviors, violations, aggressive violations, errors and lapses/slips (Reason, et al., 1990; Lawton Parker, Manstead, Stradling, 1997; Forward, 2006). Lapses/slips are failures of memory and attention. Unlike errors and violations that are potentially dangerous and may result in a crash, lapses are less likely to do so. The distinction between aggressive violations and violation is based on the reason for drivers' violation. Violations are seen as deliberate deviation from traffic rules; with no intention of aggression towards other drivers (it is called ordinary violations). Aggressive violation, however, involves a hostile connection with another driver. DBQ has been applied in several countries such as Britain, Finland, Denmark, China, Turkey, for different age-groups and road users (e.g., Dobson, Brown, Ball, Powers, McFadden, 1999, Lajunen, Parker, Summala, 2004, Obriot-Claudel & Gabaude, 2004, Steg, Brussel, 2009, Shi, Baia, Yinga, Atchleyb, 2010).

The aim of the current research is to examine that how can the identified risk factors for accident involvement, namely, age and gender,

be related to aberrant driving behavior, considering social status, exposure rate and driving experience factors in an Iranian sample. In some studies, overestimation of one's driving skills is regarded as influencing aberrant driving behavior (Obriot-Claudel & Gabaude, 2004, Shi, et al., 2010); this variable will also be examined in the current study. Beside this, DBQ will be applied and the distinction between the four identified types of aberrant driving behavior will be examined in this sample.

Method

Participants

Nearly 1000 individuals were approached, in the city of Mashhad, in north east of Iran. Of these people, 360 individuals, 79 females and 281 males, who hold driving certificate for at least a year, participated in the study. They were accessed in public places such as parks, shopping centers and taxi service corporations, and the university. Participants were assured of anonymity and confidentiality. Mean age was 34.2, ranging between 18 to 67 years; mean level of education was 13.4, ranging between 4 and 24 years of studying; mean years of driving was 11.6, ranging between 1 to 55 years.

Among participants, 13.3% had less than 3000 km driving per year, 23.6% reported between 3000 and 8000 km, 20% between 8000 and 13000, 13.6% between 13000 and 18000 and 26.9% reported more than 18000 km a year.

Regarding the number of accidents, 47.3% reported no accidents, 25.3% had experienced one accident, 14.3% two accidents, 5.2% three accidents, 2.2% four accidents, 1.4% five accidents during the previous year.

Instruments

A questionnaire, having two parts, was used. The first part was devoted to demographic information such as age, gender, level of education, length of time holding a driving license (Years driving), estimated annual mileage

(Mileage), and number of accidents during the last year. An accident was defined as any kind of crash, with results ranging from a minor damage to the car to the death of a person. In this part, participants were also asked to assess their driving skill on an 11 point scale.

The second part included 35 items of the Driver Behaviour Questionnaire (Lajunen, et al., 2004). The items included ordinary violations, aggressive violations, errors and lapses. They are reported in Table 1. Before applying the questionnaire in the current study a pilot study with 140 subjects was conducted. Some small changes were applied mainly in the wording of items. Participants were required to report how often they have committed each of the items during the last year. Their responses were recorded on a six-point scale from 0 = "Never", to 5 = "nearly all the times".

Results

The normality of the distribution of each item of DBQ was first examined. Only 5 items had a skewness or kurtosis above 2.5. Since the sample size and the set of observed variables are large enough, according to Tabachnick and Fiddle (2001), the assumption of normal distribution can be disregarded. Thus, no transformation of data was conducted.

Table 1 shows the means and standard deviations for each item. As Table 1 indicates, the most frequent aberrant behaviors are ordinary and aggressive violations.

Table 1
Means and Standard Deviations of the Items of DBQ.

	Mean	SD
S11: disrespect speed limit on inner-city roads	1.98	1.47
S33: flash lights to show your anger to another road user	1.77	1.55
S28: ignoring the speed limit on highways	1.75	1.54
S26: weaving in and out of traffic	1.75	1.57
S20: over-taking from right side of slow driver	1.59	1.61
S9: drive so close to the car in front, with an intention to force him/her to speed up or pull away for you	1.51	1.41

S4: get into the wrong lane approaching roundabout or a junction	1.46	1.50
S32: overtaking on the right on highway	1.47	1.33
S25: get angry, show your hostility with whatever means you can	1.33	1.41
S2: intending to go to destination A you find yourself going toward destination B	1.31	1.35
S18: sudden change of lane in highways	1.19	1.08
S23: close following so that it is hard to avoid collision in emergency	1.15	1.24
S29: parking your car under signpost of "No Parking"	1.11	1.24
S8: fail to check rear- or side-view mirrors, in changing lane or pulling out	1.03	1.24
S36: distracted, had to break hard	1.03	1.28
S27: when overtaking, you underestimate the speed of the oncoming-car	1.06	1.11
S13: in turning right, you nearly hit a motorbike	.97	1.05
S19: forget where you left your car in a car park	.96	1.01
S34: disregard right of way, drive fast in junctions and roundabouts	.94	1.20
S16: overtake a car signaling for turning left	.90	1.10
S14: miss highway exit	.90	1.00
S1: in reversing you hit something you had not seen	.89	.97
S5: nearly hit the other car, when in queue for entering the main road	.88	.94
S6: fail to notice pedestrian when entering the side road	.87	.98
S10: drive away junction with speed, that the driver with right of way has to stop for you	.87	1.15
S22: misread the signs and drive in the wrong road in roundabout	.84	1.21
S15: fail to reduce the speed of car when crossing junction	.81	.94
S30: drive against the direction in a one way road	.77	1.08
S12: intending to use wipers, lighting head lights instead	.70	1.14
S24: cross a junction with traffic light while knowing the light has turned against you	.67	1.08
S35: drive when you are not enough conscious	.65	1.08
S21: disregard traffic light, with an intention to overtake the driver next to you	.63	1.10
S17: chase the front car, to show your annoyance to him/her	.56	1.02
S3: left your car key inside, leaving behind the car closed doors	.54	1.03
S7: sound your horn to indicate your annoyance	.48	.87

To examine some of the psychometric characteristics of DBQ in the current sample, following Westerman & Haigney (2000) and Reason, et al. (1990) responses to 35 items were entered into a Principal Component analysis with a Varimax rotation model. Missing data were handled listwisely. Nine factors with eigenvalues above 1 were extracted, which could explain 59.8% of the variance. Although, the visual inspection of Scree plot showed a three factor solution, but based on the theory of Reason, et al., a four-factor solution was rerun. The four-factor solution could explain 43.7% of variance.

The contribution of each factor was as follows: 27.8% for the first factor, 8.1% for the second factor, 4% for the third factor and 3.8% for the fourth factor. The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.89 and Bartlett's Test of sphericity was significant ($p < 0.001$). Factors are presented in Table 2.

Table 2
The Rotated Components of the DBQ Four Factors.

.	Factor 1 violation	Factor 2 lapse	Factor 3 error	Factor 4 aggressive violation
S32 overtaking on the right on highway	.747			
S29 parking your car under signpost of "No Parking"	.714			
S30: drive against the direction in a one way road	.691			
S28 ignoring the speed limit on highways	.675			
S24: cross junction with traffic light while knowing the light has turned against you	.665			
S34: disregard right of way, drive fast in junctions and roundabouts	.662			
S26: weaving in and out of traffic	.642			.406
S11 ignoring speed limit on inner-city roads	.641			

S20 over-taking from right side of slow driver	.629		
S10: drive away junction with speed, that the driver with right of way has to stop for you	.577		
S21: disregard traffic light, with an intention to overtake the driver next to you	.544		
S23 close following so that it is hard to avoid collision in emergency	.464		
S19 forget where you left your car in a car park		.570	
S3 left your car key inside, leaving behind the car closed doors		.566	
S36 distracted, had to break hard		.550	
S2intending to go to destination A you find yourself going toward destination B		.486	
S1 in reversing you hit something you had not seen		.458	
S22 misread the signs and drive in the wrong road in roundabout		.446	
S12 intending to use wipers, lighting head lights instead		.407	
S5 nearly hit the other car, when in queue for entering the main road			.624
S8 fail to check rear- or side-view mirrors, in changing lane or pulling out			.590
S6 fail to notice pedestrian when entering the side road			.554
S15 fail to reduce the speed of car when crossing junction			.533
S16 overtake a car signaling for turning left			.523
S18 sudden change of lane in highways			.481
S14 miss highway exit		.429	.453

S25 if you get angry, you show your hostility with whatever means you can		.693
S7 sound your horn to indicate your annoyance		.691
S9 drive so close to the car in front, with an intention to force him/her to speed up or pull away for you	.402	.557
S33 flash lights to show your anger to another road user	.459	.498
S17 chase the front car, to show your annoyance to him/her		.443

For clarity of reading, factors loaded less than 0.40 were excluded

Table 2 indicates that items on factor one which is called "ordinary violation" had the highest loadings, and they all were related to the violation category. Only item 26, “weaving in and out of traffic”, had a cross loading on factor 4 as well, which is called "aggressive violation". Items for factor 2 were in the lapse category, and loaded on the same factor, except for item 14. Item 14 "miss freeway exit" loaded on factor 2, called "lapses", as it did on factor 3 which is called "errors". All error items had their highest loadings on factor 3 which is called "errors", without any cross loadings. Also, all aggressive violation items loaded on factor 4 called "aggressive violations". However, for this factor, items 9 "drive so close to the car in front, with an intention to force him/her to speed up or open the way for you" and item 33 "flash lights to show your anger to another road user" loaded on the ordinary violation factor as they did on the aggressive violation factor. Item 4 of lapses, items 13 and 27 of errors and item 35 of violation categories had factor loadings less than 0.40. Thus, DBQ in this sample produced a fairly well distinguishable four factor structure. They could be called "ordinary violations", "lapses", "errors" and "aggressive violations". These findings are consistent with those of Lajunen, et al.'s (2004) study in Britain, Finland and Netherlands.

To assess the reliability, the Cronbach's alpha coefficient for the 12 items of factor one was 0.90, for the 7 items of factor 2 was 0.73, for the 7 items of factor 3 was 0.67, and for the 5 items of factor 4 was 0.74. Deleting any item in each factor did not increase the alpha coefficient. Thus, the factors had fairly well internal consistency. A regression score was computed for each factor, and were used for further analyses.

Predictors of Aberrant Driving Behaviors

In order to find the predictors of each factor, a linear regression, the Enter model, was computed separately for each factor. The factor was the criterion and the demographic features were the predictors. In all analyses, the variable age had high co-linearity with length of time having held a driving license (Years driving); therefore it was deleted from the analyses. Tolerance was between 0.86 and 0.95. The results were as follows.

As Table 3 shows, when the factor of ordinary violation was the criterion, the model was significantly accounting for 15% of the variance. Also, variables, gender, mileage, years driving and self-report driving skill each had unique contribution to the ordinary violation factor. That is, males, high mileage driving drivers and those who reported their driving skills as high committed higher violations. Also, the more years of driving the less number of violations committed.

When the factor of lapses was the criterion, the model was not significant, though self-report driving skill had a significant unique contribution to the lapse factor. That is, drivers who considered their driving skill as high had fewer numbers of lapses.

When the factor of errors was the criterion, the model was significant and the combination of predictors could account for 4% of the variance for this factor. However, years of driving and self-report driving skill each had unique contribution to errors. That is, those holding driving license for many years and reported their skill as high had lesser number of errors.

Table 3
Linear Regressions with Aberrant Driving Behaviors as Criteria and Demographic Features as Predictors

Criteria		Predictors				
		Gender	Years driving	Education	Mileage	Self-report driving skill
Factor 1: ordinary Violation	β	-.22	-.25	.07	.2	.2
	t	-3.6	-4.1	1.3	3.2	2.9
	p	< 0.001	< 0.001	ns	.002	.004
R= 0.41, R^2 = .17, adjusted R^2 = .15, F = 10.5, df = 5, 261, p<0.001						
Factor 2: lapse	β	.02	.01	-.02	.03	-.19
	t	.24	.13	-.28	.43	-3.004
	p	ns	Ns	ns	ns	.003
R= 0.19, R^2 = .04, adjusted R^2 = .02, F = 1.9, df = 5, 261, p=0.09						
Factor 3: error	β	-.03	-.13	-.04	-.05	-.17
	t	-.45	-2.02	-.59	-.82	-2.76
	p	ns	.045	ns	ns	.006
R= 0.24, R^2 = .06, adjusted R^2 = .04, F = 3.3, df = 5, 261, p=0.007						
Factor 4: aggressive violation	β	-.05	-.1	-.03	.06	.13
	t	-.73	-1.46	-.44	.92	2.02
	p	ns	ns	ns	ns	.045
R= 0.17, R^2 = .03, adjusted R^2 = .009, F = 1.5, df = 5, 253, p=0.1						

When the factor of aggressive violation was the criterion, the model was not significant, though the self-report driving skill had a unique contribution to aggressive violations. That is, those estimating their driving skill as high, had committed more aggressive violations.

Predictors of the Self-Reported Accidents

The aim in this part was to find the relationship between aberrant driving behavior and the number of self-reported accidents. For this purpose, participants were divided into two groups, based on their reports

of having accidents during the last year: those having no accident and those with at least one accident. Logistic regression, hierarchical model, was conducted with the number of accidents as the criterion and ordinary violation, lapse, error and aggressive violation as the predictors. Since demographic features could predict aberrant driving behavior they were entered first to control them.

As Table 4 indicates, the first and second steps of the model were significant. In the first step, mileage, years driving and self-report of driving skills were significant predictors of having an accident. However, having entered the factors of aberrant driving behavior at the second step, the variable of years of driving was not significant anymore. All factors had also significant contribution to the probability of having an accident. In addition, gender, after taking the variance of all other variables into account, was significant. That is, the numbers of women having accidents were more than males. Hosmer and Lemeshow goodness of fit test indicated that there were no problems with the model fit for both models.

Table 4
Logistic Regression between Having/Not Having an Accident (Criterion) and Demographic Features and Aberrant Driving Behavior (Predictors)

	Variables entered	*B*	SD	Wald	df	*p*	EXP(B)
First step	Gender	.507	.342	2.204	1	.138	1.661
	Education	-.028	.046	.368	1	.544	.973
	Mileage	.292	.100	8.543	1	.003	1.340
	Years driving	-.036	.014	6.672	1	.010	.964
	Self-report driving skill	-.187	.076	6.063	1	.014	.829

Model Chi-Square = 26.4, df = 5, $p < 0.001$
% Correct prediction = 62.6
Cox and Snell $R^2 = 0.09$
Hosmer and Lemeshow Test Chi-Square = 9.7, df = 8, $p = 0.1$

Second step	Gender	.837	.366	5.223	1	.022	2.309
	Education	-.028	.048	.351	1	.554	.972
	Annual Mileage	.263	.106	6.129	1	.013	1.301
	Years driving	-.022	.015	2.149	1	.143	.978
	Self-report driving skill	-.197	.080	5.993	1	.014	.821
	Aggressive violations	.277	.136	4.158	1	.041	1.319
	Lapses	.361	.156	5.340	1	.021	1.435
	Errors	.319	.143	4.984	1	.026	1.376
	Violations	.434	.152	8.188	1	.004	1.544
Model Chi-Square = 47.5, df = 9, $p < 0.001$							
Block Chi-Square = 21.1, df = 4, $p < 0.001$							
% Correct prediction = 67.5							
Cox and Snell $R^2 = 0.16$							
Hosmer and Lemeshow Test Chi-Square = 5.9, df = 8, p = 0.6							

Discussion

Like previous studies, DBQ in this study, with a very different sample, produced a robust four-factor structure accounting for 43.7% of the variance. Apart from few cross loadings between factors, the only item that did not load on a predicted factor was "miss freeway exit" which loaded more strongly on error factor than on lapses. This might, however, be the result of the structure of roads in Iran, where traffic signs are not designed and erected properly. Sometimes their message is difficult to understand. Data indicated that violations (mean 1.26) and particularly aggressive ones (mean 1.41) were the most aberrant driving behaviors shown by Iranian drivers. Comparing mean scores of the current study with that reported in the study of Lajunen, et al. (2004) indicates that Iranian drivers make aggressive violations well beyound that reported for drivers in the UK, Finland and the Netherlands (0.71, 0.53 and 0.49, respectively). This also, applies for violations (0.94, 0.94, 0.94,

respectively) and errors (0.50, 0.51, 0.63, respectively[1]). This is consistent with Özkan Lajunen, Chliaoutakis, Parker, Summalaa's (2006) study which found that in comparison to Western European drivers Turkish, Iranian and Greek drivers report committing more aggressive violations. They stated that lack of rule obedience creates interpersonal conflicts, and together with lack of social tolerance, it causes enormous interpersonal aggressive violations. In addition, among different violations, speeding was the most reported one. In this regard, Zadeh, et al. (2002) noted that 27% of the victims in their study, died at the scene of the accidents, because of a high degree of trauma and high vehicle speed. These, may explain why Iranian drivers are over-involved in fatal accidents compared to other countries.

Regression of each DBQ factor onto the six demographic features to examine who does most exhibits different types of aberrant driving behavior resulted in statistically significant models. They are interpreted and written according to the risk factors in the following sections.

Experience (age)

The results of regression analyses showed that when the effect of mileage, gender and self-assessment of driving skill was removed, years of driving were able to predict ordinary violations and errors. Those with higher experience in driving reported less number of violations and errors committed. If we regard the length of time holding a full driving license as compatible with the variable age, the result is consistent with the epidemiological studies (Mohammadi, 2008; Roudsari, et al., 2004), where younger drivers committed more traffic violations than older ones did.

In addition, the higher involvement of novice drivers in accidents was not significant when the effect of aberrant driving behavior- ordinary and aggressive violations, errors and lapses- was removed. This result confirms the fact that it is the behavior rather than the experience (or age) that puts

1 In this study the mean for errors was 0.94

one in danger. The study of Chliaoutakis, et al. (2002) also demonstrated that driving violation and irritability while driving are factors related to young drivers' (18-24 years) crash involvement.

Gender

The study indicates that, when taking the variance of driving experience and mileage into account, male drivers committed more ordinary violations than females, consistent with previous studies (Westerman & Haigney, 2000; Wickens, Toplak, Wiesenthal, 2008) and with epidemiological studies (Rasouli, et al., 2008). In contrast to Westerman & Haigney's (2000) study that women making more lapses, in the current study male and female drivers were not different in making mistakes, lapses or even aggressive violations while driving. The non-significant contribution of gender to aggressive violations challenges the idea that men are more aggressive than women.

In the current study men did not involve in accidents more than women, which is inconsistent with RTI data in Iran and with the study of Özkan, et al. (2006). This might, however, be due to underreporting of men relative to women; or due to the definition of accident used in the current study, as culpability of accidents was not identified. Another explanation is that women involve in a higher number of light accidents and men involve more in heavy ones. In RTI studies, there is greater under-reporting of less severe injuries as compared with deaths.

However, gender came out as a significant predictor when factors of DBQ were entered into the regression analysis. Interestingly, an equal amount of aberrant driving behavior, estimated driving skill, experience and exposure rate, women had higher probability of having accidents. That means that for women their accidents are related to something other than ordinary or aggressive violations, lapses and errors in driving, which merit further investigation.

Exposure Rate

Exposure rate could predict ordinary violations but not driving mistakes, lapses and aggressive violations. Consistent with Wickens, et al. (2008) study, drivers having higher millage of travelling violate traffic rules more often than other drivers. Also, having higher exposure rate to traffic situations makes one vulnerable to involvement in accidents. In Lourens, et al.'s (1999) study, higher exposure defined as the number of kilometers driven in a year leads to higher fines and accidents. When the rate of exposure was controlled, individuals who get fined were significantly more often involved in car accidents than those with no fines. Näätänen and Summala (1976, cited in Özkana, et al., 2006) proposed that experience and exposure to traffic increases driving skills. However, this increment is accompanied with an increment in the sense of subjective control and a decrement in the sense of subjective risk. These induce less concern for safety among such drivers, and give rises to more violations. In the current study, controlling for driving experience, gender, self-assessment of one's driving skill and all types of aberrant driving behaviors, exposure rate to traffic situation still independently could predict accident involvement.

Social Status (Educational Level)

As WHO reports, social status could be measured by educational level or occupation. The current study used educational level for this purpose. However, educational level did not emerge as a significant predictor for any type of aberrant driving behavior and accident involvement. One reason might be that the educational level of the participants in the current study did not very much.

Conclusion

The current study scientifically indicates that lack of respect for traffic rules, especially those related to speed limit, is common. The characteristics of drivers who have less intention to obey traffic rules are

men, novice drivers, drivers who drive more (professional drivers like taxi drivers and informal passenger carriers) and those reporting their driving skills as high.

In addition, the characteristics of Iranian drivers who perpetrate more to traffic related mistakes are novice drivers and those estimating their driving skills as less. Novice drivers are in danger of committing more ordinary violations and making more mistakes, though the variance of violations was greater than that of mistakes among them. In this study, those considering themselves as skillful drivers violated traffic rules more often. They also tended to commit aggressive driving violations. On the contrary, those considering themselves as less competent in driving suffered from driving lapses and errors. In fact self-driving assessment was a single factor that popped out to be related to all types of aberrant driving behavior. The question arises as to what self-assessment is?, that could predict driving behavior. This would be an interesting line of inquiry for further research.

One of the weaknesses of the questionnaire is that respondents may give socially desirable responses. A closer look at the questionnaire item scores (Table 1) may support this claim. Respondents were giving responses a little more than the minimum scores. Therefore, there might be under-reports of what actually is. Nevertheless, the relationship between high-risk groups to road traffic injuries and driving behavior was confirmed by the current study as the studies in other countries (Sümer, 2003). In fact, all sorts of aberrant driving behaviour alongside self-report driving incompetence, a higher exposure rate and gender (female) were related significantly to the probability of one's having an accident.

The implications of the results are that; A. all groups exhibit, in one way or another, risky driving behavior relating to accident involvement. Therefore, a multifaceted behavioral intervention program targeting each group in an appropriate way should be developed. The main purpose of intervention program should be twofold, namely, changing attitudes towards driving and increasing driving skills. B. young novice drivers are

the most at risk group. Iran has a young population, where 49 millions of the people are at the age between 15 and 64 years old and over 20 millions are under 18 years old from a population of over 72 millions. This means younger novice drivers on the road in the coming years. Therefore, they should be considered as a priority group for preventive education. C. high speed driving is the common type of violation. This should be addressed as a priority in prospective traffic safety education and the enforcement of speed limits should be imposed upon more strictly.

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