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Risk perceptions, fatalism and driver behaviors in Turkey and Iran

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ABSTRACT

The present study examined traffic and non-traffic risk perception, fatalism and driver behaviors in Turkey and Iran. A questionnaire survey was carried out in a Turkish (N = 213) and Iranian sample (N = 254). A MANCOVA was conducted to compare the two countries in relation to the measured safety constructs. Results showed that Turkish respondents perceived greater risk both in traffic and non-traffic domains, such as environmental hazards. The Turkish respondents also reported safer driver behaviors and less fatalistic attitudes than Iranian respondents. In both samples traffic risk perception was correlated with non-traffic risk perception. Perceived risk was only associated with precautionary driver behaviors, such as seat belt use and speed reductions, in Turkey. However, it was not associated with any driver behaviors in Iran. Practical implications of the results for traffic safety interventions in both countries are discussed.

1. Introduction

Traffic risk perception, which refers to cognitive interpretations regarding the probability of road traffic accidents and the potential severity of their consequences (Deery, 1999), is often reported to have a positive relation to safe driver behavior (Deery, 1999; Nordfjærn et al., 2011; Rundmo, 1999). When the drivers perceive a high risk in traffic, they tend to perform preventive behaviors, such as seat belt use and speed reduction (Edwards, 1999;Şimşekoğlu, 2010). However, there are also studies showing that traffic risk perception is weakly related to driver behaviors in road traffic (Iversen and Rundmo, 2002; Ming et al., 2010; Rundmo, 1999). Inconsistent results regarding the role of traffic risk perception in driver behaviors might be explained by differences in income and development levels, risk environments and culture across different countries.

Previous studies found differences in traffic risk perception across countries with different incomes and infrastructural development levels (e.g. Lund and Rundmo, 2009; Nordfjærn and Rundmo, 2009; Şimşekoğlu et al., 2012). For instance, Ghanaians (Nordfjærn and Rundmo, 2009) and Turks (Şimşekoğlu et al., 2012) tend to report more risk perception than individuals from high-income countries, such as Norway. Both cultural differences and physical attributes of the risk environments have a role in shaping differences in traffic risk perception across countries. For instance, Hayakawa et al. (2000) argued that individuals from Japan report higher risk of traffic accidents than people in the United States because of more frequent traffic accidents involving vulnerable road users in Japan. Sjöberg (1999) concluded that perceived risk may be relatively in line with objective statistical accident distributions, especially when the risk sources are overall well known in a community.

Non-traffic risk perception could also be related to driver behaviors and this assumption has been scantly investigated in low- and middle-income countries. Non-traffic risk perception refers to individuals' probability assessments of general hazards, such as health and environmental risks (Rundmo et al., 2011; Sjöberg et al., 2004). Sjöberg et al. (2004) concluded that people who rate risk as high or low in one domain tend to have corresponding perceptions of risk in other domains (i.e. a risk amplification–attenuation process). Rundmo (1999) found that there were significant correlation between estimates of risks related to different domains of health and environmental hazards. The results also showed that health protection within these domains of risk were significantly associated. As such, non-traffic risks related to health and environmental hazards could be associated with people's perceptions of road traffic risk and driver behaviour.

According to the cultural theory of risk (Douglas and Wildavsky, 1982), cultural settings and values, such as fatalism have an

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important role in shaping risk perception of the individuals. Fatalists tend not to know and worry about the things that they perceive as being out of their personal control, resulting in a lower risk perception in some domains, such as social order (Rippl, 2002). Also, people with fatalistic beliefs tend to explain events by uncontrollable and random factors, such as fate or bad luck, which are unchangeable. Thus, they are more likely to become passive in regard to traffic safety, which in turn may lead to less willingness to take precautions or obey the rules in traffic (Kouabenan, 1998; Peltzer and Renner, 2003). Hence, fatalism is a potentially important variable that might influence both traffic risk perception and driver behaviors especially in countries with a high degree of religious conservatism.

There is a lack of studies comparing the relationship between risk perception and driver behaviors across different countries especially in low- or middle-income countries. People in these countries are usually exposed to high variety of risks and hazards both in the traffic and other environmental domains. As such, an examination of the relationship between risk perception and driver behaviors might yield useful results to be applied by human factor traffic safety interventions in those countries. Hence, the present study aimed to examine traffic risk perception, non-traffic risk perception, fatalistic beliefs and driver behaviors in two middle-income, neighboring countries, Turkey and Iran.

Iran is a middle-income developing country with a high motorization rate and poor traffic safety records (Akbari et al., 2006; Montazeri, 2004; Soori et al., 2009; WHO, 2013). Between 1999 and 2000 15,482 people died in road traffic accidents resulting in a mortality rate of 25.8 per 100,000 population in Iran, one of the highest worldwide (Montazeri, 2004). Also, according to the latest World Health Organization report (WHO, 2013) on road traffic safety, in Iran the reported road traffic fatalities were 23,249 and road traffic deaths per 100,000 population was about 30 during 2010–2011. The number of traffic accidents in Turkey has also increased in parallel with the rapid industrialization and an increasing number of vehicles. During 2010–2011, the reported road traffic fatalities were 4045 and road traffic deaths per 100,000 population was about 5 in Turkey (WHO, 2013). It should be noted, however, that despite this low rate of road traffic fatality per 100,000 population in Turkey, when road traffic fatality rate per million vehicles is considered Turkey has one of the highest rates (381) among the OECD countries (OECD, 2013). A cross-cultural study comparing Turkey with different countries including Iran on driver behaviors showed that Iranian participants reported higher level of aggressive and ordinary driving violations and driving errors than Turkish participants (Özkan et al., 2006). Thus, although both Turkey and Iran have considerably poor traffic safety records, Iran has a more substantial traffic safety problem than Turkey. In addition to the differences in traffic safety levels, there are also cultural and socio-political differences between the two countries. Although the vast majority of the population includes Muslims both in Turkey and Iran, Iran is ruled by an Islamic governmental regime, while there is a secular system and a relatively more liberal environment in Turkey. Also, due to Turkey's location bridging the West and the East, Turkey is more inspired and integrated with Western culture than Iran.

1.1. Aims

The specific aims of the study are listed below:

(1) To compare Turkey and Iran in traffic risk perception, non-traffic risk perception, fatalistic beliefs and driver behaviors.
(2) To examine the relationships between risk perceptions, fatalism and driver behavior in Turkey and Iran.

2. Methods

2.1. Sampling

2.1.1. Turkish sample

A total of 213 Turkish respondents, including students at the Izmir University of Economics and their acquaintances, filled in a printed questionnaire. Students were also given additional questionnaires to be completed by their acquaintances. The students were instructed on how to fill in the questionnaires and to approach relatives or friends differing in gender, age, occupation and socio-economic background by the researchers. Of the 350 distributed questionnaires, 213 were returned resulting in a response rate of 61%. A total of 129 respondents (61%) were female and 82 (39%) were male. The respondents' age ranged from 19 to 66 years (M = 33.00, SD = 12.54). Most of the respondents (62%) were not students (either had a full-time or part-time employment, on sick leave, unemployed or retired), while 38% were students. As the highest level of education, 49% of the respondents reported college/university, 41% high school, 7% primary school, and 3% occupational education. Besides driver license holders (75%), respondents who did not hold a driving license (25%) were also included in the study because of their potentially important perceptions regarding road traffic safety as pedestrians or passengers in road traffic.

2.1.2. Iranian sample

The questionnaire was completed by a total of 254 respondents in Iran. Similar to the Turkish respondents, the Iranian respondents included university students and their acquaintances. Questionnaires were distributed among the students of Kharazmi and Tarbiat Modares Universities, which are two major universities that are located close to each other in Iran. In Kharazmi University, located in Karaj near Tehran, students from the Civil Engineering department filled in the questionnaires. Similarly, in Tarbiat Modares University, located in Tehran, students from Civil and Environmental Engineering Faculty filled in the questionnaires. After being instructed on how to fill in the questionnaires by the researchers, the students filled in the printed questionnaires themselves in the classrooms and also took additional forms to be completed by their acquaintances, relatives or friends from different age and occupation and socio-economic groups. In order to increase the response rate, the students received bonus points for participating in the study. The data collection procedure was the same at both universities. Out of the 280 questionnaires, 254 were returned, thus the response rate was about 91%. Forty percent (n = 99) of the respondents were female and 60% (n = 147) were male. Their age ranged from 18 to 83 years (M = 34.9, SD = 12.8). About 27% were students and the rest were in either full-time or part-time employment, on sick leave, unemployed or retired. In regard of the highest level of completed education, most of them (67.2%) reported university, 26.5% of them reported high school and 2.4% of them reported primary school. A total of 72.3% had a driving license.

Comparison of the Turkish and Iranian samples shows significant differences in terms of education and gender distributions (see Table 1). The proportion of females was higher in the Turkish sample, while the proportion of university students and graduates was higher in the Iranian sample. In order to control for the influence of age and gender, these demographic variables were entered in the first block as control variables in the regression analyses.

2.2. Instruments

Data from both countries were collected using a questionnaire that was developed and used in previous studies, which

Table 1
Comparison of demographics in the Turkish and Iranian sample.

Indicator	Country		χ^2
	Turkey	Iran	
Gender			26.6*
Female	129	99	
Male	82	147	
Age			1.9 (n.s.)
19–25	77	76	
26–40	60	82	
>41	73	84	
Education			36.0*
Primary school	14	6	
High school	87	67	
Occupational school	7	0	
University	103	171	

* $p < 0.05$.

applied the questionnaire in countries with different income and development levels – Ghana, Uganda, Tanzania, Turkey, Russia, and Norway (Klempe et al., 2009; Lund and Rundmo, 2009; Nordfjærn et al., 2011; Nordfjærn and Rundmo, 2009; Şimşekoğlu et al., 2012). The internal consistency of the scales was found to be satisfactory in these previous studies. Before using the questionnaire in either sample, an English version of the questionnaire was translated into Turkish and Persian languages by language experts proficient in both languages. In addition, an expert group in road traffic safety monitored inconsistencies in items across the translated versions and culturally biased items were removed. Since drinking alcohol is illegal in Iran, items related to alcohol consumption in non-traffic risk perception (e.g. 'what is the probability of having a health problem because of drinking alcohol?') and driver behavior scales (i.e. 'Drive the morning after heavy alcohol consumption, without knowing if you're completely sober') were omitted from the scales used for the Iranian sample. In order to be consistent in the analyses, alcohol-related items were also excluded from analyses in the Turkish data.

The questionnaire included validated measures related to demographic information, driver behaviors, traffic risk perception, non-traffic risk perception, and fatalistic beliefs. Driver behaviours (Iversen and Rundmo, 2004) were measured by 22 items about the frequency of various rule violations in road traffic, for example, 'How frequently do you increase speed in highly populated areas?' A five-point Likert scale was used and the response alternatives ranged from 'very frequently' to 'never'. Items were reverse coded to make higher scores on this scale reflect safe behaviours. This part of the questionnaire was only completed by those with a driver's license. Road traffic risk perception (Nordfjærn et al., 2011) was measured by 11 items asking for an assessment of the probability of personal injury due to various traffic accidents or road traffic situations, such as 'head-on accidents', 'car over-turning', and in different road user roles, such as 'being in road traffic as a pedestrian or passenger'. A five-point Likert scale was applied and response alternatives ranged from 'very probable' to 'not probable at all'. Higher scores indicate less traffic risk perception. The non-traffic risk perception scale (see e.g. Lund and Rundmo, 2009) included 23 items asking about the probability of having health problems due to various activities and situations, such as use of cell phones, having an unhealthy diet, and global warming and transmitted diseases. The response alternatives in the five-point Likert scale ranged from 'very probable' to 'not probable at all', with higher scores indicating lower degree of non-traffic risk perception. Fatalistic beliefs were measured by 15 items, such as 'It is common to trust in destiny while in traffic'. The response alternatives in the five-point Likert scale ranged from 'strongly agree' to 'strongly disagree', lower scores indicating a high level of fatalistic beliefs.

3. Results

3.1. Factor structure of the scales

Principal component analyses (PCA) using iteration and Varimax rotation were conducted, in order to identify the factor structure of the non-traffic risk perception instrument in the Turkish and Iranian data. A factor loading cut-off of .30 was used in this analysis. As shown in Table 2, five dimensions were obtained, labeled as 'chemical and industrial risks', 'transmitted diseases risks', 'triviality risks', 'cell phone related risks' and 'life-style related risks', respectively. Sum scores were established based on these factors.

Previous studies that used the same questionnaire to conduct cross-country comparisons identified two factors for traffic risk perception (traffic risk perception related to specific traffic situations and traffic risk perception related to road user role –

Table 2
Factor structure of non-traffic risk perception scale for Turkey and Iran.[a]

	Turkey					Iran				
Items	Dim 1	Dim 2	Dim 3	Dim 4	Dim 5	Dim 1	Dim 2	Dim 3	Dim 4	Dim 5
Industrial waste	.66					.68				
Radioactivity from a nuclear plant	.65					.73				
Holes in the Ozone layer	.77					.83				
Global warming	.75					.74				
Radiation from a high-voltage power line	.64					.75				
Rests of eradicants in food	.63					.63				
Genetically modified food	.62					.62				
Epidemics		.84					.61			
HIV/AIDS		.85					.87			
Malaria		.84					.90			
Infections		.85					.80			
Getting the cold					.83				.87	
Falling at the street					.84				.84	
Radiation from cellular phones			.90					.87		
Radiation from cellular phone transmitters			.88					.87		
Not enough exercise				.84						.85
Unhealthy habits of eating				.83						.81
Explained variance (%)	20.6	19.7	11.4	9.6	9.2	22.5	16.6	11.5	11.2	10.01

[a] Factor loadings less than 0.30 were omitted from the analysis.

as a driver or bicyclist), and one factor for the fatalism instruments (Lund and Rundmo, 2009; Nordfjærn et al., 2011; Nordfjærn and Rundmo, 2009). For driver behaviors, four factors were identified, including rule violations (e.g. violating the speed limits in order to reach a destination on time), precautionary driver behavior (e.g. reducing speed due to road signs which signals caution), seat belt use and drinking and driving (Lund and Rundmo, 2009). Since alcohol related items were omitted from the instrument, sum scores based on the remaining three driver behavior factors were calculated. See Table 3 for Cronbach's alpha values, number of items, mean scores and SD values of all factors for both countries.

3.2. Country differences in risk perception measures, fatalism and traffic behaviors

A Multivariate Analysis of Covariance (MANCOVA) was conducted to examine differences in traffic and non-traffic risk perception measures, fatalism, and driver behaviors between the Turkish and Iranian samples. The sum scores of traffic and non-traffic risk perception, fatalism, and driver behavior dimensions were entered as the dependent variables and the country (Turkey and Iran) was used as the fixed factor. Gender, age, education level (primary school, high school, occupational high school, university, or college) and kilometers (km) driven per month were included as covariates in the analyses.

Results showed a significant main effect of country with a Wilks' λ of .33 ($F[12,366] = 60.6$, $p < .001$), gender with a Wilks' λ of .94 ($F[12,366] = 1.9$, $p < .001$), and km driven with a Wilks' λ of .81 ($F[12,366] = 7.3$, $p<.05$). Investigation of the individual univariate analyses of the MANCOVA show that Turkish participants reported higher role-based (i.e. as a pedestrian or motor vehicle driver) ($F[1] = 15.8$, $p < .001$), and situation-based (i.e. head-on collisions, car over-turning) traffic risk perception ($F[1] = 69.5$, $p < .001$) than Iranians. Turkish participants also reported higher non-traffic risk perception regarding chemical and industrial risks ($F[1] = 69.9$, $p < .001$), transmitted diseases risks ($F[1] = 14.8$, $p < .001$), trivial risks ($F[1]=27.9$, $p < .001$), and cell-phone related risks ($F[1] = 45.01$, $p < .001$). On the other hand, in regard of driver behaviors Iranian participants reported more rule violations ($F[1] = 47.7$, $p < .001$), lower levels of seat belt use ($F[1]=35.7$, $p < .001$) and higher levels of precautionary driver behavior ($F[1] = 43.9$, $p < .001$) than Turkish participants. Iranian participants also reported higher level of fatalism ($F[1] = 64.2$, $p < .001$). Means and standard deviations of the measures for the two countries can be seen in Table 3.

3.3. Correlations between the traffic risk assessments and driver behaviors

In order to examine the associations between traffic and non-traffic risk perception, and traffic behaviors, separate bi-variate correlations were conducted for each country. Pearson's correlation coefficients are displayed in Table 4. For both countries, non-traffic risk perception regarding chemical and industrial risks, transmitted diseases risks, and lifestyle-related risks are positively and significantly correlated with both types of traffic risk perception, involving specific traffic situations and road user roles. In the Turkish data, seat belt use was significantly and positively correlated with traffic risk perception related to specific situations, and precautionary driver behaviors were significantly and positively correlated with traffic risk perception related to road user roles. In contrast, in the Iranian data, there was no correlation between driver behavior and traffic risk perception.

4. Discussion

The present study examined risk perceptions, fatalism and driver behaviors in Turkey and Iran, two middle-income, developing countries with poor traffic safety records. Although both Turkey and Iran are categorized as middle-income countries (WHO, 2013), they show differences in cultural and socio-political environments. Hence, the two countries were expected to differ in terms of the safety constructs measured in the present study.

Mean comparisons of traffic and non-traffic risk perceptions across the Turkish and Iranian samples showed that Turkish participants perceive a greater amount of risk both in traffic and non-traffic domains. Previous studies show that compared to men women report higher risk perception related to traffic and environmental hazards (e.g. DeJoy, 1992; Fllyn et al., 1994; Lund and Rundmo, 2009). Thus, the higher proportion of females in the Turkish sample can possibly explain the higher risk perception among the Turkish respondents.

In regard to driver behaviors, Turkish drivers reported lower levels of rule violations. This finding is in line with previous research showing less driving violations in Turkey than Iran (Özkan et al., 2006). Better traffic safety records in Turkey than in Iran are likely to be caused by a more defined set of regulations with more efficient and frequent enforcement. Thus, the relatively safer traffic environment in Turkey (Peden et al., 2004; WHO, 2013) may be responsible for safer driver behaviors among Turkish drivers. Turkish respondents also reported more frequent seat belt use compared to Iranian respondents, which is incongruent with the

Table 3
Number of items, Cronbach's alpha scores, means and standard deviations for the dimensions of the used measures.

		Turkey			Iran		
Measures	Number of items	Cronbach's α	Mean	SD	Cronbach's α	Mean	SD
Traffic risk perception							
Risk perception related to specific traffic situations	7	.760	1.92	.51	.560	2.42	.55
Role-related risk perception	4	.795	2.04	.69	.534	2.35	.69
Non-traffic risk perception							
Chemical and industrial risks	7	.853	1.85	.63	.875	2.67	.96
Transmitted diseases risks	4	.887	2.33	.99	.858	2.83	1.18
Triviality risks	2	.655	2.61	.84	.698	3.25	.99
Cell phone related risks	2	.889	2.02	.84	.832	2.87	1.12
Life-style related risks	2	.716	2.46	.86	.742	2.63	0.95
Fatalism	15	.813	3.91	.61	.865	3.28	.67
Traffic behaviors							
Rule violation	6	.686	4.28	.55	.981	2.83	1.83
Precautionary behavior	6	.705	2.10	.60	.970	2.76	1.78
Seat belt use	2	.627	4.32	.86	.917	2.94	1.95

Table 4
Correlations between traffic risk perceptions, and non-traffic risk perception and driver behaviors in Turkey and Iran.[a]

	Risk perception related to specific traffic situations	Role-related traffic risk perception
Chemical and industrial risks	.30** (.30**)	.25** (.27**)
Transmitted diseases related risks	.24** (.23**)	.17* (.20*)
Triviality risks	.19** (.09)	.06 (.01)
Cell phone related risks	.10 (.20**)	.21 (.09)
Life-style related risks	19** (.17**)	.18** (.18**)
Rule violation	.02 (−.08)	.02 (−.01)
Precautionary behavior	.15 (−.07)	.17* (−.01)
Seat belt use	.19* (−.09)	−.02 (−.04)

* $p < 0.05$.
** $p < 0.01$.
[a] Pearson correlation coefficients for Iran are given in parentheses.

WHO (2013) report stating that in 2010 seat belt use rate was 90% among the Iranian drivers and 50% among the Turkish drivers, according to the data obtained from the police. Use of self-report for seat belt use and relatively small samples including both drivers and non-drivers in the present study can explain this discrepancy between our findings and driver population police data. Iranian participants also reported a higher level of fatalism than Turkish participants. This could be explained by the high level of religious conservatism steaming from the Islamic practice of the political governing system in Iran. Since fatalistic beliefs are associated with ignorance of safety precautions and attributing traffic accidents to uncontrollable and random factors (e.g. Kouabenan, 1998; Peltzer and Renner, 2003), higher level of rule violation can be associated with higher level of fatalism in the Iranian sample.

In both countries, traffic risk perception was positively correlated with non-traffic risk perception regarding chemical and industrial risks, transmitted diseases risks and life-style related risks. This adds empirical support to the Sjöberg et al. (2004) risk amplification attenuation theory in two developing middle-income countries. The degree of risk perceived in traffic and other domains tend to be correlated for individuals indicating the presence of a domain- independent risk sensitivity process. In the Turkish data, seat belt use was positively correlated with traffic risk perception, meaning that as the frequency of seat belt use increases, people report less traffic risk perception. Similarly, precautionary driver behaviors (e.g. reducing speed due to road signs which signals caution) were positively correlated with traffic risk perception, meaning that as the frequency of precautionary driver behavior increases, people report less traffic risk perception. Hence, in Turkey the only type of driver behavior that was correlated with traffic risk perception was precautionary behaviors, such as seat belt use and reducing speed according to driving conditions. This finding is in line with the social cognition theories, such as Health Belief Model (Janz and Becker, 1984; Rosenstock, 1974), which argues that people are likely to decrease risk by engaging in a certain protective behavior when its perceived benefits are greater than its perceived barriers.

Except for precautionary driver behaviors other driver behaviours, such as speeding and close following, were not associated with traffic risk perceptions in either country. A reason for why the respondents did not show safer driver behaviors as a result of higher traffic risk perception might be the high number of perceived barriers and social costs related to engaging in safe driver behaviors, such as loss of time and negative reactions from other drivers. That kind of perceived barriers related to safe driver behaviors are especially common in developing middle-income countries, such as Iran and Turkey, where traffic is mostly governed by informal rules that may not always be safety oriented.

Differences in gender and education distribution in the Turkish and Iranian samples might be considered as a limitation of the study. However, by controlling both gender and education in the analyses allowed adjustment for their influence on the dependent measures. The lower number of females in the Iranian traffic system can explain the gender imbalance in the Iranian sample. Also, because of the high level of education in both samples the results may apply more to the particular segments of the populations in both countries.

4.1. Conclusions and implications

Risk perception in traffic is correlated with risk perception in other domains, such as health and environment, both in Turkey and Iran. Turkish participants reported higher risk perception, less fatalism and safer driver behaviors than Iranian participants. Traffic risk perception was not associated with driver behaviors in Iran, while it was only associated with preventive driver behaviors, such as seat belt use, in Turkey. Thus, traffic risk perception does not appear as a relevant factor for driver behaviors in these middle-income countries.

The present findings have implications for traffic safety campaigns aimed to facilitate safe driving in developing countries. The finding showing that in Turkey traffic risk perception is only associated with preventive driver behaviors indicates that people may try to reduce an increased perceived risk by engaging in certain preventive behaviors. However, the problem with this approach is that safe driver behaviors are based on subjective assessment of risk, which might be biased by human cognition and different from the objective statistical distributions of risk in a driving situation (see Dejoy, 1989). Besides, in Iran traffic risk perception was not associated with driver behaviors at all. Hence, rather than aiming to alter the traffic risk perception, a clearly defined set of traffic regulations with high level enforcement and formation of safe road traffic attitudes seems more urgent to improve traffic safety in both countries, especially in Iran. Also, possible perceived barriers, such as loss of time and conflict with other drivers, related to safe driving should be targeted through human factor safety campaigns in Turkey and Iran.

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