

Predicting intentions to comply with traffic rules among Iranian drivers

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subm. 10th June 2014

approv. after rev. 2nd October 2014

Abstract

Poor compliance with traffic regulations is one of the main causes of RTIs in Iran. This study examined the factors influencing the intention of Iranian drivers to comply with traffic rules. Factors investigated were demographic variables (age, gender, education, driving history) and psychological variables (moral norm, affective reaction, prior behaviour and Theory of Planned Behaviour variables). This descriptive study was conducted on 699 individuals having a full driving licence. Participants completed a questionnaire comprising demographic items, Theory of Planned Behaviour items and 10 driving violations items. Regression analyses found that instrumental and affective attitude, descriptive norm, perceived ease, moral norm, affective reaction and prior behaviour predicted intentions. Traffic accidents and fines related to prior behaviour and all the TPB variables except for instrumental attitude. Women scored higher for descriptive norm, and lower for prior behaviour. Important social cognitive factors for predicting intention were components of instrumental and affective attitude, descriptive norm, perceived ease, moral norm, affective reaction and prior behaviour. Age, educational level and length of driving did not relate to the TPB variables. Gender differences were found in descriptive norm, prior behaviour and traffic fines. Potential applications of the results to future Iranian road safety educational policies and programs were highlighted in the conclusions.

Keywords – theory of planned behaviour, attitude, road safety, driver behaviour, driving violation

1. Introduction

Iran has a serious problem with road-user safety and road traffic injuries (RTI). After cardiovascular disease and cerebrovascular accidents, RTI was the third cause of mortality [26, 35]. This is higher than the global estimation where RTIs ranked as the ninth cause of mortality [42, 43]. In Iran, road traffic deaths account for 10.3% of all deaths and 55% of all unintentional injury deaths [3, 42]. This is higher than the global estimation of RTIs accounting for 2.1% of all deaths and 23% of all injury deaths [41]. In comparison to the global death rate due to traffic injuries which was estimated as 19 people in 100,000, in Iran it was estimated at 44 in 100,000 [26]. An increment rate of 83.8% for RTIs from 2002 to 2005 was reported [4]. However, a reduction in death rate was observed in 2011 [5].

Despite that, the rate is still high and without any intervention, it was estimated that 200 people will be killed due to RTIs every day in Iran in 2014 [4]. Topics identified for potential intervention include environmental changes, human behavioural improvement, law enforcement and safety in manufacture [45]. Iranian policy makers have made enormous efforts in the fields of environmental changes, law enforcement and public education. One of the major barriers to success has been identified as human factors [6, 45, 46]. Poor traffic safety behaviours of road-users have been noted as the most important human barriers [46]. These studies have reached a common conclusion that unacceptably low levels of compliance with traffic regulations are one of the main causes of RTIs. Also, that health education campaigns are needed for preventing RTIs and changing this “culture” of traffic violations. Akbari, et al. [3] noted that social and behavioural factors are rarely addressed in relation to unintentional injuries in Iran, although the involvement of aberrant driving behaviour in crashes has long been established in many countries [24, 32].

1.1. Theory of Planned Behaviour

A variety of theories has been applied to explain the reasons for aberrant driving behaviour. A popular theory is the theory of planned behaviour [1]. In the theory of planned behaviour Ajzen [1] argued that behaviour is determined by intentions. Intention refers to the motivation to perform a behaviour and is regarded as the most proximal determinant of actual behaviour. Further, intention is explained by the variables of attitude towards the behaviour, subjective norm and perceived behavioural control. Attitude towards the behaviour means the evaluation of the consequences of the behaviour; the benefits that the person feels are gained by performing the behaviour. Benefits could be instrumental (how much sooner do I get to my destination if I do not obey traffic rules?) or emotional (how enjoyable is not obeying traffic rules?). Therefore it is argued that attitude could be bi-dimensional comprising instrumental attitude and affective attitude [1, 14, 15, 38]. Subjective norm means the perceived social pressure to perform a behaviour. That is, the perception that a person has about the expectation of significant others for performing the behaviour; that the behaviour ought to be done (injunctive). Studies have suggested another dimension of subjective norm called descriptive norm. This involves a perception about how much significant others perform the behaviour; that the behaviour is seen as normal [9, 14, 15, 19, 33]. Perceived behavioural control (PBC) means people’s perceptions of the degree of control they have over performing a behaviour. This construct also includes two dimensions; one is the person’s ability to perform the task, namely, perceived ease. The other is how well the person can control his/her behaviour, namely, perceived controllability [15, 19, 30]. A high degree of perceived behavioural control and subjective norm and a positive evaluation of the behaviour leads to a strong intention to perform that behaviour [1]. Ajzen’s early work [1] considered these constructs as unitary. However, more recent research studies have supported the bi-dimensionality of the constructs [15, 30]. For example, Paris and Van den Broucke [30] stated that while the bi-dimensions of the original components of TPB are often thought of as interchangeable, they are in fact different constructs which both may contribute to the prediction of intentions and behaviours. Although Ajzen appeared to be in favour of a unitary factor for each construct, he still argued that it is up to the investigator to decide whether or not to separate each aspect [1]. Furthermore, evidence supports extending the model of the TPB by additional variables, including moral norm, affective reaction and prior behaviour [8, 10]. Moral norm is defined as an individual perception of the moral correctness or incorrectness of performing a behaviour [1].

Affective reaction is the feelings one has when the internalized rule is broken [7, 8, 14]. The inclusion of the prior behaviour variable was especially recommended for frequently occurring behaviours where habitual behaviour may develop [8, 10, 34, 37]. Frequent past behaviour is considered to be an independent predictor for intention. It is also proposed that it predicts intention and behaviour via the TPB constructs, particularly through the PBC [8, 19].

1.2. Theory of Planned Behaviour and driving

Studies on driving attitude have revealed the success of the original and the extended TPB in predicting various driving behaviours among different groups and in various countries [18, 27, 30, 36, 38, 39, 47]. For example, it was found that constructs of the TPB can determine intention to obey traffic rules, to observe speed limits and to use a seat belt [10, 13, 19, 36, 38, 40]. In Victoir et al. [38] study all three constructs of the TPB predicted driving performance as much as 33%. However, Simsekog̃lua and Lajunen [36] found attitudes and subjective norm but not PBC to have a positive relationship with intention to use a seat belt among Turkish drivers. Studies have been done on the extended model of the TPB for explaining driving behaviour. The extended version of the TPB, containing the additional construct of affective attitude explained both self-reported aggressive and ordinary traffic violations [29]. The significance of descriptive norms for intention to speed in rural areas was determined [47]. Also, the addition of moral norm to the original TPB framework proved successful in predicting intentions to commit driving violations and breaking speed limits [7, 10, 11, 15, 28]. The mediating role of the TPB variables between prior behaviour and intention has also been examined [12]. Studies indicated that prior behaviour predicts intention to obey traffic rules via attitude and subjective norm. The mediating role of PBC between prior behaviour and intention has also been emphasized [1, 8].

Additionally, the effect of distal factors including age and gender on intention to comply with traffic rules and related TPB components have been observed. Women and older adults were found to have lower intention to violate traffic rules than men and younger adults and that different mechanisms motivate women and men, young and older age groups [10, 21, 25, 47]. In Parker et al.'s [29] study age and not gender predicted driving violation over and above that predicted by the TPB components [29]. Also, female high intenders were more likely than female low intenders to perceive the advantages of speeding, while male high intenders were more likely than male low intenders to consider speeding as exciting [22]. Males in comparison to females had higher intention to use a handheld mobile phone while driving [39, 47].

From the above studies it is evident that the reason for compliance could vary among different groups and aspects of driving behaviours and has to be established empirically [1]. Also, both driving behaviour and attitudes are culturally dependent. It is stated that attitudes, in general, are shaped within social contexts [16]. They are learned, and are the product of socialization and experience rather than heredity or constitution [16, 17]. Thus, this study aims to examine Iranian drivers' intentions to comply with traffic regulations within the TPB model. The results of the study will confirm some of the cognitive-social factors influencing traffic rule compliance in a country with a low level of safety. It will also provide a basis for designing TPB based intervention programmes in order to increase safe traffic behaviours.

1.3. Objectives of the research

This research examines intention to comply with traffic rules among Iranian drivers within the extended model of the TPB.

The first objective was to predict intention to comply with traffic rules using the bi-dimensional constructs of the original TPB variables plus moral norm, affective reaction and prior behaviour. The dimensions of the original TPB constructs were as follows; for attitude towards behaviour the dimensions were instrumental attitude and affective attitude, for subjective norm dimensions were injunctive norm and descriptive norm, for PBC dimensions were perceived ease and perceived controllability. Similar to the original variables of the TPB, in the current study, a bi-dimensional definition of moral norm was used. Moral norm was defined as perceptions of performing a behaviour as correct or incorrect and personal feelings/affective reaction about doing/not doing a behaviour [1, 8]. The second objective was to examine the relationship between the TPB variables and demographic features including gender, age, average hours of driving per day, number of accidents and fines.

2. Subjects and methods

2.1. Participants

A total of 699 people (including 488 males and 211 females) participated in this study. The mean age of participants was 33.3 years and the age range was 18 – 68 years. Participants all had a full driving license and had been driving for at least a year. Years of driving were between 1 and 47 years. Participants were students and staff from Ferdowsi University of Mashhad and participants recruited from organisations in the city of Mashhad, such as National Youth and Education Organisations. A volunteer sampling procedure was applied.

2.2. Instrument

For assessing attitudes towards driving violations, a questionnaire based on the TPB was used. Direct measures for assessing intention, affective attitude, instrumental attitude, injunctive norm, descriptive norm, perceived ease and perceived controllability, moral norm and affective reaction were used, as described and applied in previous studies [1, 2, 8, 14]. They were all measured on 7-point scales. Intentions toward the behaviour of obeying traffic rules was measured by two statements: “you intend to obey traffic rules from now on” and “you think you will obey traffic rules from now on”, with end-points labelled not at all and very much, and never and always respectively. The remaining TPB variables were measured by one statement as follows:

- Instrumental attitude: “*for you, obeying traffic rules when driving is ...*” followed by end-points very beneficial and very harmful.
- Affective attitude: “*for you, obeying traffic rules when driving is ...*” followed by pleasant and unpleasant.
- Injunctive norm: “*people important to you you for obeying traffic rules when driving*” with end-points labeled strongly approve and strongly disapprove.
- Descriptive norm: “*people important to you comply with traffic rules*” with end-points labelled never and always.
- Perceived ease: “*for you, obeying traffic rules when driving is ...*” followed by end-points labelled very hard and very easy.
- Perceived controllability: “*if you want you can obey traffic rules when driving*”, with end-points labelled strongly agree and strongly disagree.
- Moral norm: “*for you, not obeying traffic rules is wrong*” with end-points labelled not at all and very much.
- Affective reaction: “*when you break traffic rules you feel guilty*” with end-points labelled not at all and very much.

Scores ranged between 1 and 7, with the maximum score indicating desirable, and the minimum score indicating undesirable. For preventing response set some questions were stated in reverse.

Prior behaviour was assessed by 10 items relating to different driving violations including speeding, dangerous overtaking, chasing, close following, disregarding traffic lights, disregarding right of way, disregarding one way road.

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 1 = "Never", to 6 = "Nearly all the time". The order of the administration of TPB questions and Prior behaviour items was random.

Examining the distributions of all variables, they were between 0.03 to 2.2 for skewness and 0.2 to 1.6 for kurtosis, except for instrumental attitude and perceived controllability which were 2.9 and 3.9 respectively. Reliability of the ten items of the prior behaviour variable was calculated using Cronbach's alpha. Reliability was good, 0.83.

Participants also provided self-reported data on their age, gender, education, average hours they drive in a day (length of driving), and the number of accidents they were involved in the last year. What constituted a traffic accident was not defined for the respondent, but left to his or her own judgment [24].

They were also asked if they have been fined for violations of traffic rules by police. Responses were scored 0 not been fined and 1 had been fined.

2.3. Procedure

Participants in each organization were approached by a research assistant. After ensuring that they had a driving license, had driven for at least a year (regardless of owning a car or not) and given consent to participate, the questionnaire was handed out. The completed questionnaires were collected by the research assistant later (collection times varied from between later the same day to one week later).

In cases where the research assistant was unable to access members of staff directly, the questionnaires were distributed by one of the staff in that organization and returned after a week. Of 1300 questionnaires distributed, 699 were returned, a response rate of 53.77%. This low level of response rate may indicate that the volunteers may not be fully representative of the target population.

3. Results

3.1. Demographic features

A total of 83.8% of participants responded to the question about whether they had been fined for traffic violations. Of these, 34.8% reported no fines and 49.1% reported that they had been fined for violation of traffic rules. All participants (100%) responded to the question about whether they had experienced a car accident or not. Of these, 47.5% reported no accident, 27% one accident, 14.3% two, 6% three, 2.1% four, 1.7% five and 1.2% six and more accidents. For educational level, 31.8% of the participants reported that they had 12 years or less of schooling, 42.2% were undergraduate students or had an undergraduate certificate and 11.9% were postgraduate students or had postgraduate/professional certificates. A total of 80.5% of participants responded to the question about average hours of driving, of these 51.7% stated that they drive less than two hours a day.

3.2. Determining intention to comply with traffic rules by the extended TPB variables and prior behaviour

A hierarchical multiple regression analysis was conducted first to determine the role of the extended TPB variables in predicting intention to comply with traffic rules, and second to test that prior behaviour can predict intention to comply with traffic rules after the effects of the TPB variables have been controlled.

Table 1 shows the intercorrelations among the variables entered into the regression model.

As Table 1 indicates, the variable of intention correlated significantly with all the variables of the TPB. Higher scores in intention were related to higher scores in affective attitude, instrumental attitude, injunctive norm, descriptive norm, perceived ease, perceived controllability, moral norm and affective reaction. Higher scores of intention were related to lower scores of prior behaviour. Also, all the variables of the TPB had significant positive correlations with each other. Prior behaviour related negatively to all the TPB variables, more strongly to intention, affective reaction, affective attitude and perceived ease.

The hierarchical regression analysis comprised three steps, each of which estimated the unique contribution of the variable(s) entered in that step beyond the variables previously entered. The variables entered in each step and the rationale for the order in which they were entered is as follows. Age was entered in the first step because a large number of studies indicated that young people are more likely to violate [19, 44].

Also, in the present study age was correlated significantly with 8 out of 11 variables of the TPB, as shown in Table 4. Thus, it was decided to control its effect. Gender, education and length of driving did not relate to the TPB variables, so they were not entered in the regression. The variables of the TPB, moral norm and affective reaction were entered in the second step and prior behaviour in the third step. Intention was the criterion. Table 2 presents the results of the regression.

Tab. 1 - Pearson correlation coefficients between the extended TPB variables and means (SDs) of the variables for all participants and separately for men and women

	1	2	3	4	5	6	7	8	9	all M(SD)	women M(SD)	men M(SD)
1.Intention	1									5.9(1.4)	6(1.3)	5.9(1.4)
2.Instrumental attitude	0.32	1								6.1(1.6)	6.1(1.6)	6.0(1.6)
3.Affective attitude	0.43	0.55	1							5.8(1.7)	5.9(1.6)	5.7(1.7)
4.Injunctive norm	0.32	0.51	0.49	1						5.7(1.8)	5.9(1.7)	5.7(1.8)
5.Descriptive norm	0.42	0.12	0.18	0.21	1					4.8(1.7)	5.0(1.7)	4.7(1.7)
6.Perceived ease	0.40	0.49	0.60	0.45	0.25	1				5.6(1.8)	5.8(1.7)	5.5(1.8)
7.Perceived controllability	0.31	0.40	0.50	0.44	0.15	0.49	1			6.2(1.6)	6.2(1.6)	6.2(1.5)
8.Moral norm	0.44	0.16	0.24	0.14	0.30	0.19	0.11*	1		5.6(2.1)	5.8(2.0)	5.6(2.1)
9.Affective reaction	0.60	0.30	0.31	0.35	0.28	0.33	0.18	0.35	1	5.3(2.0)	5.5(2.0)	5.2(2.0)
10.Prior behaviour	-	-	-	-	-	-	-0.19	-	-	2.2(0.8)	2.0(0.7)	2.2(0.8)
	0.47	0.21	0.39	0.24	0.22	0.36		0.24	0.41			

All correlations were significant at $p < 0.001$ except * $p < 0.01$

Tab. 2 - Summary hierarchical regression analysis for variables predicting intention

	R ²	ΔR ²	F	β ₁	β ₂	β ₃
Step 1	0.07	0.06	48.8***			
age				0.26***	0.07*	0.05
Step 2	0.52	0.51	81.2***			
Instrumental attitude					0.07*	0.08*
Affective attitude					0.13**	0.10*
Injunctive norm					0.000	-0.001
Descriptive norm					0.20***	0.19***
Perceived ease					0.09*	0.07
Perceived controllability					-0.04	-0.03
Moral norm					0.19***	0.19***
Affective reaction					0.36***	0.32***
Step 3	0.54	0.53	79.2***			
Prior behaviour						-0.17***

*** $p < 0.001$, ** $p < 0.01$, * $p \leq 0.05$

Table 2 shows that in the first step age was positively significant accounting for 7% of the variance. In the second step, the significant variables from the strongest to the weakest beta coefficients ranging between 0.36 and 0.07 were affective reaction, descriptive norm, moral norm, affective attitude, perceived ease and instrumental attitude. The TPB variables could account for 45% of the intention variance ($F_{\text{change}} = 79.8$, $df = 9,688$, $p < 0.001$). Injunctive norm and perceived controllability were non-significant. Prior behaviour added 2% to the explained variance ($F_{\text{change}} = 29.9$, $df = 1,687$, $p < 0.001$). In total, 54% of intention to comply with traffic rules variance was explained by age, the extended TPB variables, affective reaction, moral norm and prior behaviour ($F_{\text{change}} = 71.9$, $df = 10,687$, $p < 0.001$).

3.3. Relationship between the extended TPB variables and demographic features

For examining the relationship between the variables of TPB and demographic features Pearson or Spearman correlations were conducted as appropriate. Independent samples t-test was used for assessing gender differences. Table 3 presents the correlation coefficients for the TPB and demographic variables.

As Table 3 shows, a higher number of self-reported accidents and traffic fines were significantly correlated with lower scores in all the TPB variables except for the variable of instrumental attitude. The higher scores in prior behaviour were correlated with higher numbers of accidents and traffic fines. Increased age was related to higher scores in intention, affective attitude, subjective norm, descriptive norm, perceived ease, moral norm, affective reaction and lower scores in prior behaviour. Also age was negatively related to the number of accidents and positively related with traffic fines. A lower level of education was related to a higher number of self-reported accidents. Hours of driving was correlated with a higher number of accidents and traffic fines. Statistically significant gender differences were found for the following variables; descriptive norm ($t(699) = -2.1$, $p < 0.05$), prior behaviour ($t(697) = 2.9$, $p < 0.01$) and traffic fines ($t(584) = -6.9$, $p < 0.001$). Women scored higher for descriptive norm and lower for prior behaviour and traffic fines.

Tab. 3 - Correlation coefficients between the TPB variables and demographic features

	age	education	length of driving	finest ^{ab}	No. of accidents ^a
Intention	0.26***	-0.01	0.05	-0.12**	-0.22***
Instrumental attitude	0.02	-0.01	-0.04	-0.08	-0.13***
Affective attitude	0.17***	-0.03	0.01	-0.18***	-0.09
Injunctive norm	0.13***	0.04	-0.01	-0.15***	-0.12**
Descriptive norm	0.15***	0.04	0.06	-0.16***	-0.11**
Perceived ease	0.12**	0.01	-0.04	-0.19***	-0.18***
Perceived controllability	0.03	0.07	-0.06	-0.13**	-0.15***
Moral norm	0.15***	0.05	0.08	-0.15***	-0.13***
Affective reaction	0.30***	-0.03	-0.05	-0.09*	-0.11**
Prior behaviour	-0.24***	0.08	-0.04	0.15***	0.21***
No. of accidents ^a	-0.07*	-0.13***	0.11**	0.20***	1
finest ^a	0.12**	0.07	0.29***	1	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, ^a Spearman rho, ^b N = 586

4. Discussion

The aim of the current study was to determine the intention of Iranians towards compliance with traffic rules using the extended version of the theory of planned behaviour as a framework. The results of simple correlations indicated that intention to comply with traffic rules was significantly related to all constructs of the extended TPB. In addition, the strongest link was between affective reaction and intention; that is drivers who do not feel guilty of not observing traffic rules have less intention to comply with traffic rules. The results of the multiple regression analysis showed that all the extended variables of the TPB were responsible for 45% of the explained variation in intention to comply with traffic rules. Studies on the intention to perform specific driving behaviours such as exceeding speed limits, dangerous overtaking, light running or drink driving reported that between 23% and 47% of the variance was explained by the original TPB model of behavioural attitude, subjective norm and perceived behavioural control [19, 28, 40]. In another study, the bi-dimensional constructs of the TPB explained 55% of intentions to speed [14]. However, some researchers used general terms (obeying traffic rules) within the TPB model [12, 17, 38]. Thus, among Iranian drivers, the efficiency of the theory for explaining intention to comply with traffic rules seems compatible with the results of previous research. For this Iranian sample, drivers who intend to obey traffic rules feel more guilty about breaking traffic rules, have people important to them obeying traffic rules, believe breaking traffic rules is wrong, their prior behaviour is to obey traffic rules, also they find obeying traffic rules pleasant and beneficial. In the current study, attitude which is based upon personal evaluation of the behaviour of obeying traffic rules was assessed by two dimensions. Both dimensions of behavioural attitude were important, with affective attitude (feeling that obeying traffic rules is pleasant) a little stronger than instrumental attitude (finding obeying traffic rules to be beneficial). However, both dimensions of the construct stood after affective reaction (feeling guilty), moral norm (thinking that not complying is wrong), descriptive norm (people important to them comply with traffic

rules) and prior behaviour (previously complying with traffic rules), in terms of strength. The role of attitudes in predicting intentions in various driving behaviours has been consistently reported across a number of studies [14, 15, 20, 29]. The significance of both dimensions of attitude has also been supported in a range of studies [14, 15]. The construct of PBC as an indication of self-efficacy with respect to behaviour was assessed by perceived ease and perceived control. In the current study, both dimensions appeared weak as explanations of intentions to observe traffic rules. Consistent with Elliott, et al.'s [15] study, perceived ease but not perceived control was the significant independent component of PBC in predicting intention to comply with traffic rules.

However, in the study by Forward [19] perceived ease was the strongest predictor for intention to overtake. The weak role of PBC is consistent with those studies that failed to find a significant independent effect of PBC [36]. With regards to the socially expected mode of conduct (subjective norm), the current study assessed it with a bi-dimensional measure of the construct, including injunctive norm, and descriptive norm (people important to the driver approve of traffic rule compliance and comply with traffic rules, respectively). Consistent with some studies [27, 38] and inconsistent with others [10, 12, 20, 30], the traditional measure of subjective norm, i.e., injunctive norm was non-significant. A preliminary argument raised is that the "significant others" is implicit, and an explicit "significant others" may influence the results differently. However, in the study of Victoir, et al. [38] the "significant other" was explicit (parents, friends) and the result was still non-significant. Another argument for the weak results for subjective norm has been suggested by Forward [17] that the interpretation of subjective norm items by people is difficult, leading to "false consensus" or "false uniqueness". The last argument to make is that perceived social pressure from significant others is not as important as personal factors (i.e., attitudes, moral norm, affective reaction) at influencing Iranians to obey/disobey rules. Of particular interest is the unique effect of descriptive norm and its much higher Beta coefficient than that of injunctive norm in the present study. These results are consistent with the studies demonstrating that descriptive norm and injunctive norm are distinct from each other and that descriptive norms were a better predictor of intentions than injunctive norms [9, 15, 19]. Among Iranians, perceived social pressure from significant others is less important than their perceived behaviour. In summary, the differential value of the dimensions of the original TPB i.e., behavioural attitude, subjective norm and PBC to predict intention supports the bi-dimensional view of the constructs. Of the dimensions important for predicting intention, both components of instrumental and affective attitude, descriptive norm but not injunctive, perceived ease but not perceived control were independently significant. The present results are in line with the results of Elliott, et al.'s [15] study where a causal analysis was used. In the present study, affective reaction (feeling guilty when breaking traffic rules) and moral norm (thinking that not obeying traffic rules is wrong) were among the strongest predictors having a unique contribution of 32% and 18% respectively for the variance of intention to comply with traffic rules when taking the variance of the other variables into account. The significant role of moral norm in predicting intention is consistent with previous studies [7, 8, 10, 14, 15, 28, 30]. For example, in Elliott and Thomson's [14] study the beta coefficient for moral norm was 16% after controlling for the bi-dimensional variables of TPB, self-identity, anticipated regret and past behaviour for intentions to speed. In Conner, et al.'s [10] research the amount was 14% after controlling for past behaviour, anticipated affective reaction and the original TPB variables for driving at speed. In the present study, the importance of feeling guilty after not obeying traffic rules was substantial and a great deal more than that for personal obligation to obey or disobey traffic rules. Prior behaviour had an independent effect on the intention to obey traffic rules once the TPB variables were taken into

account supporting the argument that prior behaviour is a predictor of unique variance in intentions in the TPB and that it was consistent with current intentions [7, 8, 10, 14, 18]. The amount of variance added to the prediction of intention by past behaviour was an additional 2% in the current study. This amount is less than the average amount of 7.2% that was reported [8]. In Elliott and Thomson's [14] study past behaviour added 6% and had an independent effect of 34% for intentions to speed, after taking the variance of instrumental and affective attitude, perceived ease, perceived controllability, injunctive norm, descriptive norm, moral norm, anticipated regret and self-identity into account.

4.1. Relationship of TPB with demographic features

The last analyses of the present study found some significant relationships between the TPB variables and demographic features. A higher number of reported accidents was linked negatively with most constructs within the TPB, albeit in moderate way. The strongest link was with intention and prior behaviour being able to explain as much as 5% and 4.4% of the variance, respectively. The lowest link was with the descriptive norm and affective reaction both with an effect size of 1.2%. Possibly, having a positive motivation to observe traffic rules and committing less disobedience leads to a lower number of accidents experienced.

For the reported fines, perceived ease and affective attitude had the strongest link and affective reaction the weakest link with effect sizes of 3.6%, 3.2% and 0.8%, respectively. Those reported to have been fined were more likely to perceive traffic rule obedience harder and to enjoy disobedience. Gender and length of driving per day played significant roles for reported fines. Men and those spending more time driving reported to have been fined more often than women and those spending less time driving. On the other hand, the level of education and length of driving per day played significant roles for reported number of accidents. The more time spent driving and the lower the level of education the higher number of accidents reported.

Consistent with a large number of other studies age was related to most TPB variables, indicating a growing positive intention, and attitudes towards compliance with traffic rules with age [19, 27, 44]. In the regression, when taking the constructs of TPB into account, age was still able to explain intention as much as 6% which was fairly similar to that reported by Forward (2009). However, when including prior behaviour, age was no longer a significant factor.

Consistent with Newman, et al. [27] gender did not relate to the TPB components, though it related to descriptive norm, and prior behaviour. Education and length of driving as a distal factors had no relationship with the TPB components and its extended variables.

4.2. Limitations

There are four main limitations to this study; (1) the measurement of prior behaviour, (2) the questions referred to general, rather than specific, driving violations, (3) the study focused on driving intentions rather than future driving behaviour and so the full TPB model was not operationalised, (4) response bias and/or sampling bias. The study used the self-reported frequently occurring behaviours as prior behaviour, indicating habitual behaviour. Whether these reported frequent behaviours were automatic is not certain. However, it is evident that these behaviours occur on a regular basis. Nevertheless, the current study operationalized prior behaviour by asking participants to indicate the frequent occurrence of several traffic behaviours during the past year. Some studies used a single item to assess prior behaviour [10, 14, 30]. Also, in the current study the questions were expressed in general terms. The items did not focus on a

specific driving regulation/violation. This might be assumed to be contrary to the usual definition of behaviour within the TPB. However, there are several studies where a more general term of traffic behaviour has been used [12, 17, 23, 31, 38].

Future studies could add to our results by focusing on more specific driving behaviours. Further, the study did not operationalise the full standard TPB model as it focused on intention rather than on behaviour. However, the strong association of intentions with behaviour has been established in a range of studies. In addition to these, scores for traffic violations were low and intentions to comply scores were quite high. Sampling bias and/or response bias could be noted. Given the possibility of socially desirable responses in self-reported measures, there might be a response bias.

However, significant relationships between self-reported driving behaviour and objectively assessed behaviour have been reported [38]. For sampling bias, it seems that the results of the current study are for fairly compliant drivers or drivers who intend to observe traffic rules. Therefore, further research could focus on those drivers who frequently violate traffic rules.

4.3. Further research

A number of other predictors of intentions have been reported in the literature [8]. Three additional variables i.e., affective reaction, moral norm and prior behaviour was examined in the present paper with noteworthy results. Examining other variables such as self-identity and risk perception would give a more thorough picture of traffic behaviour in Iran. In terms of methodology, the current study did not use a specific scenario for assessing the TPB variables because we did not want to focus on a specific driving behaviour. However, focusing on a specific driving behaviour and designing an appropriate scenario would increase our understanding of the usefulness of the TPB model among Iranian drivers.

Additionally, Ajzen [1] argued that past behaviour exerts its influence on behaviour via the mediation of PBC. This could be a topic for further research. Also, to explore the automaticity of prior behaviour, it can be examined among experienced and novice drivers. Accordingly, it would be expected that prior behaviour has a stronger effect for experienced drivers than the novice ones.

4.4. Implications

The results of this study can be applied to future Iranian road safety educational policies and programs. The strongest predictors of Iranian drivers' intentions to comply with traffic rules were feeling guilt after violating traffic rules, a moral obligation to obey traffic rules and seeing traffic rule obedience as normal (the psychological constructs of affective reaction, moral norm and descriptive norm).

These constructs could be regarded as a potentially positive psychological tool for influencing Iranian drivers' behaviour. Thus, in order to deter Iranian drivers' intention to commit traffic violations, educational policies and programs should focus on the wrongs of engaging in aberrant driving behaviour, highlight the number of drivers who observe traffic rules and place emphasis on the positive consequences of intending to engage in such behaviours. Finally, intentions to comply with traffic rules were influenced by past behaviour, that is, by the rate of previous traffic violations. Also, higher rates of past traffic violations were correlated to more traffic collisions and traffic fines. Iranian road safety education programmes could highlight the role of frequent bad driving behaviours in high rates of traffic collisions and traffic fines, or highlight the role of good driving behaviours in avoiding traffic collisions and traffic fines.

5. Conclusions

These data add to the already considerable body of evidence supporting the role of the social cognitive constructs in predicting intention to comply with traffic rules. The psychological constructs within the TPB and the additional variables of affective reaction, moral norm and prior behaviour can determine the social cognitive factors underlying the intention of driving within the law among Iranians. Important dimensions for predicting intention were both components of instrumental and affective attitude, descriptive norm but not injunctive, perceived ease but not perceived controllability, moral norm, affective reaction and prior behaviour. The inclusion of prior behaviour improved the predictive power of TPB on intentions to observe traffic rules. Age, educational level and length of driving did not relate to the TPB variables. Gender differences were found in descriptive norm, prior behaviour and traffic fines.

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