Public Intention to Pay for Road Safety Improvement: A case study of Pakistan

Fazle Subhan[a], Shengchuan Zhao[b *], El Bachir Diop[c], Yasir Ali[d], Hongmei Zhou[e]

[a] Faculty of Management & Economics, Dalian University of Technology, Dalian, 116024, PR China. fsubhan@dlut.edu.cn; fsubhan71@yahoo.com

[b] School of Transportation and Logistics, Dalian University of Technology, Dalian, 116024, PR China. szhao@dlut.edu.cn

[c] Post-doctoral fellow at Center of Urban Systems, University Mohammed VI Polytechnic, No. 660 Hay Moulay Rachid, Ben guérir, 43150, Morocco. elbass88@yahoo.fr

[d] School of Civil and Environmental Engineering, Faculty of Engineering, Queensland University of Technology, 4001, Australia. y2.ali@qut.edu.au

[e] School of Transportation and Logistics, Dalian University of Technology, Dalian, 116024, PR China. hzhou@dlut.edu.cn

Abstract

The dramatic increase in road traffic accidents poses social and economic challenges to nations, especially for developing countries. Thus, road safety urgently needs to be significantly improved at the national level to reduce the number of road traffic accidents and costs associated with it. Understanding road users' acceptance of road pricing regarding road safety improvement is crucial for safety-related investment programs. As such, this paper investigated the factors associated with intention-to-pay (ITP) for road safety improvement in Pakistan. A structural equation model (SEM) was proposed to analyze the determinants of ITP according to the theory of planned behavior (TPB) combined with latent psychological variables describing the personal characteristics and evaluations of different measures. Furthermore, the moderating effects of some socioeconomic characteristics were also examined. A sample of 340 car drivers, interviewed at different locations of Peshawar, Pakistan, was used to test the model. Results of the SEM model indicated that Road Infrastructure Safety Perception and Perceived Behavioral Control have strong association with the ITP of car users' for road safety improvement. Risk Perception, Attitude towards Traffic Safety Responsibility, Attitude, Perceived Fairness, and Perceived Effectiveness were also associated with ITP. Differential age and gender-related moderating effects were also observed. Findings from this study are expected to assist the decision-makers in the effective planning and implementation of road safety projects and related budget allocations.

Keywords: Road safety; intention-to-pay; developing countries; theory of planned behavior; structural equation modeling.

1. Introduction

Pakistan, as a developing country, experience the rate of road traffic accident mortality as much as three times higher than that of high-income countries. More specifically, traffic accidents and injuries have devastating effects on the country's economy, resulting in a loss of approximately 6.48 million USD annually (1 USD = 154.4 PKR) (Ahmed, 2007). Not surprisingly, road traffic accidents in Pakistan are the second, fifth and eleventh-leading causes for disability, overall healthy-life-year losses, and premature fatality, respectively (Hyder and Morrow, 2000). These alarming statistics imply for interventions so that road safety can be significantly improved, which also motivates the current study.

Decisions in road safety management, with the aim of reducing the toll of road traffic accidents, are typically about actions (interventions, programs, regulations, projects, standards, etc.) that involve the expenditure of public money, and therefore, represent a significant financial burden on government as well as family budgets. Due to the scarcity of resources, especially in developing countries, policy makers have to prioritize among different investments towards road safety projects and social benefit policies (Chaturabong et al., 2011). Therefore, a monetary traffic safety valuation is required to compare the value of road traffic accident risk reduction with the costs of implementing road safety measures (Wijnen and Stipdonk, 2016). The monetized benefit of reduced road accident risk for each individual in society is captured through the intention-to-pay (ITP) (Svensson, 2009). According to microeconomic theory, the value of goods and services is derived from individual choices and, therefore, the loss of welfare to road traffic accident victims should be evaluated according to ITP of those affected by the reduction in road traffic accident risks. ITP is an individual's (or road users') willingness to financially contribute to a road safety program to reduce the risk of accidental death or injury. ITP aims to

provide sound understanding about the factors associated with the likeliness of people to finance in government projects. The identification of factors can help the policy makers to initiate campaigns for road safety programs, which will help in eliciting public contribution to road safety projects. In doing so, obviously the burden exerted by road accidents on country's economy would be drastically reduced. Although a large body of literature has studied ITP (or willingness-to-pay in general) for developed countries, e.g., Australia (Hensher et al., 2009), France (Haddak et al., 2016), Spain (González et al., 2018), our understanding on people intentions to financially support road safety programs in developing context, especially for Pakistan, remain elusive, primarily because of different social conditions and attitudes. This study, therefore, focuses on understanding ITP in the context of Pakistan.

Among many ways to study ITP and its association with factors (both observable and latent), the theory of planned behavior (TPB) seems to be the most relevant as it provides a theoretical background for any decision made towards the behavior in question. TPB, primarily a social psychological model, is an extension of the theory of reasoned action (Fishbein and Ajzen, 1977) and has been successfully used to understand a wide range of health behaviors and intentions. According to this theory, an individual's behavior is a function of their behavioral intention that is often determined by the individual's attitude, subjective norms, and perceived behavioral control. In nutshell, '*Attitude*' refers to an individual's positive/negative evaluation of the behavior of interest (Fishbein and Ajzen, 1977). '*Subjective Norms*' are perception of peoples reflecting subjective bias for their close acquaintance that they should or should not perform an activity. In other words, the more an individual perceives that others think he or she should engage in a behavior, the more likely it is that the person will do so. '*Perceived Behavioral Control*' is assumed to reflect past experience as well as anticipated obstacles. The more

resources and opportunities that individuals think they possess along with the power of internal and external constraints, the greater their perceived control over the behavior (Elie-Dit-Cosaque et al., 2011, Ajzen, 1991). Previous studies have demonstrated the use of predictive utility of TPB to better understand the intention and decision-making process of the people (Sun et al., 2016, Forward, 2009, Zhou et al., 2009a), and thus form the basis for its selection in this study.

Although several studies have investigated the relationship between TPB and psychological factors, only a few of them have focused on studying the relationship between TPB and ITP for accident risk reduction, with specific focus on developed countries. Comparisons of the estimated values of road traffic accident risk reductions across countries with differed levels of development, however, is not possible as many factors (e.g., income, behavior, attitude, etc.) differ significantly (Wegman, 2017). Since these factors may vary across countries, it is important to examine the determinants of ITP for road accident risk reductions in Pakistan to serve as a basis for policymaking in the road safety projects in the country. In doing so, it is envisioned that the simple TPB would fail because it only explains a small portion of the variance. In order to explain a larger portion of the variance and to be comprehensive, additional variables are required and should be added to the TPB (Conner and Armitage, 1998). The additional variables must satisfy the context of the study of road accident risk reduction. Drawing from previous studies (Mon et al., 2019, Zheng et al., 2019, Sun et al., 2016, Haddak et al., 2016, Eriksson et al., 2006, Hensher and Sullivan, 2003), Road Infrastructure Safety Perception, Risk Perception that reflects the perception of involvement in road traffic accident, Attitude towards Traffic Safety Responsibility, Perceived Fairness and Perceived Effectiveness were among the most significant variables associated with the ITP, but unfortunately never been considered. Using the simple TPB without these important variables may results in omitted

variable bias (see Ali et al. (2020) and ITP estimates could be unrealistic. As such, an extension to the simple TPB is required to fully understand ITP for safety improvement in the context of Pakistan. This study aims to fills this research gap.

While studying ITP, moderating effects are sought to provide sound understanding and insights into individual characteristics, which are otherwise difficult to obtain. For instance, moderators help in explaining the circumstances that can cause a weak or an inconsistent association between the variables that were expected to have a strong relationship and vice versa. Recognizing the strength and multi-facet inferences provided by moderating effects of individual characteristics, majority of studies, unfortunately, appears to overlook this important, which is clearly not proportional to its importance. Although a few studies that used moderating effects are Unified Theory of Acceptance and Use of Technology (Tran et al., 2019), these studies did not focus on ITP for road safety improvement.

Motivated by these research gaps, the objective of this study is to understand ITP in Pakistani context through the extended TPB. ITP for road safety improvement will be used as a latent variable instead of an observed variable. The relationships among the variables are tested using Structural Equation Modeling (SEM) approach on a sample of 340 participants collected from a metropolitan city of Pakistan. In order to demonstrate the validity of the data used in this study, the measurement model is also tested for Common Method Bias. Furthermore, using the developed model, this study also investigates the moderating effects of individual characteristics including gender, age, personal income and accident experience on the relationships between ITP and independent variables using multiple group comparisons. This will help in a more in-depth analysis and provide new insights into the relationship between the ITP for road accident risk

reduction and the independent variables, thereby adding a great value in our understanding on how to improve road safety.

2. Method

2.1 Model and Hypotheses

2.1.1 *Theory of Planned Behavior (TPB)*

The theory of planned behavior (TPB) is an extension of the theory of reasoned action (Fishbein and Ajzen, 1977) and has been widely used in predicting the intention towards performing the actual behavior (Zhou et al., 2016, Zhou et al., 2009a). The TPB posits that Attitude, Subjective Norm, and Perceived Behavioral Control predict behavioral intention as shown in Figure 1.

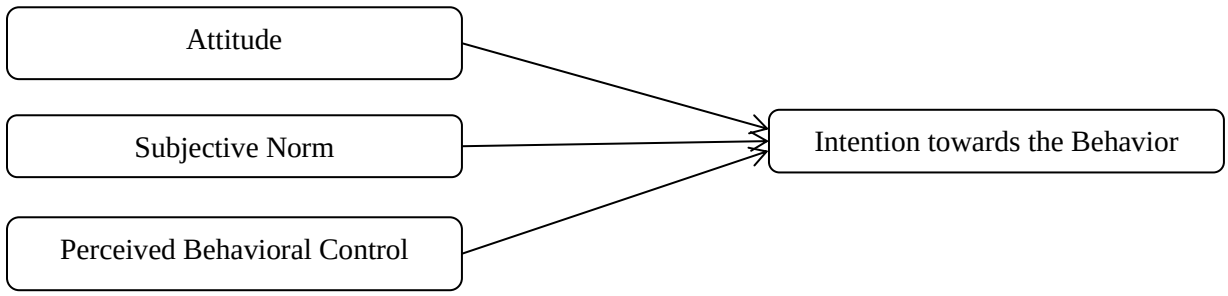

Figure 1. Theory of Planned Behavior

TPB is a simple yet robust model and has been widely adopted in the transportation field. The main reason for its wide use is its ability to predict the intention towards the actual behavior. TPB has been adopted to study people's intention towards traffic rules violation (Castanier et al., 2013), drivers'/riders' behavior including speeding (Cristea et al., 2013), and using mobile phone while driving (Zhou et al., 2009b). These studies demonstrates that the efficacy of TPB in supporting the hypothesized relationships. Thus, this paper adopts TPB to examine road user's ITP for road safety improvement and proposes the following hypotheses:

H1: Attitude is positively associated with ITP

H2: Subjective Norm is positively associated with ITP

H3: Perceived Behavioral Control is positively associated with ITP

In the context of this study, these hypotheses suggest that individuals who possess a more favorable attitude towards ITP and subjective norm as well as greater perception of their control over the resources (money) are more likely to pay for road accident risk reduction and road safety improvement.

Acceptance of transportation related safety policies may also depend on individual's characteristics (Haddak et al., 2016) and evaluations of the measure (Sun et al., 2016). Therefore, this study attempts to examine the road users' ITP for road accident risk reduction and road safety improvement by using the extended TPB. The TPB is extended by incorporating personal characteristics including road infrastructure safety perception, risk perception, and attitude towards road safety responsibility. In addition, the individual's perception of effectiveness and perceived fairness of road traffic safety policy and its related toll will also be investigated by incorporating them into the TPB. The next sub-sections describe the relationships between the additional variables and the ITP.

2.1.2 *Road Infrastructure Safety Perception*

Road infrastructure safety perception determines the road users' perception of their environment because some elements of a poor road environment may mislead a road user perception (Aworemi et al., 2010) and create human error responsible for accident involvement (Ahmed, 2013). A sound road infrastructure provides a safe travel environment and reduces the responsibility of road users, and is thereby associated with their behavior (Stanton and Salmon, 2009). Studies have found that individuals are likely to be willing to pay for safe road

infrastructure (Bhattacharya et al., 2006). Moreover, Hensher and Sullivan (2003) found that people are likely to pay to travel on sound road infrastructure. In the light of previous studies, we propose:

H4: Perception of unsafe road infrastructure is positively associated with ITP

2.1.3 *Risk Perception*

Risk perception is determined by the information of the impending hazards in traffic environment and on the ability of road user to perceive the potential hazards resulting into actual road traffic accidents (Brown and Groeger, 1988). The priority, contribution to safety, and the judgment of the severity of the consequences of road traffic accidents is associated with anticipated worry (Rundmo and Moen, 2007, Rundmo and Moen, 2006) and perception of risk of accident involvement, thereby influences behavior towards road traffic safety (Backer-Grøndahl et al., 2009). According to Hensher et al. (2009), an individual's ITP for road accident risk reduction is directly related to the valuation of his/her own life and personal risk perceptions. Aligned with the literature, we hypothesize:

H5: Risk perception is positively associated with the ITP

2.1.4 *Attitude towards Traffic Safety Responsibility*

In many cases, people, instead of being self-interested individuals, act in a context of social interest (Sen, 1987) and care about the safety of others (Andersson and Lindberg, 2009). The attitude towards traffic safety responsibility measures the extent to which an individual feels responsible for traffic safety and accident prevention (Yao and Wu, 2012). People with positive attitude towards traffic safety responsibility respect traffic rules and consider themselves to be responsible for the prevention of self and others' traffic accident (Zheng et al., 2019, Yang et al.,

2013, Yao and Wu, 2012) and are likely to pay for traffic accident risk reduction and road safety improvement (Lindberg, 2003). Following this relevant literature, we hypothesize:

H6: Attitude towards road traffic safety responsibility is positively associated with ITP

2.1.5 *Perceived Fairness*

The implementation of a public policy depends on public opinion (Bertsimas et al., 2011). A policy is acceptable to the public if they consider the cost to be fair (Georgiadis et al., 2006). Therefore, a relationship between the perceived fairness of a policy and road users' intention to pay for it can be assumed. Furthermore, previous research has demonstrated the strong relationship between perceived fairness and the public's acceptance or rejection of a monetary scheme (Sun et al., 2016). Thus, we propose:

H7: Perceived fairness is positively associated with the ITP

2.1.6 *Perceived Effectiveness*

The perceived effectiveness of road safety policies refers to the degree to which a road user believes that a given road safety policy reduces the risk of road traffic accidents and improves road safety as a whole (Auzoult et al., 2015). Road users are already aware of the risk and consequences of road traffic accidents, and therefore, the more they perceive a road safety policy to be effective in reducing the risk of accidents, the more likely they will change their intentions and behaviors (Auzoult et al., 2015). Previous studies found that if the public perceives the policy to be effective and has no effect on their own interests, they will accept the measure (Eriksson et al., 2006). Therefore, we propose:

H8: Perceived effectiveness of road safety is positively associated with ITP

Figure 2 depicts the hypothesized research model where all the considered hypotheses are shown to be associated with ITP.

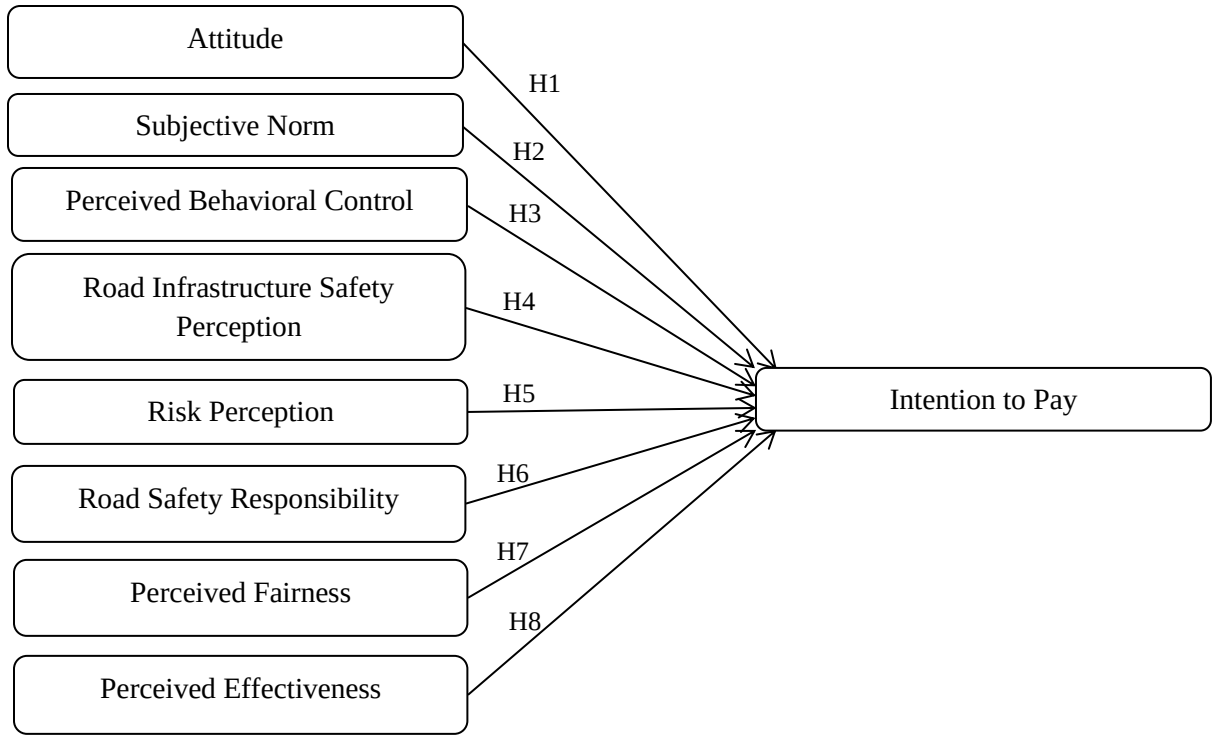

Figure 2. The proposed extended TPB research model

2.1.7 *Moderating effects of socio-economic characteristics*

Acceptability of public policies (road pricing) also depends on socio-demographic characteristics to some extent (Haddak et al., 2016, Sun et al., 2016). It has been observed that the impact of road condition on driving behavior is more prominent in women compared to men (Ministry of Justice, 2012). Many studies found an association between risk perception, varying from individual to individual, and ITP for road safety improvement (Haddak et al., 2016). Similarly, older drivers perceive a greater risk of road traffic accident involvement (Rhodes and Pivik, 2011), thereby discern road safety interventions to be more effective (Auzoult et al., 2015).

Another important factor from age and gender that may be associated with ITP is income. The association of income with acceptability of road pricing has been investigated by many studies (Eliasson, 2016). Wealthier people are more likely to pay for their safety than their counterparts (Chaturabong et al., 2011). Similarly, it has also been found that the victims of road traffic accidents are more anxious (Rundmo and Moen, 2006) and more likely to pay for road safety improvement (Haddak et al., 2016).

Therefore, this study adopts a multi-group comparison of certain individual characteristics including gender (male vs. female), age (less/equal to 30 years vs. above 30 years), personal income (high-income vs. middle-/low-income), and accident experience (direct/indirect victims vs. non-victims) to test whether these characteristics moderate the association of the hypothesized predictors with ITP for road safety improvement.

2.2 Data Collection

A carefully designed questionnaire is essential for the reliability and validity of the data for further analysis. To this end, a questionnaire was designed, consisting of three parts. The first part was the information on the number and risk of road traffic accidents and the introduction of a new road safety enhancement policy. The second part consisted of several questions about the respondents' demographics such as age, gender, educational level, occupation, etc. The third part focused on the items used to assess the constructs of the extended TPB.

2.3 Study Area

The questionnaire surveys were administered in Peshawar, the capital of Khyber Pakhtunkhwa province, which is a motorized and the eighth-most populous city (with population of 2,202,946) of the country. The annual growth rate of the city (3.26%) is higher than the national average

(2.1%) (World Population Review, 2020) due to significant rural-to-urban migration. According to Rescue 1122 (Waseem et al., 2011), a total of 8,438 road traffic accidents comprising of fatal and different non-fatal accidents occurred in the city during 2018. This figure was used, in the introductory part of the questionnaire, to inform the respondents about the seriousness and the risk of road traffic accidents.

2.3.1 *Participants*

A traffic accident is a well-known tragedy and, every individual, whether or not a road user, is well informed of its risk and consequences. However, as many people think that it is the government's job to bear the cost for such road safety policy/measure, therefore a clear explanation to the respondents was still needed. Also, as this was the first study in the country, we started with one specific group of road users, i.e., car drivers. Unfortunately, in Pakistan, many educated people do not use the internet except for some social applications, so it was not feasible to conduct an online survey. Therefore, the survey was conducted on-site through face-to-face interviews. Undergraduate civil engineering students of Iqra National University Peshawar, Pakistan, were trained for conducting the on-site survey. Furthermore, the inclusion criteria were that the respondents must have at least 10^{th} grade education (a minimum threshold in the education system in Pakistan) and resided for more than one year in Peshawar city, as they could understand the risk and other information provided in the study area. The safety enhancement program was described to the participants as a new public policy. Respondents were asked to state their answers in the way they actually think and behave, instead of what they should (to avoid biased answers). In total, 407 car drivers, approached at different locations of Peshawar city, agreed to participate in the study. During preliminary screening and analysis, we excluded invalid responses and the responses that did not fulfill the inclusion criteria. Only 340

valid responses from car drivers, who fulfilled the inclusion criteria, were considered for the analysis. Table 1 shows a summary of the respondents' socio-economic characteristics.

Female drivers were under-represented in the sample (23.82%) compared to their actual proportion in the country (48.77%) (Statistics, 2017). This under-representativeness is associated with fewer female drivers in the city as well as in the whole country. Majority of respondents had ages within the range of 18-40 years (73.52%). Most of the old people do not drive their cars by themselves due to poor health conditions and relatively early ageing and therefore their ratio is low in the overall drivers' population in the country. This is also evident from the study sample.

Table 1. Summary of Respondents' Socio-demographic Characteristics

Demographic	Category	Frequency	Percent (%)
Gender	Male	259	76.18
	Female	81	23.82
Age (years)	18 – 30	139	40.88
	31 – 40	111	32.64
	41 – 50	69	20.30
	> 50	21	06.18
Education	Secondary School (Matric)	54	15.88
	Intermediate	72	21.18
	Undergraduate Bachelor's Degree	130	38.23
	Above Bachelor's Degree	84	24.71
Family Status	Single	64	18.82
	Married without Children	95	27.94
	Married with Children	181	53.23
Personal monthly income (PKR)	0 - 30,000	91	26.77
	> 30,000 – 60,000	38	11.18
	> 60,000 – 100,000	78	22.94
	> 100,000	133	39.11
Residence time (years)	< 3	14	4.12
	3 – 5	94	27.65
	> 5	140	41.18
	Since Birth	92	27.06
Accident experience	Victims (direct/indirect)	117	34.41
	Non-victims	223	65.59

2.3.2 *Measurement Scale*

We used multiple items with different wordings to extract the real response of a driver towards the ITP. This is a comprehensive and very common procedure adopted in social sciences where a construct is often made by several questions with different wordings to examine the true behavior. All the items used in the study were already validated in previous studies (Zheng et al., 2019, Ram and Chand, 2016, Sun et al., 2016, Lee, 2009, Wu and Chen, 2005, Taylor and Todd, 1995). Using the validated items helped us avoid the problem related to measurement error in terms of latent variable modeling. Note that a few items may seem to be redundant to measure ITP; the use of multiple indicators, however, not only allows the testing of assumptions regarding measurement equivalence that cannot be tested with single-indicator data (Cole et al., 2005), but reduces the measurement error and improves the statistical estimation of the relationships between the latent constructs by accounting for the measurement error in the constructs (Hair et al., 2006). The wording and relevance of the selected items were discussed and verified by traffic safety experts, from the school of transportation and logistics, Dalian University of Technology, China. The wording of the items was further refined further through discussion with professors of transportation engineering, from civil engineering department, Iqra National University Peshawar, Pakistan. The medium of the survey was both English and Urdu (National language of Pakistan). The second version of the questionnaire (Urdu) was prepared by two English and Urdu language professors. The pilot survey was conducted in October 2019, which helped in further evaluation of the validity and wording of the chosen items. A total of 62 respondents, including undergraduate and graduate university students (33 in total), university staff members (12), and normal car drivers (17), were interviewed, and the results were used for further refinement of the items' wording.

311 All the items were measured on a five-point Likert scale. The items measuring the same
312 construct were put together in the same group to remove carryover effects (Davis and Venkatesh,
313 1996). A detailed list of the items used in the study is provided in Table 2.

314 Table 2. Items of the Extended TPB Constructs

Constructs	Items	Description	Source
Road Infrastructure Safety Perception (RISP) [a]	RISP1	How is the road travel in this City	(Ram and Chand, 2016)
	RISP2	How safe you feel driving on road as a driver	
	RISP3	How do you think about the design and standard of the roads you normally use (drive/ride)	
Risk Perception (RP) [b]	RP1	I may be involved in a road accident	(Zheng et al., 2019, Ram and Chand, 2016)
	RP2	Others may be involved in a road accident	
	RP3	I may be injured in a road accident	
	RP4	Others may be injured in a road accident	
	RP5	Feel unsafe that others could be injured by me	
	RP6	Feel unsafe that I could be injured	
Attitude towards Traffic Safety Responsibility (ATSR) [b]	ATSR1	I have the responsibility to avoid road traffic accident	(Zheng et al., 2019)
	ATSR2	I think safety is more important than speed	
	ATSR3	I feel responsible for others' road safety	
	ATSR4	I try what I can do to prevent any crash	
	ATSR5	I need to warn those people who violate traffic rules	
Attitude (ATT) [b]	ATT1	Paying for road traffic accident risk reduction and road safety improvement is a wise idea	(Taylor and Todd, 1995)
	ATT2	Paying for road traffic accident risk reduction and road safety improvement is a foolish idea	

	ATT3	I like the idea of paying for road accident risk reduction and road safety improvement	
Subjective Norm (SN) [b]	SN1	People who are important to me would think that I should pay for road traffic safety improvement program	(Lee, 2009, Wu and Chen, 2005)
	SN2	People who influence me would think that I should pay for road traffic safety improvement program	
	SN3	People whose opinions are valued to me would prefer that I should pay for traffic road safety improvement program	
Perceived Behavioral Control (PBC) [b]	PBC1	I think I would be able to pay for road traffic safety improvement program	(Lee, 2009, Wu and Chen, 2005, Taylor and Todd, 1995)
	PBC2	I think that paying for road traffic safety improvement program would be entirely within my control	
	PBC3	I think that I have the resources, knowledge, and ability to pay for road traffic safety improvement program	
Perceived Fairness (PF) [b]	PF1	To what extent do you perceive road traffic safety improvement toll to be a fair for you?	(Sun et al., 2016)
	PF2	To what extent do you perceive road traffic safety improvement toll to be a fair for others?	
Perceived Effectiveness (PE)	PE1	How effective do you think such a measure would be in improving road traffic safety? [c]	(Sun et al., 2016)
	PE2	How many percent do you think road traffic accidents would reduce if the measurement is implemented? [d]	
Intention-to-Pay (ITP) [b]	ITP1	Whenever possible, I intend to pay for road traffic safety improvement program	(Taylor and Todd, 1995, Davis, 1989)
	ITP2	I intend to pay for road traffic safety improvement program as much as needed	
	ITP3	To the extent possible, I would pay for road traffic safety improvement program [b]	

[a] Scales 1 – 5 (1 = 1 = very safe, 2 = unsafe, 3 =neutral/don't know , 4 = unsafe, 5 = very unsafe).
[b] Scales 1 – 5 (1 = 1 = strongly disagree, 2 = disagree, 3 =neutral/don't know , 4 = agree, 5 = strongly agree).
[c] Scales 1 – 5 (1 = 1 = not at all, 2 = not effective, 3 =neutral/don't know , 4 = effective, 5 = very effective).
[d] Percentage levels (0%, 5%, 10% , 20%, above 20%).

2.4 Analysis

As discussed above, the present study is intended to examine the determinants of public ITP for road safety improvement. SEM, being able to examine structural relationships between latent constructs[1] (psychological factors) (Hair et al., 2006), was used to test the hypothesized relationships between the independent latent variables and ITP (dependent variable). The statistical software *R* (lavaan package) (Rosseel, 2011) was used for SEM and to test the hypothesized relationships in Section 2.1. The model was built using the two-stage approach recommended by Anderson and Gerbing (1988). The first stage consisted of building a confirmatory factor analysis (CFA) as a pre-requisite to assess the validity and reliability of the items of the latent constructs (measurement model) (Kline, 2011). Once the CFA was deemed adequate, the relationships between the ITP and independent variables were simultaneously tested using SEM.

The measurement invariance test was first used to ensure the validity of the multi-group comparison. As the next step, to investigate which relationships in the model were moderated by the personal characteristics (e.g., age. gender, income, etc.), single paths were constrained one at a time to be equal in both the groups for each characteristic.

3. Results

3.1 Normality Check

In order to verify which estimation method would be more suitable for the data, a normality check was performed by computing the multivariate normality detected through Univariate

[1] The latent variables used in this study are reflective indicators that are more than just a shorthand way of referring to an empirical combination of measures, which cannot be adequately represented by a scale score. In contrast, using a summed scale score (average item score) to represent a reflective indicator construct results in inconsistent structural estimates of the relationships between the latent constructs because it ignores the effects of measurement error (Jarvis et al., 2003).

distributions. As a rule of thumb, absolute values of skew indexes larger than 3 and absolute values of kurtosis indexes larger than 10 indicate that there is severe violation of normality. In this study, skew indexes range from -1.346 to 0.351, kurtosis indexes range from -1.461 to 0.884. Thus, we can assume that our data is normally distributed, and therefore, a maximum likelihood estimation method was adopted for building CFA and SEM models. A detailed list of the Univariate skewness and kurtosis for each indicator is provided in Table A in the appendix.

3.2 CFA model results

3.2.1 *Reliability and validity of the constructs*

The properties of the CFA model, also called the measurement model, were assessed by checking the reliability, convergent and discriminant validities. Reliability reflects the internal consistency of the indicators measuring a given construct. The composite reliability for each construct was higher than 0.6, thus confirming the reliability of the model. Convergent validity demonstrates if different indicators measuring the same construct have strongly correlated scores. Table 3 shows that the factor loadings for the indicators measuring the same construct were statistically significant and greater than 0.5 and the average variance extracted for each construct was higher than 0.5, which confirmed the convergent validity of the measurement model. Discriminant validity is evaluated if the constructs are adequately distinguishable from one another and is established when the square root of the average variance extracted for each construct is much larger than any of the correlation among any pair of latent constructs. Table 4 shows that the measurement model meets the requirement for discriminant validity. Note that recognizing high variability in the data, the level of significance is considered as 10% for this study, which corroborates to some existing studies (see Ali et al. (2018) for more details).

363 Table 3. Validity and Reliability of the Measurement Model

Constructs	Indicators	Mean	SD	Factor Loadings	Cronbach's Alpha	CR	AVE
Road Infrastructure Safety Perception (RISP)	RISP1	3.653	1.237	0.863	0.889	0.889	0.728
	RISP2	3.612	1.375	0.838			
	RISP3	3.591	1.299	0.860			
Risk Perception (RP)	RP1	3.923	1.177	0.851	0.939	0.939	0.719
	RP2	3.847	1.276	0.854			
	RP3	3.865	1.262	0.855			
	RP4	3.841	1.174	0.830			
	RP5	3.847	1.283	0.838			
	RP6	3.853	1.181	0.859			
Attitude towards Traffic Safety Responsibility (ATSR)	ATSR1	3.803	1.264	0.892	0.947	0.947	0.780
	ATSR2	3.794	1.328	0.877			
	ATSR3	3.797	1.311	0.884			
	ATSR4	3.741	1.336	0.878			
	ATSR5	3.827	1.260	0.886			
Attitude (ATT)	ATT1	3.865	1.180	0.866	0.903	0.904	0.758
	ATT2	3.785	1.270	0.850			
	ATT3	3.882	1.199	0.899			
Subjective Norm (SN)	SN1	3.253	1.427	0.882	0.918	0.918	0.789
	SN2	3.232	1.494	0.996			
	SN3	3.235	1.465	0.885			
Perceived Behavioral Control (PBC)	PBC1	3.753	1.409	0.874	0.883	0.884	0.717
	PBC2	3.750	1.402	0.850			
	PBC3	3.762	1.469	0.815			
Perceived Fairness (PF)	PF1	3.459	1.413	0.859	0.849	0.850	0.739
	PF2	3.512	1.369	0.860			
Perceived Effectiveness (PE)	PE1	3.456	1.368	0.778	0.813	0.814	0.686
	PE2	3.503	1.282	0.882			
Intention to Pay (ITP)	ITP1	3.688	1.225	0.797	0.819	0.820	0.603
	ITP2	3.762	1.262	0.736			
	ITP3	3.756	1.198	0.797			

364 *Note: CR – Composite Reliability; AVE – Average Variance Explained.*

365 Table 4. Discriminant Validity of the CFA Model

	RISP	RP	ATSR	ATT	SN	PBC	PF	PE	ITP
RISP	**0.853**								
RP	0.194	**0.848**							
ATSR	0.237	0.486	**0.883**						
ATT	0.175	0.421	0.250	**0.871**					
SN	0.209	0.352	0.295	0.257	**0.888**				
PBC	0.149	0.454	0.436	0.303	0.274	**0.847**			
PF	0.231	0.518	0.387	0.469	0.278	0.388	**0.860**		
PE	0.183	0.450	0.488	0.357	0.222	0.407	0.454	**0.828**	
ITP	0.390	0.573	0.534	0.459	0.365	0.533	0.538	0.509	**0.777**

366 3.2.2 *Goodness-of-Fit Measures of the Measurement Model*

367 Several goodness-of-fit indices are commonly used to assess the fit of the CFA model including
368 chi-square (χ^2), Goodness-of-Fit Index, Adjusted Goodness-of-Fit Index, Normalized Fit Index,
369 Comparative Fit Index, Tucker-Lewis Index, Standardized Root Mean Square Residual, and the
370 Root Mean Square Error of Approximation. An insignificant chi-square test ($p > 0.05$) is an
371 indication of a good model fit. However, the chi-square statistic being too sensitive to sample
372 size nearly rejects the model with a large sample size. To minimize the impact of sample size, an
373 alternative approach called the normed chi-square (χ_2/df) is used. As shown in Table 5, the
374 comparison of all the fit indices with their corresponding thresholds provided evidence of a good
375 model fit (except the chi-square statistic), thereby demonstrating that the measurement model
376 exhibited a good fit for the data. Other indicators are also present in Table 5 and can be
377 interpreted similarly.

378 Table 5. Overall Fit of the CFA Model

Measures	**Value**	**Recommended Value**
Normed Chi-square (χ^2/*df*)	1.644	≤ 3.0
Goodness-of-Fit Index (GFI)	0.900	≥ 0.90
Adjusted Goodness-of-Fit Index (AGFI)	0.874	≥ 0.80
Normalized Fit Index (NFI)	0.924	≥ 0.90
Comparative Fit Index (CFI)	0.968	≥ 0.90
Tucker-Lewis Index (TLI)	0.963	≥ 0.90
Root Mean Square Error of Approximation (RMSEA)	0.044 (0.959) [a]	≤ 0.80
Standardized Root Mean Square Residual (SRMR)	0.030	≤ 0.80

379 *Note: χ^2 = 606.711, df = 369, p-value < 0.001, [a] p-value < = 0.05*

380 3.2.3 *Assessment of common method*

381 As all the variables in this study were collected from the same source (car drivers), and at the
382 same time using a single data collection method, and therefore, there may be a possibility that
383 common method variance (Podsakoff and Organ, 1986) may have affected the strengths of the
384 observed relationships between the constructs. To assess the potential impact of this form of bias,

the hypothesized model in Figure 1 was re-estimated with a single common method factor approach (Wen Lim et al., 2018). According to this approach, a CFA was performed where the items were loaded upon their respective constructs; a common method factor was added to the model and paths from it to each indicator were drawn. Before running this analysis, all the loadings onto the method factor were held to be equivalent. Also, the method factor was specified as uncorrelated with the substantive constructs. The results of this test revealed that the fit indices of this model (χ^2/df = 1.712, GFI = 0.894, AGFI = 0.870, NFI = 0.918, CFI = 0.964, TLI = 0.959, RMSEA = 0.046, SRMR = 0.103), except SRMR, were very similar to those of the general measurement model in Table 5. The addition of a common method factor captured 28.52% of the total variance, which is less than the specified threshold of 50% in a recent study (Eichhorn, 2014). The results indicate that the addition of common method factor did not improve model fit (*p*-value for chi-square test > 0.1) and therefore due to parsimony, the initial model was retained. Meanwhile, although a small degree of common method variance may be present, it is not strong enough to meaningfully influence the results.

3.3 SEM

3.3.1 *Path analysis*

Table 6 represents the results of the path analysis with standardized coefficients. Similar to the CFA, the fit indices of the SEM results (χ^2/df = 1.644, GFI = 0.900, AGFI = 0.874, NFI = 0.924, CFI = 0.968, TLI = 0.963, RMSEA = 0.044, SRMR = 0.030), indicate that the model exhibited a good fit for the data. Road Infrastructure Safety Perception (β = 0.201), Risk Perception (β = 0.166), Attitude towards Traffic Safety Responsibility (β = 0.157), Perceived Fairness (β = 0.134), and Perceived Effectiveness (β = 0.116) were positively and significantly associated with the ITP for road safety improvement. Among the three variables of TPB, Attitude (β = 0.131)

and Perceived Behavioral Control (β = 0.202) were positively and significantly associated with ITP, while Subjective Norm was positive but insignificant (β = 0.067). Altogether, our developed model explained about 58% of the variance in ITP.

Table 6. SEM Results

Latent Variable	Coefficient	SE	*p*-value	Hypothesis
Road Infrastructure Safety Perception (RISP)	0.201	0.046	0.000	H_4 (Supported)
Risk Perception (RP)	0.166	0.062	0.009	H_5 (Supported)
Attitude towards Traffic Safety Responsibility (ATSR)	0.157	0.052	0.008	H_6 (Supported)
Attitude (ATT)	0.131	0.054	0.020	H_1 (Supported)
Subjective Norm (SN)	0.067	0.040	0.191	H_2 (Not supported)
Perceived Behavioral Control (PBC)	0.202	0.052	0.001	H_3 (Supported)
Perceived Fairness (PF)	0.134	0.053	0.041	H_7 (Supported)
Perceived Effectiveness (PE)	0.116	0.059	0.071	H_8 (Supported)

Note: Goodness of fit: χ^2 = 606.711, df = 369, p < 0.000, χ^2/df = 1.644, GFI = 0.900, AGFI = 0.874, NFI = 0.924, CFI = 0.968, TLI = 0.963, RMSEA = 0.044 (p =0.959), SRMR = 0.030

3.3.2 *Moderating effects*

The next natural step is to test the moderating effects of certain individual characteristics. In order to test moderating effects, a prerequisite is to create groups. Smaller groups could create insignificance issue and therefore to create equal numbers of participants in each age group, the respondents were divided into two groups, i.e., less/equal to 30 years and above 30 years. Similarly, the two income groups were split based on the personal monthly income of the respondents (Dawn, 2006) as ITP for road accident risk reduction varies with the income level (Haddak et al., 2016). The first income group (low/middle-income) comprised of respondents whose monthly income was less than or equal to 100,000 PKR. The second group (high-income)

comprised of respondents having monthly income above 100,000 PKR. The distribution of these groups is given in Section 2 (Table 1). The rationale for combining low- and middle-income people into a single group was to obtain equal numbers of participants in each group and avoid biasedness caused by dominant income group. This is also evident from our survey sample. Similarly, for the accident experience, the two groups were split based on whether the respondent him/herself (direct victim) or any of his/her close relatives or friends (indirect victim) has experienced any kind of road traffic accident in the last 3 years (Haddak et al., 2016). The victims (direct/indirect) of road traffic accidents are more anxious/worried about their road safety and this, in turn, is associated with their ITP for road traffic accident risk reduction and road safety improvement (Bhattacharya et al., 2006).

The measurement invariance test was performed for each characteristic as an initial step, and results are presented in Table 7. The results confirmed the measurement invariance between genders, age groups, income groups, and accident experience groups because the chi-square difference between the unrestricted and restricted (equal factor loadings called full metric invariance) models was insignificant ($p > 0.1$). As a next step, the moderating effects of the aforementioned individual characteristics on every path were tested using the Satorra-Bentler chi-square difference test between the models with (the model with a coefficient of the latent variable to be tested was fixed for all groups) and without the constraints. For example, to test the moderating effect of gender on risk perception (RP), the Satorra-Bentler chi-square difference test between the model with (the model with a coefficient of RP → ITP fixed for both groups) and without the constraints was conducted. The result was significant ($\Delta\chi^2(1) = 4.23$, *p-value* < 0.1), indicating the statistically significant difference between the two models. Thus, the magnitude of the two path coefficients was significantly different in the two models, implying

the presence of the moderating effect of gender on the path between Risk Perception and ITP. The association of Risk Perception with ITP was stronger for drivers above 30 years than for less/equal to 30 years' old. In the same way, the moderating effects of all the stated individual characteristics were tested for all the hypothesized relationships in Figure 2. Table 8 shows only the significant results for the moderating effects of gender, age, personal income, and accident experience on the relationships.

Table 7. Measurement Invariance Test for demographics

Groups	Model	χ^2 (df)	CFI	TLI	RMSEA	Δχ2 (Δdf)	Results
Gender	Non-restricted	1373.393 (834)	0.931	0.928	0.062	19.852 (21) p = 0.5307 (insignificant)	Supported
	Full-metric invariance	1393.244 (855)	0.931	0.929	0.061		
Age	Non-restricted	1159.930 (834)	0.957	0.956	0.048	29.472 (21) p = 0.1031 (insignificant)	Supported
	Full-metric invariance	1189.403 (855)	0.956	0.955	0.048		
Personal Income	Non-restricted	1153.251 (834)	0.956	0.954	0.047	28.755 (21) p = 0.12 (insignificant)	Supported
	Full-metric invariance	1182.005 (855)	0.955	0.954	0.047		
Accident Experience	Non-restricted	1230.485 (834)	0.947	0.944	0.053	19.852 (21) p = 0.5307 (insignificant)	Supported
	Full-metric invariance	1259.249 (855)	0.945	0.944	0.053		

The links between Attitude towards Traffic Safety Responsibility, Risk Perception, Perceived Fairness, and ITP were significantly different at the 90% confidence level between the two age groups. People aged above 30 years showed more positive attitude towards road traffic safety responsibility than their younger (less/equal to 30 years) counterparts. Results also show that above 30 year's aged group stated higher Risk Perception of accident involvement than young-aged group. The relationship between Perceived Fairness and ITP was significantly higher for young drivers compared to the drivers aged above 30 years. In addition, the link between Perceived Behavioral Control and ITP was significantly different at the 90% confidence level for

462 the two income groups. This implies the presence of the moderating effect of personal income on
463 the relationship between Perceived Behavioral Control and ITP. The relationship between
464 Perceived Behavioral Control and ITP was more prominent for the high-income group than for
465 the middle/low-income group. Similarly, the path between Risk Perception and ITP was
466 significantly different between the victims (direct/indirect) of road traffic accidents and the non-
467 victims. The association of Risk Perception with ITP was stronger for victims than for non-
468 victims.

469 Table 8. Moderating effect test for demographics

Moderator	Group		Path	$\Delta\chi2(\Delta df)$	*p*-value
Gender	**Male**	**Female**	RP → ITP	4..2293 (1)	0.03973
	0.117	0.524*			
Age	**Less/equal to 30 years**	**Over 30 years**	ATSR → ITP	3.9235 (1)	0.04761
	0.017	0.254*			
	0.002	0.270*	RP → ITP	4.1805 (1)	0.04089
	0.327*	0.061	PF → ITP	3.1951 (1)	0.07386
Personal Income	**High-Income**	**Middle/low Income**	PBC → ITP	6.8844 (1)	0.008695
	0.276*	0.063			
Accident Experience	**Yes**	**No**	RP → ITP	3.9371 (1)	0.04723
	0.375*	0.135			

470 *Note: * p < 0.1*

471 **4. Discussion**

472 This study aimed at understanding public ITP for road safety improvement through
473 psychological factors embedded in the simple TPB (i.e., the extended TPB). Using SEM, this
474 study found that all the variables of the extended TPB except the Subjective Norm were
475 significantly associated with the ITP for road safety improvement. Additionally, individual
476 characteristics moderated the association of certain independent variables with the ITP for road

accident risk reduction. The relationship between ITP for road accident risk reduction and independent variables. Results (including each component of the extended TPB and moderating effects) are further discussed in detail in ensuing paragraphs.

Road Infrastructure Safety Perception was identified as a significant antecedent of ITP for road safety improvement, thereby suggesting that individuals are mostly concerned about the road infrastructure they use to drive. This finding is intuitive as poorly maintained road infrastructure confuses road users (Aworemi et al., 2010) and leads to accident causation (Ahmed, 2013). The roads in the country suffer from blatant deterioration (Pak-RAP, 2018), and therefore, most car drivers in our survey stated that the roads in the city are not safe for driving and were, therefore, more likely to pay for road safety improvement. Another important factor is Risk Perception, which also had a significant association with ITP. This finding is quite intuitive and consistent with previous studies on road traffic accidents risk mitigation (Rundmo and Moen, 2007) and ITP for road accident risk reduction (Mon et al., 2018). Therefore, in our survey, individuals who stated a higher risk perception of involvement in road traffic accident were more likely to pay for improving their safety and reducing the risk of involvement in road traffic accident. Similarly, Attitude towards Traffic Safety Responsibility was found to be significantly associated with ITP. People who possess a positive Attitude towards Traffic Safety Responsibility are concerned about self and others' road safety (Yao and Wu, 2012) and likely to pay for road traffic safety improvement (Andersson and Lindberg, 2009, Lindberg, 2003). Furthermore, in line with TPB (Ajzen, 1991) and studies on intentions towards driving behavior (Cristea et al., 2013), Attitude was significantly associated with ITP for road safety improvement. People who are more concerned about the risk of road traffic accident involvement will consider road traffic safety to be more important and will be more likely to pay for road safety enhancement. In this survey,

individuals who stated more positive attitude towards road traffic accident risk reduction and road safety improvement stated a higher ITP. Another factor, Perceived Behavioral Control, was found to be substantially associated with ITP for road safety improvement. This finding is consistent with TPB (Ajzen, 1991) and previous studies on the acceptability of congestion pricing (Sun et al., 2016) and internet banking (Lee, 2009). From the theory of micro-economics, people buy/pay for goods/services which they can afford constrained to their budget (Ben-Akiva and Bierlaire, 1999). People pay a proportion of their income for public policies and will accept the policy if they perceive control over their income and the money they consider paying for the public policy. In this study, individuals who stated more control over their money were more likely to pay for road traffic accident risk reduction and road safety improvement. Similarly, Perceived Fairness was identified as a significant factor associated with ITP for road traffic accident risk reduction and road safety improvement. This is similar to findings in previous studies on e-commerce (Kim et al., 2008), acceptability of congestion pricing (Sun et al., 2016), and acceptability of road pricing (Holguín-Veras et al., 2020). People will accept a public policy if they consider the cost for it to be fair (Bertsimas et al., 2011). Individuals who perceived the road safety policy and the payment for it as fair had higher ITP in this study. Finally, Perceived Effectiveness also had a significant association with ITP. This finding is also in line with previous studies in the context of users' acceptability of road pricing (Jakobsson et al., 2000), congestion pricing (Sun et al., 2016), and increase in fuel pricing (Eriksson et al., 2006). Road safety programs and policies, being public policies, are evaluated by road users (Ulleberg, 2001) and will only comply when they perceive them as appropriate (Tyler, 2006). Everything else being equal, the more individuals perceive a road safety program to be effective, the more they will be likely to contribute to it.

Among the three latent constructs of TPB, only Subjective Norm was insignificantly associated with ITP for road safety improvement. This finding is in line with previous studies on intention to texting while driving (Prat et al., 2015), and intention towards cycle commuting (Lois et al., 2015). The rationale for this finding would be that Subjective Norm, in the context of road traffic safety, is not a characteristic to be seen by others, and the individuals' payment for road traffic safety remains confidential. Also, when it comes to public road traffic safety, most of the association of Subjective Norm was covered by Attitude towards Traffic Safety Responsibility, and therefore, Subjective Norm was found to be insignificant.

Apart from studying the effects of variables on ITP, this study also analyzed moderating effects through the developed model. In particular, we find significant moderating effects of age, gender, personal income, and accident experience on the relationships between independent variables and ITP for road safety improvement. Risk Perception was more strongly associated with ITP for females than for males. This might be because female drivers perceive greater risk (Rhodes and Pivik, 2011) and ITP is directly proportional to the risk perception of road traffic accident involvement (Andersson and Lindberg, 2009) and females, compared to males, are more likely to pay to reduce their risk of road accident involvement (Haddak et al., 2016). Similarly, the relationship between Risk Perception and ITP was also moderated by age, and the association was higher for drivers above 30 years. Previous studies found that ITP is proportional to the perception of risk of accident involvement (Haddak et al., 2016), and young drivers underestimate their risk (Delhomme et al., 2009). Also, people above 30 years are more likely to pay for risk reduction of road traffic accidents compared to people less than 30 years old (Yang et al., 2016). Finally, in line with previous studies, the relationship between Risk Perception and ITP was significantly different between the two groups based on accident experience, and the

association was higher for the victims. Contributing to road traffic safety enhancement is associated with risk perception (Rundmo, 1996). The victims of road traffic accidents are more anxious/worried (Rundmo and Moen, 2006) and more likely to pay for road safety improvement (Haddak et al., 2016). Similar results were found for moderating effects between (i) Attitude towards Traffic Safety Responsibility and ITP for age (i.e., ITP was higher for the above 30 year's old drivers), (ii) Perceived Fairness with ITP for age (i.e., ITP was significantly higher for younger (less/equal to 30 years) drivers), and (iii) Perceived Behavioral Control and ITP for income group (i.e., ITP was significantly higher for high-income group than for middle-/low-income group), and as such, they are not described in detail herein.

Thise ~~findings of this~~ study ~~have determined~~ found the factors associated with people's behavior towards payment for road safety programs. Findings of this study~~They~~ demonstrate ~~the~~ promising implications for policy implementation and can be used as a decision support to understand future policy decisions. ~~The i~~Identifying~~cation~~ of factors associated with ITP would help in proper safety campaigns for affecting ~~the~~ behavior of road users and eliciting their contribution to road safety programs in monetary terms. ~~The~~ Furthermore, moderating effects examined in this study have provided disaggregated findings to provide project-specific inputs for policy implementation. This will help in determining specific groups of road users that are likely to pay for road traffic safety improvement and future road safety policies will focus on these groups for policy implementation.

5. Conclusions, limitations and future research directions

This study applied the framework of TPB to investigate the psychological determinants of public ITP for road safety improvement and extended TPB by adding Road Infrastructure Safety perception, Risk Perception, Attitude towards Traffic Safety Responsibility, Perceived Fairness,

569 and Perceived Effectiveness. Also, the moderating effects of gender, age, income, and accident
570 experience on the relationship between public ITP for road safety improvement and independent
571 variables were determined. Results of the structural equation model revealed that all the variables
572 of the extended TPB except the Subjective Norm, a standard component of TPB, were
573 significantly associated with the ITP for road safety improvement. Gender moderated the
574 relationship between risk perception and ITP. Age moderated the relationship between Attitude
575 towards Traffic Safety responsibility, Risk Perception, Perceived Fairness and ITP. Furthermore,
576 income moderated the relationship between Perceived behavioral Control and ITP, while
577 accident experience moderated the relation between Risk perception and ITP. The findings
578 provide promising implications for safety campaigns for affecting the behavior towards
579 contribution to road safety programs in monetary terms.

580 This study has some limitations that could be addressed in future studies. First, this study
581 considered public's ITP as a latent variable only and did not add ITP as an actual value (stated
582 amount of money). Second, the present study did not investigate all factors such as personal
583 beliefs, trust in government policies, etc. that might influence acceptance of ITP. In particular,
584 more research is also required to understand the impact of other demographic variables, such as
585 family status, education, etc. Information about the introduction and effectiveness of specific
586 road safety interventions/measures should be given to the respondents based on their cognitive
587 ability and their beliefs to enhance the validity of their responses to the ITP questions. Third, a
588 hybrid choice model (Ben-Akiva et al., 2002) that combines the latent variables (as in the
589 extended TPB model) and actual choice behavior (as in a discrete choice model) to account for
590 asymmetric preference formation in ITP is suggested for future research. Finally, ITP space

models should be used to better characterize the distribution of ITP among the population. Our future research efforts will consider these limitations.

Although our study has a few limitations, it adds a great value to our understanding of the people's ITP for road safety improvement. The results in this study have contributed to understand the psychological determinants of ITP in a developing country. Although the findings of this study are limited to Pakistan context only, the findings can be applied (and generalized) to other developing countries with similar economy and drivers' attitude towards road safety. Similarly, the extended TPB can be adopted in other parts of world to examine how drivers perceive road safety and consequently understand their ITP. By adding new variables to the TPB, this study has provided theoretical support for the application of the extended TPB to understanding the public ITP for road safety improvement.

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Appendix A

Table A1. Skewness and Kurtosis Indexes of the Data

Indicators	Skewness Value	Kurtosis Value	Indicators	Skewness Value	Kurtosis Value
RISP1	0.164	-1.389	ATT2	-1.346	0.884
RISP2	0.351	-1.140	ATT3	-1.296	0.798
RISP3	0.242	-1.033	SN1	-0.780	-0.775
RP1	-0.857	-0.692	SN2	-0.806	-0.820
RP2	-0.855	-0.694	SN3	-0.784	-0.823
RP3	-0.884	-0.750	PBC1	-1.046	-0.016
RP4	-0.865	-0.702	PBC2	-1.042	-0.087
RP5	-0.884	-0.709	PBC3	-1.118	0.027
RP6	-0.870	-0.749	PF1	-0.398	-1.457
ATSR1	-0.972	-0.474	PF2	-0.384	-1.461
ATSR2	-0.976	-0.464	PE1	-0.577	-1.197
ATSR3	-0.971	-0.459	PE2	-0.559	-1.152
ATSR4	-0.977	-0.499	ITP1	-0.941	-0.490
ATSR5	-0.966	-0.455	ITP2	-0.953	-0.530
ATT1	-1.161	0.526	ITP3	-0.944	-0.458

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