THE INTERCITY BUS PASSENGER'S LOCUS OF CONTROL WITH REGARD TO SEAT BELT USE INTENTION

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Abstract

In Thailand, the number of accidents caused by intercity buses and their severity are increasing while the rate of seat belt use by intercity bus passengers is decreasing. This study aims to identify the factors affecting the seat belt use behavioural intention (BI) of intercity bus passengers. For analysis, the samples were divided into 2 groups: the teenage group (334 samples) and adult group (577 samples). The theory of locus of control (LC) was applied to analyse internality (IN) and externality (EX), which were both based on LC basic components. The theory was extended by additionally analysing factors that consist of knowledge of seat belt enforcement (EN) and past experience. Structural equation modelling was used to analyse the factors affecting seat belt use BI. Analysis results showed that the two models have differences and that all factors influenced the seat belt use BI of the 2 groups. For the teenage group, IN had the most positive influence on seat belt use BI, followed by past experience, EX, and EN (β = 0.369, 0.290, 0.240, and 0.190, respectively). For the adult group, the IN factor also had the most positive influence, followed by EX, EN, and past experience (β = 0.388, 0.273, 0.244, and 0.236, respectively). Thus, the factors

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obtained from the result analysis can be proposed to the government as guidelines for formulating policies or practical methods to encourage passengers to increasingly use seat belts while travelling.

Keywords: Intercity bus passenger, seat belt use, locus of control, structural equation modelling, multi-group analysis

Introduction

At present, Thailand is developing public transportation systems to serve future needs. Travelling by public intercity bus is accepted as the most popular type of public transportation in Thailand or even in foreign countries, such as Germany (Nickel, 1988). Consequently, the increasing need for intercity bus services has also resulted in increased intercity bus accidents. Each accident causes a large number of fatalities or injuries (Barua and Tay, 2010). In the past 2 or 3 years, each intercity bus accident in Thailand caused a large number of passenger injuries and fatalities. The data collected by the Academic Center for Road Safety from online media in 2017 showed that the total number of public intercity bus accidents in 2016 was 49, as well as 49 accidents with 55 cases of fatalities and more than 602 cases of injuries. According to the estimation of the total number of injuries and deaths, nearly 2000 families have been affected by public intercity bus accidents (Department of Land Transport, 2017). Studies showed that the feasible causes of public intercity bus accidents include road characteristics, unsuitable weather conditions (Michalaki *et al.*, 2016), unsuitable service bus conditions (Aceves-González *et al.*, 2015), or driver behaviour (Agusdinata *et al.*, 2009). Passengers can protect themselves from injuries or fatalities by wearing seat belts (Bilgic *et al.*, 2011). However, the rate of seat belt use among bus passengers in Thailand is 40% (Department of Land Transport, 2017) which is still low even though government organisations have continuously encouraged seat belt use and implemented policies such as the mandatory installation of seat belts in public buses and the enforcement of passenger seat belt use while travelling. The low rate of seat belt use has increased the number of injuries and fatalities. Thailand considers this issue highly important. Moreover, seat belt use is given importance worldwide (Olsen *et al.*, 2010) because seat belts can protect passengers from serious injuries or death due to road accidents. Seat belts have decreased the number of deaths or serious injuries by 60% (Høye, 2016). Table 1 shows the various studies that have investigated seat belt use behaviour.

From the review of related literature, it can be seen that most studies concerning seat belt use involved private cars. The target group mostly consisted of private car drivers or their passengers. However, no research has focused on public intercity bus passengers, which can be a remarkable target group to study because of the increasing severity and rate of public intercity bus accidents at present. Thus, the present study analysed the seat belt use intention of intercity bus passengers. We divided the samples into 2 groups: the teenage group and adult group because we would like to know whether the intercity bus passenger's locus of control with regard to seat belt use intention for teenagers and adults is similar or different.

This aims to identify the factors that influence the seat belt use behavioural intention (BI) of public intercity bus passengers by applying the theory of locus of control (LC), which is a psychological model. This research adopts the factors used in related studies to develop relevant questions for the measurement model. The factors obtained from analysis can be used to propose to government organisations appropriate policies or practical methods based on passenger age and current road conditions to increase the rate

of seat belt use in public intercity buses. This study hypothesizes that the LC was consistent with the empirical data model and the assessment of parameter invariance in the model forms for each group were different groups.

Locus of Control

From the theory of personal control beliefs, LC was invented by Rotter (1966) and is the belief that people can explain the reason for their

Table 1. Summary of related research

Author(s)	Type of vehicle/Country	Analysis method	Factor of seat belt
(Routley *et al.*, 2009)	Taxi driver/China	Independent sample t-tests, a binomial distribution	Using a seat belt (fine avoidance, safety, high speed and long trips) Not using a seat belt (feeling trapped and uncomfortable)
(Gras *et al.*, 2007)	Car driver/Spain	Discriminant analysis	Unbelted drivers **(**the seat belt limited their movement, uncomfortable, negative social influence**)** Seat belt use **(**beliefs about their friends**'** seat belt use, years of driving experience**)**
(Şimşekoğlu and Lajunen, 2009)	Passenger car/Turkey	Factor analyses and multiple regression analysis	Seat belt use (driver behaviour, e.g. driving errors and violations, regular walking and adequate sleep) Not seat belt use (male, and smoking frequency)
(Şimşekoğlu and Lajunen, 2008)	Car driver/Turkey	Conducting principal component analysis and multiple regression analysis	Using a seat belt **(**travelling conditions, e**.**g**.** long trips, high speeds, dangerous weather and bad road conditions; safety conditions, e**.**g**.** situational conditions, habit of using a seat belt and punishment avoidance**)** Not using a seat belt **(**situational conditions, not believing in the effectiveness, discomfort and no habit of seat belt use**)**
(Vaughn *et al.*, 2012)	Driver and passenger car/United States	Binary logistic regression	No seat belt use (young, male, African American or Hispanic, income < USD 75,000, high school or college graduate, use of alcohol and drugs, antisocial behaviour and dual diagnosis.)
(Karbakhsh *et al.*, 2010)	Passenger car**(**pregnancy**)**/Iran	Cross**-**sectional study	Seat belt use **(**protects me from road traffic injuries, protects my foetus from road traffic injuries, my husband and other family members persuade me to wear it**)** No seat belt use **(**risk of injury to my foetus, forget to wear seat belt, improper seat belt installation**)**
(Reagan *et al.*, 2013)	Car driver/United States	Chi-squared tests and univariate ANOVA	Seat belt use (fewer trips per day and increased average trip speed)
(Okamura *et al.*, 2012)	Front seat car/Japan	Theory of planned behaviour	Self**-**efficacy, instrumental attitude **(**discomfort, convinced, penalty, effectiveness of belt, probability of detection**)** and descriptive norm
(Cunill *et al.*, 2004)	Driver and passenger car/Spain	Discriminant analysis	Seat belt use (perceptions of risk, perception of safety, the effectiveness of the seat belt and social influence)
(Kim *et al.*, 2009)	Car driver and front seat (high school)/United States	Binary choice model	Low seat belt use (males, African American, accompanying occupants, weekends, inclement driving conditions, small school size, lower socioeconomic status and rural country school locations)

behaviour by analysing their actions or external environment. The motives of different behaviours cause individuals to have diverse behavioural patterns. Rotter (1966) divided personal control beliefs in controlled factors into 2 types. The first type is internal LC,

Table 2. Questions used for the seat belt use BI model

	Variables used in research	N = 911	
		Scoring	Source
	Behavioural intention		
BI1	I will wear seat belts whenever I take an intercity bus.	1 = Strongly disagree 5 = Strongly agree	(Lajunen and Räsänen, 2004; You *et al.*, 2013)
BI2	I plan to wear a seat belt in the future because I think it is a lifesaving piece of equipment.		
	Internality		
IN1	If I do not wear a seat belt, It can lead to my death in an accident while travelling by bus.	1 = Strongly disagree 5 = Strongly agree	(Lajunen and Räsänen, 2004; Ratanavaraha *et al.*, 2018; You *et al.*, 2013)
IN2	If I do not wear a seat belt while travelling by bus, I may obtain serious injuries that can lead to disability, which requires extensive medical treatment, in case of an accident.		
IN3	If I do not wear a seat belt, my capacity to study or perform work will be affected in case of an accident while travelling by bus.		
IN4	If I do not wear a seat belt, the lives of my family, friends, relatives, etc., will be affected in case I encounter an accident while travelling by bus.		
IN5	Wearing a seat belt is one's own duty.		
IN6	If I wear a seat belt while travelling by intercity bus, I feel safer.		
IN7	If I wear a seat belt, I can prevent serious injuries in case of an accident.		
IN8	I can reduce fatality risks from accidents by using a seat belt.		
	Externality		
EX1	Accidents were caused by colliding with other vehicle types.	1 = Strongly disagree 5 = Strongly agree	(Lajunen and Räsänen, 2004; You *et al.*, 2013)
EX2	Accidents were caused by travelling by intercity bus running on wet/slippery street.		
EX3	Accidents were caused by travelling by intercity bus running on mountainous routes.		
EX4	The accident severity was caused by a nonstandard seat belt installation.		
EX5	Accidents caused by intercity bus did not involve passenger behaviour.		
	Knowledge of seat belt enforcement		
EN1	Do you know about the 'enforcement of passenger seat belt laws'?	1 = Yes 0 = No	(Chaudhary *et al.*, 2004)
EN2	Do you know about 'the punishment for people who are caught not wearing seat belts'?		
	Past experience		
PA	Did you wear a seat belt during your past travel by intercity bus?	1 = Yes 0 = No	(Şimşekoğlu and Lajunen, 2008)

which is defined as the way people believe or perceive that events that happen to them are caused by or are a result of their own deeds or abilities. Therefore, success or failure depends on oneself and can be controlled by the individual. The second type is external LC, which is the belief or perception of people that events that happen to them are caused by or are a result of the environment or external influences. Therefore, events are attributed to destiny, supernatural powers, or actions of other people.

This research extended the theory of LC by adding factors such as knowledge of seat belt enforcement (EN) and past experience and used structural equation modelling (SEM) to identify the factors that affect seat belt use BI. However, no research has been conducted on the seat belt use of intercity bus passengers. Thus, the current study analysed the seat belt use BI of intercity bus passengers by using LC

Methodology

Participant

Data on seat belt use BI were acquired by conducting a survey of intercity bus passengers in 4 main provinces, namely, Chiang Mai, Songkhla, Nakhon Ratchasima and Bangkok. Among the 1200 samples drawn by random sampling, 911 (75.92%) people completed the questionnaires. These people were assessed on the basis of 18 observed variables. The sample size should not be less than 270 samples in each group because the research methodology indicates that the sample size should not be less than 15 times the number of variables used (Golob, 2003). By using age-based criteria for sexual development, the current research divided the data for analysis into 2 groups: the teenage group and adult group (Hines, 1982).

Research Variables and Questionnaire Design

The questionnaire for this research was divided into 2 parts: the first part involves enquiry about the respondents' general information and their travel behaviour; the second part includes the question items, which were designed by using parameters from previous research on LC, including internality (IN), externality (EX), EN, past experience, and BI (Table 2).

Analysis

Data Reliability and Validity

To measure the research quality, the questionnaire was used as a measuring instrument and was assessed by 2 features: 1) Content validity based on expert judgement by using the index of item objective congruency (IOC) (the value should be greater than 0.50) (Tavakol and Dennick, 2011); 2) Equipment reliability by using the confidence level of Cronbach's alpha (the value should be 0.6-0.7) (Tavakol and Dennick, 2011).

Structural Equation Modelling

SEM is an analysis model that integrates different models by using several equations at the same time to measure the construct validity between many latent variables. The degree of importance of each question item to the latent variables is estimated by using the values of the correlation coefficient between the observed variables and latent variables and the measurement variance (Kline, 2011). SEM is also used to confirm the relevance of hypothetical models that identify the details of the relationship between variables to explain the relationship of all variable sets.

Model Fit Indices

To measure data consistency with the hypothetical model of the theory of LC, the measurement criteria for the index of consistency were as follows: 1) the χ^2/degree of freedom (DOF) value should be less than 3 (Kline, 2011); 2) the value of the root mean square error of approximation (RMSEA) should be less than or equal to 0.07 (Steiger, 2007); 3) the comparative fit index (CFI) value should be greater than or equal to 0.90 (Hu and Bentler, 1999); 4) the value of the Tucker-Lewis Index (TLI) or non-normed fit index should be greater than or equal to 0.80 (Hooper *et al.*, 2007); and 5) the value of the standardised

root mean square residual (SRMR) should be less than or equal to 0.08 (Hu and Bentler, 1999).

Findings

Descriptive Statistics

The 911 intercity passengers were divided into the teenage group and adult group. The results of the respondents in the teenage group showed that the respondents consisted of 110 males (32.9%) and 224 females (67.1%). In terms of education, there are 2 samples in elementary school (0.6%), 1 sample in secondary education or M.3 (0.3 %), 273 samples in high school or M.6/vocational school (81.7%) and 58 samples with diplomas/ higher vocational degrees (17.4%). As regards occupation, 327 samples are students (97.9%), 4 samples are general workers (1.2%), and 3 samples have other occupations (0.9%). In the adult group, the samples consisted of 287 males (49.7%) and 290 females (50.3%). In terms of education, 90 samples have completed elementary school (15.6%), 73 samples have completed M3secondary education (12.7 %), 153 samples have completed M6/vocational school education (26.5%), 47 samples (8.1%) have diplomas/higher vocational degrees, 154 samples have bachelor's degrees (26.7%), 59 samples have master's degrees (10.2%), and 1 sample has a doctorate degree (0.2%). For occupations, there were 74 government officials/state enterprise (12.8%), 115 private employees (19.9%), 70 business owners (12.1%), 23 farmers (4%), 131 pupils/ students (22.7%), 154 general workers (26.7%) and 10 samples in other professions (1.7%).

From the results of the overall picture of each factor of both passenger groups (Table 3), it can be concluded that passengers intended to use seat belts in the future while travelling by intercity bus (mean = 3.85 (teenagers), 4.19 (adults)). The other results are as follows: the

Table 3. Mean, standard deviation, skewness, and kurtosis values of variables

Variables used	Teenagers (N = 334)				Adults (N = 577)			
	x̄	SD	SK	Ku	x̄	SD	SK	Ku
Behavioural intention (Cronbach's α = 0.726)								
	3.85				**4.19**			
BI1	3.620	0.918	−0.392	0.268	4.120	0.865	−0.847	0.674
BI2	4.081	0.799	−0.466	−0.301	4.277	0.712	−0.778	0.793
Internality (Cronbach's α = 0.827)								
	4.10				**4.16**			
IN1	4.015	0.773	−0.497	0.360	4.191	0.787	−0.865	0.948
IN2	4.072	0.779	−0.470	−0.119	4.189	0.767	−0.521	−0.436
IN3	4.057	0.842	−0.382	−0.849	4.179	0.798	−0.743	0.262
IN4	4.063	0.845	−0.481	−0.474	4.017	0.821	−0.448	−0.272
IN5	4.099	0.812	−0.318	−1.058	4.173	0.851	−0.865	0.465
IN6	4.168	0.749	−0.284	−1.170	4.198	0.810	−0.848	0.656
IN7	4.114	0.688	−0.151	−0.884	4.125	0.756	−0.550	0.034
IN8	4.180	0.750	−0.307	−1.168	4.182	0.748	−0.585	0.121
Externality (Cronbach's α = 0.751)								
	4.01				**4.10**			
EX1	3.955	0.821	−0.310	−0.628	4.083	0.837	−0.816	0.803
EX2	4.150	0.795	−0.527	−0.533	4.146	0.806	−0.410	0.942
EX3	4.123	0.838	−0.512	−0.557	4.182	0.799	−0.810	0.777
EX4	3.967	0.780	−0.324	−0.228	4.081	0.822	−0.717	0.381
EX5	3.868	0.853	−0.446	0.062	3.988	0.805	−0.580	0.417
Knowledge of seat belt enforcement (Cronbach's α = 0.679)								
	0.63				**0.75**			
EN1	0.754	0.431	−1.188	−0.592	0.882	0.323	−1.495	1.498
EN2	0.506	0.501	−0.024	−1.490	0.622	0.485	−0.505	−1.450
Past experience (Cronbach's α = NS)								
PA	0.317	0.466	0.788	−1.387	0.515	0.500	−0.059	−1.471

belief that each event was caused by their own deeds: mean = 4.10 (teenagers), 4.16 (adults); the belief that the outcomes of each event were caused by the environment or external influences that cannot be controlled: mean = 4.01 (teenagers), 4.10 (adults); the acknowledgement of law enforcement and punishment: mean = 0.63 (teenagers), 0.75), (adults); and seat belt use while travelling in the past: mean = 0.317 (teenagers), 0.515 (adults). For the skewness and kurtosis values used to measure the data distribution, the skewness value should be less than 3, and the kurtosis value should be lower than 10 for the accepted values (Kline, 2011). This research had skewness and kurtosis values in the criteria range for both groups. It could be concluded that the data used for the analysis of both groups have a normal distribution and were suitable for analysis.

Structural Equation Modelling

I.) Intention of seat belt usage among teenagers

For the SEM analysis results as regards the seat belt use BI of intercity bus passengers in the teenage group (Table 4 and Figure 1), it was found that the goodness of fit index was as follows; χ^2 = 169.648, DOF = 120, χ^2/DOF = 1.414, P<0.001, RMSEA = 0.035, CFI = 0.968, TLI = 0.959, and SRMR = 0.049. When compared with the goodness of fit index, it was found that the measurement met the criteria. Therefore, in the teenage group, the SEM for the seat belt use BI of intercity bus passengers was relevant to empirical data.

The factor that had a significant positive influence and the highest coefficient of standardised factor loading value towards seat belt use BI was IN, which is the belief that various incidents occurring to oneself resulted

Table 4. Results of SEM for seat belt use intention

Variables used	Teenagers (N = 334)			Adults (N = 577)		
	Stand. estimates	S.E.	t-value	Stand. estimates	S.E.	t-value
Behavioural intention BY						
BI1	**0.655**	**0.050**	**12.844**	0.698	0.040	14.819
BI2	**0.743**	**0.042**	**15.592**	0.712	0.040	17.945
Internality BY						
IN1	**0.621**	**0.041**	**15.297**	0.603	0.029	20.532
IN2	**0.596**	**0.042**	**14.252**	0.691	0.028	24.739
IN3	**0.658**	**0.038**	**17.207**	0.692	0.027	25.675
IN4	**0.589**	**0.044**	**13.505**	0.603	0.033	18.389
IN5	**0.618**	**0.041**	**15.221**	0.635	0.031	20.339
IN6	**0.511**	**0.048**	**10.671**	0.543	0.038	11.605
IN7	**0.505**	**0.048**	**10.285**	0.572	0.032	17.735
IN8	**0.559**	**0.044**	**12.654**	0.570	0.037	12.614
Externality BY						
EX1	**0.607**	**0.049**	**12.357**	0.667	0.026	25.469
EX2	**0.617**	**0.048**	**12.723**	0.753	0.023	33.481
EX3	**0.517**	**0.057**	**9.088**	0.784	0.021	37.628
EX4	**0.510**	**0.060**	**5.620**	0.673	0.027	25.009
EX5	**0.515**	**0.054**	**8.997**	0.632	0.029	21.857
Knowledge of seat belt enforcement BY						
EN1	**0.808**	**0.047**	**17.301**	0.827	0.040	23.370
EN2	**0.692**	**0.047**	**14.870**	0.667	0.020	23.324
Behavioural intention ON						
IN	**0.369**	**0.034**	**10.757**	0.388	0.030	12.891
EX	**0.240**	**0.026**	**9.209**	0.273	0.021	13.077
EN	**0.190**	**0.021**	**8.926**	0.244	0.020	12.067
PA	**0.290**	**0.060**	**4.869**	0.236	0.049	4.817

Note: Teenagers: χ^2 = 169.648, DOF = 120, χ^2/DOF = 1.414, P < 0.001, RMSEA = 0.035 (<0.07), CFI = 0.968 (>0.9), TLI = 0.959 (>0.8), SRMR = 0.049 (<0.08).

Adults: χ^2 = 273.336, DOF = 121, χ^2/DOF = 2.258, P < 0.001, RMSEA = 0.047 (<0.07), CFI = 0.952 (>0.9), TLI = 0.939 (>0.8), SRMR = 0.042 (< 0.08).

from one's own deeds ($\beta = 0.369$), followed by past experience, which is the experience of using safety belts in the past ($\beta = 0.290$); EX, which is the belief that events occurring to oneself were caused by the environment or external influences that cannot be controlled ($\beta = 0.240$); and EN ($\beta = 0.190$).

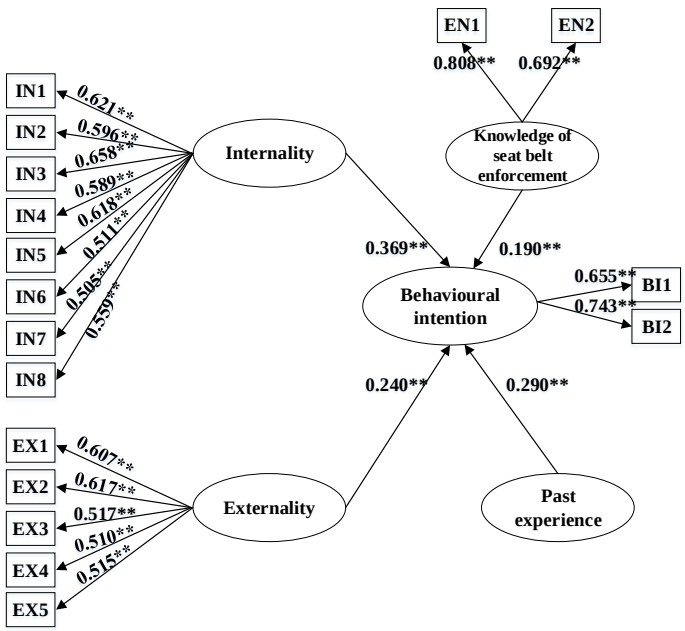
II.) Intention of seat belt usage among adults

For the SEM analysis results as regards the seat belt use BI of intercity bus passenger in the adult group (Table 4 and Figure 2), it was found that the goodness of fit index was as follows; $\chi^2 = 273.336$, DOF = 121, $\chi^2/\text{DOF} = 2.258$, $P < 0.001$, RMSEA = 0.047, CFI = 0.952, TLI = 0.939, and SRMR = 0.042. When compared with the goodness of fit index, it was found that the measurement met the criteria. Therefore, the SEM for seat belt use BI of intercity bus passengers in the adult group was consistent with empirical data.

The factor that had a significant positive influence and highest coefficient of standardised factor loading value towards seat belt use was IN ($\beta = 0.388$), followed by EX ($\beta = 0.273$), EN ($\beta = 0.244$), and past experience ($\beta = 0.236$).

Multigroup Analysis

The invariance test results of the model are shown in Table 5. The invariance of the model forms was assessed using a hypothesis stating that the values of factor loadings, intercepts, and structural path were not different when using the simultaneous model and the strict model. The total value of the different chi-squared values was 63.464, and the difference between the DOFs was 24 ($P<0.0001$), thus indicating that the hypothesis cannot be accepted. Therefore, the model of intention of seat belt use for an intercity bus passenger indicated different values of factor loadings, intercepts, and structural path



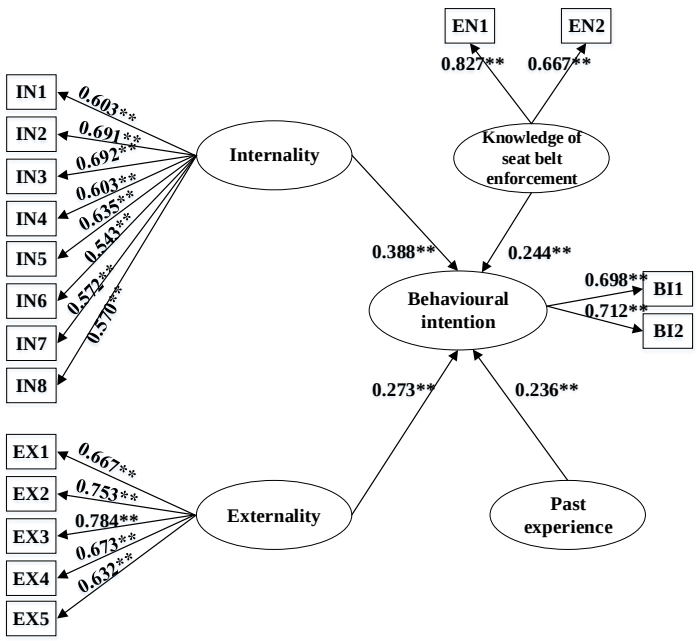
$\chi^2 = 169.648$, DOF = 120, $\chi^2/\text{DOF} = 1.414$, $P < 0.001$, RMSEA = 0.035 (<0.07), CFI = 0.968 (>0.9), TLI = 0.959 (>0.8), and SRMR = 0.049 (<0.08)
*P < 0.05, **P < 0.01 (Mplus 7.12 standardised estimates)

Figure 1. SEM of BI to use a seat belt among teenagers

between teenagers and adults. Therefore, a model of intention of seat belt use for intercity bus passengers must be developed separately for teenagers and adults.

Conclusions and Discussion

The overall analysis of these 2 groups showed that both the teenage group and adult group believe that events occurring to them were caused by their own deeds (IN). For example, if a passenger encounters an accident while travelling and he/she dies or becomes disabled, requires lengthy medical treatment, or suffers injuries that decrease the capacity to study or work, the passenger will affect not only his/her own life but also the lives of his/her family, friends, and relatives because he/she did not wear a seat belt while travelling. Passengers can feel safe and reduce fatality risks by simply wearing seat belts while travelling. Regarding the belief that the outcomes of events are caused by the environment or external influence that cannot be controlled, e.g. accidents were caused by colliding with other vehicle types, travelling on wet/slippery roads, travelling on mountain passes, use of nonstandard seat belts or accidents caused by intercity buses, these are not involved with the behaviour of passengers at all. This belief influenced more the seat belt use intention of the adult group than that of the teenage group. However, the past experience of using seat belts significantly influenced seat belt use in the teenage group rather than the adult group. Furthermore, the adult group was more aware of laws than the teenage group. Therefore, perceived law enforcement may not be effective in encouraging seat belt use in the teenage group. Furthermore, given that adherence to the law differs in each country, the importance of following the law should be properly communicated (Lee *et al*., 2015).



χ^2 = 273.336, DOF = 121, χ^2 /DOF = 2.258, P < 0.001, RMSEA = 0.047 (<0.07), CFI = 0.952 (>0.9), TLI = 0.939 (>0.8), and SRMR = 0.042 (<0.08)
*P < 0.05, **P < 0.01 (Mplus 7.12 standardised estimates)

Figure 2. SEM of seat belt use BI among adults

From the multigroup analysis results of the 2 groups, it was found that the 2 models were different. Therefore, proposals to government with regard to encouraging seat belt use while travelling should be separately considered according to the age of the passengers. The analysis results show that the overall picture of the factors of both groups can be explained as follows:

IN is the factor that influences the seat belt use behaviour of both groups, but it had a greater coefficient value in the adult group than in the teenage group. This is consistent with the results of previous research that existing beliefs or attitudes towards seat belt use for increasing safety or reducing medical treatment costs increased the rate of seat belt use of private car passengers (Okamura *et al.*, 2012). Other examples include the following: perceived accident severity resulted in the increased precaution of private car drivers (Akbaş *et al.*, 2010), and pilots believe that they can avoid accidents if they follow aviation instructions (You *et al.*, 2013).

EX is the factor influencing the seat belt use BI of both passenger groups, but it had more influence on the adult group than on the teenage group. EX influences passengers to increasingly wear seat belts while travelling because passengers believe that seat belt use can reduce accident severity in case of uncontrolled events. In other words, if passengers perceive that an accident may occur, seat belt use while travelling will increase. This is relevant to the previous review of literature that if private car drivers or passengers perceive accident risks, it will result in more seat belt uses (Kim *et al.*, 2009; Rowe *et al.*, 2016; Şimşekoğlu and Lajunen, 2008).

EN is the factor influencing seat belt use BI of both passenger groups, but it had more influence on the adult group than on the teenage group. Knowledge of seat belt use law and its punishment will positively affect seat belt use BI while travelling. This result is consistent with the previous review of related literature stating that the availability of law enforcement personnel will increase the rate of seat belt use (Ash *et al.*, 2014; Beck and Shults, 2009).

Past experience is the factor that influences the seat belt use of both passenger groups, but it had more influence on the teenager group than adults. If the passengers have an existing habit of wearing seat belts, it will result in increased seat belt use while travelling. This result is consistent with previous research indicating that car drivers or passengers that forget to use seat belts or lack the discipline to regularly use seat belts have low seat belt use intention (Kim *et al.*, 2009;

Table 5. Model fit indices for the invariance test between groups

Description	χ^2	DOF	χ^2/DOF	CFI	TLI	RMSEA (90% CI)	SRMR	$\Delta\chi^2$	ΔDOF	p
Individual group:										
Model 1: Teenagers	169.648	120	1.414	0.968	0.959	0.035 (0.022–0.047)	0.049			
Model 2: Adults	273.336	121	2.258	0.952	0.939	0.047 (0.039–0.054)	0.042			
Measurement of invariance:										
Simultaneous model	496.508	231	2.15	0.944	0.925	0.050 (0.044–0.056)	0.045			
Factor Loadings, Intercepts, structural paths held equal across group	559.972	255	2.19	0.935	0.922	0.051 (0.045–0.057)	0.077	63.464	24	<0.000

Note: χ^2 = Chi-squared statistic; DOF = Degree of freedom; p = Level of significance; CFI = Comparative fit index; TLI = Tucker-Lewis index; RMSEA = Root mean square error of approximation; SRMR = standardised root mean square residual.

Demirer *et al.*, 2012). According to the overall analysis, the results can be used to create proposals to government for promoting seat belt use among intercity bus passengers:

1. Cultivate positive attitudes towards teenagers' seat belt use, such as creating a campaign or advertising media promoting the benefits of seat belt use, which simultaneously illustrates a good image for themselves and society. Furthermore, both internal public and private organisations should support this policy by determining the level of policy enforcement within organisations. According to previous research, the policy of seat belt use enforcement within organisations resulted in increased seat belt use (Studnek and Ferketich, 2007).

2. Easy- to- understand advertising media should be created to attract teenagers' attention with regard to seat belt use, e. g. , comics that express accident severity, and public exhibitions should be held to reflect the consequence of not wearing seat belts while travelling (e. g. severe injury, disability, and death). Owing to the perception of consequences, the awareness will increase seat belt use.

3. Public relations should be organised. The content in law enforcement and punishments for violating 'laws enforcing passengers to use seat belts' should be included in textbooks. Furthermore, serious measures should be enforced such as establishing checkpoints to investigate violating drivers or passengers, use of CCTVs, or conducting police checks in intercity buses.

The abovementioned examples of policy recommendations will help raise awareness of wearing seat belts for both the teenage and adult groups. The examples can also help reduce accident severity and the death rate of passengers.

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References

Aceves-González, C., Cook, S., and May, A. (2015). Bus use in a developing world city: Implications for the health and well- being of older passengers. J. Transp. Health, 2(2):308-316.

Agusdinata, D.B., van der Pas, J.W.G.M., Walker, W.E., and Marchau, V. A. W. J. (2009) . Multi- criteria analysis for evaluating the impacts of intelligent speed adaptation. J. Adv. Transport., 43(4) : 413-454.

Akbaş, O., Güven, R., Cebeci, G., Bertlek, S.B., Aldemir, G., and Bal, E. (2010) . A study on the effects of seat belt posters on drivers. Procedia - Social and Behavioral Sci., 2(2):1002-1007.

Ash, I. K., Edwards, A. L., and Porter, B. E. (2014) . An investigation of state population characteristics that moderate the relationship of state seat belt law and use in the United States. Accident Anal. Prev., 71:129-136.

Barua, U. and Tay, R. (2010). Severity of urban transit bus crashes in Bangladesh. J. Adv. Transport., 44(1):34-41.

Beck, L.F. and Shults, R.A. (2009). Seat belt use in states and territories with primary and secondary laws - United States, 2006. J. Safety Res., 40(6):469-472.

Bilgic, S., Barut, H.B., Karacasu, M., Er, A., and Yaliniz, P. (2011) . The changes in usage of seat belts in Antalya, Turkey. Procedia - Social and Behavioral Sci., 20:588-593.

Chaudhary, N. K., Solomon, M. G., and Cosgrove, L. A. (2004). The relationship between perceived risk of being ticketed and self- reported seat belt use. J. Safety Res., 35(4):383-390.

Cunill, M., Gras, M. E., Planes, M., Oliveras, C., and Sullman, M.J.M. (2004). An investigation of factors reducing seat belt use amongst Spanish drivers and passengers on urban roads. Accident Anal. Prev., 36(3):439-445.

Demirer, A., Durat, M., and Haşimoğlu, C. (2012) . Investigation of seat belt use among the drivers of different education levels. Safety Sci., 50(4):1005-1008.

Department of Land Transport. (2017) . Thailand Transport Statistics. Available from: http://apps.dlt.go.th/statistics_web/statistics.html Accessed Date: April 4, 2017

Golob, T. F. (2003) . Structural equation modeling for travel behavior research. Transport Res. B- Meth., 37(1):1-25.

Gras, E.M., Cunill, M., Sullman, M.J.M., Planes, M., and Font-Mayolas, S. (2007). Predictors of seat belt use amongst Spanish drivers. Transport. Res. F- Traf., 10(3):263-269.

Hines, M. (1982) . Prenatal gonadal hormones and sex differences in human behavior. Psychol. Bull., 92(1):56-80.

Hooper, D., Coughlan, J., and Mullen, M.R. (2007). Structural equation modeling: guidelines for determining model fit. Electronic Journal of Business Research Methods, 6(1):53-60.

Høye, A. (2016). How would increasing seat belt use affect the number of killed or seriously injured light vehicle occupants? Accident Anal. Prev., 88:175-186.

Hu, L.T. and Bentler, P.M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Struct. Equ. Modeling, 6(1):1-55.

Karbakhsh, M., Ershadi, Z., Khaji, A., and Rahimi-Sharbaf, F. (2010). Seat belt use during pregnancy in Iran: attitudes and practices. Chinese J. Traum., 13(5):275-278.

Kim, S., Depue, L., Spence, L., and Reine, J. (2009). Analysis of teenage seat belt use: From the 2007 Missouri high school seat belt survey. J. Safety Res., 40(4):311-316.

Kline, R.B. (2011). Principles and Practice of Structural Equation Modeling: Guilford Press, New York, NY, USA, 427p.

Lajunen, T. and Räsänen, M. (2004). Can social psychological models be used to promote bicycle helmet use among teenagers? A comparison of the Health Belief Model, Theory of Planned Behavior and the Locus of Control. J. Safety Res., 35(1):115-123.

Lee LK, Monuteaux MC, Burghardt LC, Fleegler, E.W., Nigrovic, L.E. Meehan, W.P., Schutzman, S.A., and Mannix, R., (2015). Motor vehicle crash fatalities in states with primary versus secondary seat belt laws: a time-series analysis. Ann. Intern. Med., 163:184-190.

Michalaki, P., Quddus, M., Pitfield, D., and Huetson, A. (2016). A time-series analysis of motorway collisions in England considering road infrastructure, socio-demographics, traffic and weather characteristics. J. Transp. Health, 3(1):9-20.

Nickel, B.E. (1988). Facing the challenge of the future by strategic planning for public transport in Germany. J. Adv. Transport., 22(2):134-153.

Okamura, K., Fujita, G., Kihira, M., Kosuge, R., and Mitsui, T. (2012). Predicting motivational determinants of seatbelt non-use in the front seat: a field study. Transport. Res. F-Traf., 15(5):502-513.

Olsen, C.S., Cook, L.J., Keenan, H.T., and Olson, L.M. (2010). Driver seat belt use indicates decreased risk for child passengers in a motor vehicle crash. Accident Anal. Prev., 42(2):771-777.

Ratanavaraha, V., Khampirat, B., Jomnonkwao, S., and Mon, E.E. (2018). Myanmar motorbike riders' willingness to pay for fatality risk reduction. Suranaree J. Sci. Technol., 25(2):131-142.

Reagan, I.J., McClafferty, J.A., Berlin, S.P., and Hankey, J.M. (2013). Using naturalistic driving data to identify variables associated with infrequent, occasional, and consistent seat belt use. Accident Anal. Prev., 50:600-607.

Rotter, J.B. (1966). Generalized expectancies for internal versus external control of reinforcement. Psychol. Monogr., 80(1):1-28.

Routley, V., Ozanne-Smith, J., Qin, Y., and Wu, M. (2009). Taxi driver seat belt wearing in Nanjing, China. J. Safety Res., 40(6):449-454.

Rowe, R., Andrews, E., Harris, P.R., Armitage, C.J., McKenna, F.P., and Norman, P. (2016). Identifying beliefs underlying pre-drivers' intentions to take risks: an application of the Theory of Planned Behaviour. Accident Anal. Prev., 89:49-56.

Şimşekoğlu, Ö. and Lajunen, T. (2008). Why Turks do not use seat belts? An interview study. Accident Anal. Prev., 40(2):470-478.

Şimşekoğlu, Ö. and Lajunen, T. (2009). Relationship of seat belt use to health and driver behaviors. Transport. Res. F-Traf., 12(3):235-241.

Steiger, J.H. (2007). Understanding the limitations of global fit assessment in structural equation modeling. Pers. Indiv. Differ., 42(5):893-898.

Studnek, J.R. and Ferketich, A. (2007). Organizational policy and other factors associated with emergency medical technician seat belt use. J. Safety Res., 38(1):1-8.

Tavakol, M. and Dennick, R. (2011). Making sense of Cronbach's alpha. Int. J. Med. Educ., 2:53-55.

Vaughn, M.G., Salas-Wright, C.P., and Piquero, A.R. (2012). Buckle up: non-seat belt use and antisocial behavior in the United States. Ann. Epidemiol., 22(12):825-831.

You, X., Ji, M., and Han, H. (2013). The effects of risk perception and flight experience on airline pilots' locus of control with regard to safety operation behaviors. Accident Anal. Prev., 57:131-139.