

The development of Indonesian traffic locus of control

Leksmono Suryo PUTRANTO ^a

^a *Civil Engineering Department, Universitas Tarumanagara, Jakarta, 11440, Indonesia*
E-mail: leksmonop@ft.untar.ac.id

Abstract: Locus of control (LoC) is a dimension reflecting one's belief whether things that happened to them were under or not under their control. Specifically, in the context of driving, Traffic locus of controls have been developed in Turkey, Sweden, Romanian, China, etc. Uniquely, only the Romanian version detailed the TLoC with additional sub-scales of religious beliefs and additional indicators in the sub-scale of fate/ destiny. As a nation that appreciates highly religious values, it might be suitable to adopt Romanian TLoC. This paper will discuss this adaptation. More than 200 respondents who drive daily and possess valid driving licenses were completing the online questionnaire. Unfortunately, the respondents were too mature and too highly educated with quite a significant percentage of respondents with a doctoral degree. As a result, the respondents were mainly people who undergo their religious life rationally and e.g., do not believe that religious symbols have traffic safety effect. The confirmatory factor analysis, therefore, shows different results with Romanian general respondents especially in religious belief and fate/ destiny sub-scales.

Keywords: traffic locus of control, religious belief, fate, Romanian, Indonesian, confirmatory factor analysis

1. INTRODUCTION

Locus of control (LoC) defines as individual differences in making a perception of the relationship between individual action and its following consequences (Rotter, 1966). An individual with external LoC tends to perceive consequences as the impact of uncontrollable external influences, such as luck, destiny, and other more powerful creature. Meanwhile, internal individual LoC tends to interpret the consequences of actions as the results of one's behavior. LoC is one interesting trait to be observed related to risky driving behavior. A study conducted by Crisp and Barber (1995) showed that the decision to conduct or not conduct risky behavior is affected by internal and external LoC. Based on a meta-analysis from 13 research, Arthur et al (1991) found a positive correlation between Rotter's I-E scale LoC and traffic accidents. The finding was the opposite of findings of Guastello and Guastello (1986).

Driver with internal LoC is more vulnerable to optimism bias in which they perceive owning better driving ability compared to other drivers. This bias will also decrease driver risk perception. In another word, highly internal locus of control orientation in traffic may increase risky driving, because an over-confident and optimistic driver believes in his/her ability to avoid an accident in every case (Özkan and Lajunen (2005)).

Specialize locus of control actually is not only regarding traffic but also in the other field, such as health LoC (Lindstrom and Rosvall, 2020) and even more specifically, i.e. mental health LoC (Churcill et al, 2020). In this particular (health) field, there was also a development of new dimensional health LoC, e.g., Multidimensional health LoC (MHLC) scale (Rogowska et al, 2020). There was also environmental LoC (Hwang et al, 2020).

2. TRAFFIC LOCUS OF CONTROL

Özkan and Lajunen (2005) developed a specific multidimensional LoC scale for traffic behavior called Traffic Locus of Control (TLoC). By this scale, they describe the source of control of driving behavior consequences. There are four subscales of TLoC, i.e., self (internal LoC) and vehicle/ environment, other drivers & fate (external LoC). This instrument consists of 15 items.

Özkan dan Lajunen (2005) found that a high score of Self in TLoC is related to violation, error, and accident. They argued that individual with a high score of Self shows high bias on their perceived ability to drive skill. This bias trigger risky driving behavior. In other research with the same method but with a different sample, Warner et al. (2010) found that a high score of Self in TLoC predicts driving above the speed limit.

TLoC has been translated into different languages since 2005. For example, into Swedish (Warner et al, 2010) and in Romanian (Mairean et al, 2017). They both consist of 5 dimensions. The Swedish instrument consists of 17 indicators. Subscale “self” was divided further into 2 groups, i.e., own skill and own behavior (Warner et al, 2010). Besides, keeping 4 subscales from the original TLoC, the Romanian scale was added with the fifth subscale. i.e., religiosity. This scale consists of 50 indicators. (Mairean et al, 2017). Both Warner et al (2010) and Mairean et al (2017) recommend reconstructing TLoC to be applicable for Chinese culture and driving setting. The driver came from a strong socialist background, such as China tends to have external LoC.

The relationship between TLoC and driving style was for example studied by Taubman-Ben Ari et al (2004). Montag & Comrey (1987) found that drivers with external LoC tend to adopt risky behavior compared to drivers with internal LoC. On the contrary, drivers with internal LoC, tend to drive more safely as they were more conscious and attentive in driving (Alper & Özkan, 2015; Huang & Ford, 2012).

According to Holland et al (2010) more external LoC the more likely that the driver was less dissociative, less fear, and less distressed, although Mairean et al (2017) found the opposite. Mairean et al (2017) also found that other drivers, vehicles, environment, and fate were positively correlated with attentive, risky, and angry driving styles.

3. ROMANIAN TRAFFIC LOCUS OF CONTROL SCALE

As mentioned before, Romanian TLoC (Mairean et al, 2017) contain a special subscale. i.e. Religious Beliefs (which cannot be found in the TLoC scale from other countries such as Sweden and China). Even the Fate scale also contains some superstitious items. These conditions seem to be suitable to be adapted in the Indonesian case. Therefore, the contribution of this paper is to provide Indonesian adaptation of Romanian TLoC.

3.1. Religious Belief Sub-Scale

As a consequence of East European Culture in the 2010s, Christianity might influence the detail of the items. If the items are to be adopted into the Indonesian TLoC Scale, firstly more neutral items might be produced, as commonly used in daily Indonesian terminologies or secondly some commonly used examples for major practiced religions. For example, Item no 18 “A holy car blessed by a priest keeps you away from unwanted events in traffic. For Indonesia's adaptation, a car blessed by a religious leader might replace the priest for a more neutral term. Item no 19 in Romanian Scale was “Having a small cross or icon in my car protects me while driving”. Many Indonesian drivers hang different things according to their beliefs. Muslim drivers might hang small calligraphy in their car of “Allah and Muhammad” to express their belief in God and His Messenger, meanwhile, Christian drivers might hang a

rosary in their car. Mentioning those things in Indonesian TLoC to substitute “small cross” might transform the item into a more neutral term. Surprisingly, the Philippines’ Government since 2017 forbid drivers to hang a cross in a car as it might become a source of driving distraction (<https://travel.tribunnews.com/2017/05/23/karena-alasan-ini-pihak-berwenang-filipina-larang-pemasangan-salib-dan-rosario-di-mobil>). Similar adaptation might apply to item no. 17 and 21.

Apart from the existence of “holy things” in the car in the previous discusses items to protect the driver from accidents, items no. 22 to 24 were about religious acts to protect the driver from accidents. Item no. 22 “Before I leave on a journey, I make the cross sign with my finger”. The general meaning “make the cross sign with my finger” is praying which is Indonesian is the general term acceptable and understood by any religion. Item no 23 “Before I leave on a long journey I say “Gold help me” to be protected. In Indonesian version to accommodate Muslim driver, “Gold help me” might be added by “In the name of God (bismillah)”. Item no 24 “I feel that God cares for me and protects me from traffic accidents” is applicable directly for Indonesian adaptation as the meaning is acceptable for all religions in Indonesia.

3.2. Destiny/ Luck Sub-Scale

In the Indonesian case, the destiny/ luck sub-scale might be overlapped with religious belief. Item no. 1 “Avoiding a road accident depends on my luck” is of course not that religious. However, item no. 12 “If an accident is to happen, we cannot do anything to stop it” for certain road users might contain a significant religious side of destiny. Therefore, in this paper, we examined how Indonesian driver to Indonesian TLoC adapted from Romanian TLoC.

3.3. Desirability Sub-Scale

Desirability reflects the willingness to behave considerately in traffic. Road traffic situations (e.g. congestion, other road users' aggressive behaviour, involvement in an accident, etc) might trigger unpleasant feelings. Therefore, we need to use the road together with courtesy. To reduce everybody’s stress, every road user might contribute any of these indicators on this sub-scale, e.g., item no. 25 “I have always respected the rules imposed by the Traffic Code” or item no. 32 “I have never got mad at another road user”.

3.4. Other Drivers Sub-Scale

One of the features of the Locus of Control Scale is regarding who is responsible for something that happens. So, items in TLoC are regarding whether you admit that you are responsible for an incident in traffic or you blame other parties (can be the environment, but mostly other drivers). In Romanian TLoC, some examples of Other Drivers Sub-Scale, e.g., item no. 37 “The other road users would avoid causing accidents if they paid more attention to the potential hazards or item no. 38 “Traffic crashes occur because the other drivers do not care about the road”.

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3.5. Internality (Myself) Sub-Scale

As an opposite from Other Driver Sub-Scale, there is an Internality (Myself Sub-Scale). Instead of blaming the other party causing certain traffic incidents, road users with high Internality will try to look at him/herself as the cause of the traffic incident. These items are,

e.g., item no. 43 “The risky overtaking maneuvers that I initiate may lead to accidents” or item no. 44 “Traffic accidents can result from my own driving errors.

3.6. Vehicle and Environment Sub-Scale

This Sub-Scale along with Other Driver Sub-Scale are actually within a mutual group of external LoC. Some items within this Sub-Scale, e.g., item no. 47 “The presence of animals (dogs, sheep, horses, cows, etc.) on the roadway is an important cause of accidents” or item no. 49 “Traffic accidents are usually caused by unsafe or poorly maintained cars.”

4. METHOD

233 respondents filled online questionnaires using google form. As original Romanian TLoC contains 83 items. The author tried to simplify the adaptation into Indonesian TLoC by deleting some obvious duplication. In the end, the author decided to adopt 39 items to maintain the respondent's willingness to fill the questionnaires considerably. Just for comparison, the original titles of the sub-scales in the Romanian TLoC were used. To prevent self-report bias, all items have passed validity test and all constructs have passed reliability test. The following were the 39 selected items with some rewording (number in the brackets show loading factor in Mairean et al (2017):

a. *Destiny/ Luck*

1. Accident depends on my destiny (0.742).
2. Injury in an accident is a destiny (0.737).
3. Destiny determines accident involvement (0.730).
4. Less lucky driver involves in more accident (0.720).
5. Accident involvement depends on luck (0.720).
6. Accident involvement is a predicted fate (0.715).
7. Accident involvement depends on my bad luck (0.714).
8. Safe from an accident is luck (0.685).
9. During a risky traffic situation, I trust that the chance is on my side (0.649).
10. If an accident is to happen, we cannot do anything to stop it (0.602).
11. Crash injury depends on luck (0.598).
12. Being “in the wrong place at the wrong moment” decides whether a driver produces an accident or not (0.515).

b. *Religious Beliefs*

1. A religious symbol on a car protects me from an accident (0.741)
2. Car blessed by religious leaders prevents unwanted events (0.739).
3. A religious symbol in a car will result in a less severe accident (0.725).
4. Car blessed religious leaders will have a less severe accident (0.714).
5. Before a trip, I pray to be protected (0.683).
6. God protects me from an accident (0.636).

c. *Desirability*

1. I obey the traffic rule (0.750).
2. I never violate solid marking (0.693).
3. I always obey the speed limit (0.680).
4. I reduce speed when approaching traffic light (0.561).
5. I always turn on the turning sign before changing my direction (0.499).
6. I never angry with another driver (0.496).

7. I always polite in road traffic (0.454).

d. Other Drivers

1. Road accidents could be avoided if the other road users behaved safer (0.699).
2. Other driver's errors cause an accident (0.659).
3. Other drivers can avoid accidents by observing hazards (0.657).
4. Traffic accident happens due to other road users (0.610).
5. Careless driver cause accident (0.607).

e. Internality (Myself)

7. My risky driving behaviour could cause an accident (0.789).
8. My high driving speed may cause an accident (0.747).
9. My lack of driving skills causes an accident (0.730).
10. My risky overtaking cause an accident (0.711).
11. My driving error causes an accident (0.555).

f. Vehicle and Environment

1. Damaged road cause accident (0.697).
2. The presence of animals on road might cause accidents (0.626).
3. Unsafe and broken vehicles cause an accident (0.490).
4. Better road signs reduce accidents (0.482).

Likert scale was used as responses, i.e. (1) strongly disagree (2) disagree (3) agree, and (4) strongly agree. A confirmatory factor analysis was conducted using principal component analysis in SPSS 27 and rotated using varimax with Kaiser Normalization.

5. RESPONDENTS PROFILE

Most of the respondents (79%) were male. 42% of the respondents were within the young-adult age group (18-39 years old), 52% were within the middle-adult age group (40-59 years old) and the rest were older than that. The respondents came from excellent educational backgrounds as only 15% got less than a bachelor's degree, 13% with a bachelor's degree, 41 % with a master's degree, and 31% with a doctoral degree. 62% of the respondents were Muslim, 10% were Christians, 15% were Catholics and the rest were either Hindu, Buddhists, and other religions and beliefs. The mean monthly personal expenses were IDR 8,704,506 (about USD 626) with standard deviation of IDR 14,007,482 (USD 1,008). This quite high standard deviation showing high variability of monthly expenses which ranged between IDR 350,000 to IDR 150,000,000 (USD 25 to USD 10,791), Most of the respondents (71%) were married and the rest were unmarried. The driving experience of the respondents was between 1 year and 47 years with a mean of 17.3 years and a standard deviation of 12 years representing groups of well-experienced drivers. Mean daily driving durations of respondents were 131.3 minutes with a standard deviation of 140.1 minutes. In the last 365 days, 81% of the respondents stated that they did not involve in any accident. Only 10% involved in a single accident and each less than 1% involved in 2 and 3 accidents.

6. RESULTS

The varimax rotation converged in 12 iterations. The result is reported in Table 1. There were nine factors were extracted which accounted for 62.2% of the total variance. However, the author decided to remove item no. a9, a10, and a12, as they have only single membership. The final total variance extracted was 56.2% from seven factors. Kaiser-Meyer-Olkin Measure of

Sampling Adequacy was 0.81. A value greater than 0.7 justifies the sampling adequacy of the factor analysis. Table 1. Shows the rotated component matrix.

Table 1. Rotated Component Matrix

	1	2	3	4	5	6	7
Accident depends on my destiny (a1)	.783						
Injury in an accident is a destiny (a2)	.772						
A destiny determines accident involvement (a3)	.766						
Accident involvement is a predicted fate (a6)	.688						
Accident involvement depends on luck (a5)	.620						
Safe from an accident is luck (a8)	.619						
Accident involvement depends on my bad luck (a7)	.593						
Crash injury depends on luck (a11)	.578						
Less lucky driver involves in more accident (a4)	.559						
I always obey the speed limit (c3)		.764					
I never violate solid marking (c2)		.734					
I always polite in road traffic (c7)		.692					
I obey traffic rule (c1)		.684					
I reduce speed when approaching traffic light (c4)		.676					
I never angry with another driver (c6)		.651					
I always turn on the turning sign before changing my direction (c5)		.494					
A religious symbol in a car will result in a less severe accident (b3)			.884				
A religious symbol on a car protect me from an accident (b1)			.869				
Car blessed religious leader will have a less severe accident (b4)			.861				
Car blessed by religious leader prevents unwanted event (b2)			.833				
My lack of driving skills causes an accident (e3).				.779			
My high driving speed may cause an accident (e2)				.757			
My risky overtaking cause an accident (e4)				.747			
My driving error causes an accident (e5)				.663			
My risky driving behaviour cause accidents (e1)				.654			
Careless driver cause accident (c5)					.776		
Traffic accident happens due to other road users (d4)					.764		
Other driver's error cause accident (d2)					.604		
Other drivers can avoid accidents by observing hazards (d3)					.596		
Other drivers safer behaviour can prevent an accident (d1)					.557		
The presence of the animals on the road might cause an accident (f2)						.750	
Damaged road cause accident (f1)						.748	
Better road signs reduce accidents (f4)						.638	
Unsafe and broken vehicles cause an accident (f3)						.634	
God protects me from an accident. (b5)							.772
Before a trip, I pray to be protected (b6)							.754

In general, all items in Romanian TLoC adapted in Indonesian TLoC belong in the same subscales with the following exceptions:

- a. In the Indonesian TLoC destiny/ luck sub-scale there were 3 items removed, i.e.
 - During a risky traffic situation, I trust that the chance is on my side (a9).
 - If an accident is to happen, we cannot do anything to stop it (a10).
 - Being “in the wrong place at the wrong moment” decides whether a driver produces an accident or not (a12).
- b. In the Indonesian TLoC religious beliefs sub-scale, there were two groups of items, i.e.:
 - Items which belong to the original Romanian TLoC (further named as superstitious religious beliefs):
 - i. A religious symbol on a car protects me from an accident (b1).
 - ii. Car blessed by religious leaders prevents unwanted events (b2).
 - iii. A religious symbol in a car will result in a less severe accident (b3).
 - iv. Car blessed religious leaders will have a less severe accident (b4).
 - Items which belong to new sub-scale (further named as real religious beliefs):
 - i. Before a trip, I pray to be protected (b5).
 - ii. God protects me from an accident (b6).
- c. The magnitude of the loading factors of the same items was different in Romanian and Indonesian TLoC. For example, in sub-scale Internality (Myself), the item with the highest loading factor in Mairean et al (2017) was item no. e1 “My own risky driving behaviour could cause an accident (0.789)”, whilst in this present study, in sub-scale Internality (Myself), the item with the highest loading factor was item no. e3 “My lack of driving skill cause accident (0.730)”.

Although according to Lin and Ding (2003) locus of control was moderating perceived behavioural control, this present paper did not incorporate theory of planned behaviour.

7. CONCLUSION AND RECOMMENDATION

It is concluded that although in the present study regarding Indonesian TLoc, the respondents were rather inclined to highly educated sample, in most of the sub-scales, the grouping of the items falls into the sub-scales of the Romanian TLoC study (Meirean et al (2017)) with certain exceptions. From the beginning, the author is concerned that somehow the difference will be in the fate/ destiny and religious beliefs sub-scales. The concern was confirmed.

It is recommended that for further studies, a more heterogeneous sample is collected, especially in terms of educational attainment. In the present study educational attainment was too high with most respondents possessed university degree which do not describing Indonesian driver population in real situation. The result of this study can be used as one of the materials for developing a traffic safety campaign related to TLoC.

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