

## REPORT OF RESEARCH RESULTS REPORT OF UTILISATION OF RESEARCH GRANT

### 1) INSTRUCTIONS FOR REPORT OF RESEARCH RESULTS

(a) **Title:** Analysis of risk perception modelling and factors affecting in motorcyclist near misses using Structural Equation Modeling

(b) **Primary Researcher:** Natthaporn Hantanong  
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(c) **Summary:** The purposes of this research are to develop models of risk perception and analyze factors affecting in motorcyclist near misses. Collected data were distributed among two areas: district municipalities, and non-municipalities from six regions. The sample consisted of 1408 motorcycle riders who were at least 19 years old. Of these riders, 29.4% had motorcycle riding licenses, 60.3% used a motorcycle to go to work/study, 68.9% had experience near-miss in the past 12 months, and 4.1% had experience crash in the past 12 months. Exploratory factor analysis (EFA) and Structural Equation Modeling (SEM) were used for measurement model creation. The results presented 22 indicators that were confirmed to compose the factors affecting in motorcyclist near misses of Thai people at a statistical significance level of  $\alpha = 0.01$ ; these were separated into five factors, namely, traffic error, slips and lapses, speed violation, control error, and social media.

The results shown speed violation has the greatest effect on causing near miss. The mentioned result is in consistence with the Thailand road accident statistics notifying that over speed limit driving, caused by the driver behavior, ranks first. Thus, the issue of speed used should be urgently addressed. In addition, the result is simultaneously relevant to the near miss type occurring most: Swerve or brake due to other vehicle, which is often caused by overtaking and crossing. This also corresponds to the most common road accident type which is cutting another car off and slamming the brake immediately.

Therefore, the first measure to prevent and resolve motorcycle accidents is to emphasize the rider's riding speed to control the use of vehicle speed and rider behavior due to its biggest risk to motorcycle accidents, followed by Control errors and Slips and Lapses.

(d) **Aim of Research:** To develop models of risk perception and analyze factors affecting in motorcyclist near misses

(e) **Method of Research & Progression  
Procedure**

The procedure of the research involved studying previous research related to motorcycle riding behaviors (MBRQ). The MBRQ was utilized as a tool to study and collect the data. The item-objective congruence index (IOC) was studied via questionnaire by experts who were specialists in screening research tools. Human research ethics application documents were submitted, and the ethics evaluation result was that the study was of low risk. Data were collected from acrosss the country. The collected data were verified as following a normal distribution. We utilized exploratory factor analysis (EFA) to filter observed variables of the same group and eliminate some factors to fit with the model. Structural Equation Modeling (SEM) was utilized to analyze the structural relationship between measured variables and latent constructs, as shown in Figure 1.

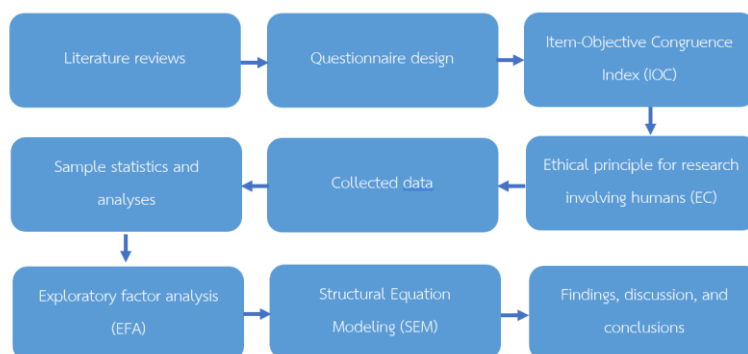


Figure 1 Research processing

## Participants

The samples in this research numbered 1408, collected from all parts of Thailand; this is enough for analysis according to the recommendation. The samples were distributed between two areas, which were district municipality, and non-municipality areas. These were also from six regions, namely, central region, northeastern region, north region, south region, east region, and west region.

## (f) Results of Research

**Table 1. Sample characteristics; n = 1408.**

Variable		N	Frequency	Percent (%)
<b>Gender</b>	Male	1408	670	47.6
	Female		738	52.4
<b>Age group</b>	<20	1408	94	6.7
	20-29		234	16.6
	30-39		267	19.0
	40-49		259	18.4
	≥50		554	39.3
<b>Family status</b>	Single	1408	782	55.5
	Other		626	44.5
<b>Education</b>	<Bachelor	1408	582	41.3
	≥Bachelor		826	58.7
<b>Income</b>	<30,000 Baht	1408	582	41.3
	≥30,000 Baht		826	58.7
<b>Licensed rider</b>	Yes	1408	414	29.4
	No		994	70.6
<b>Main riding purposes</b>	School/work	1408	849	60.3
	Travel		225	16.0
	Shopping		334	23.7
<b>Riding frequency</b>	Everyday	1408	403	28.6
	Several times per week		390	27.7
	Once a week		615	43.7
<b>Experience near-miss in the past 12 months</b>	Yes	1408	970	68.9
	No		438	31.1
<b>Experience crash in the past 12 months</b>	Yes	1408	58	4.1
	No		1350	95.9

**Table 2. Type of Near Miss Accident**

Type of Near Miss Accident	Frequency	Percent (%)
<b>Skid</b>		
due to water	100	10.29%
due to mud, wet leaves, animal manure	9	0.93%
due to oil spillage on the road	19	1.95%
due to slippery or loose road surface (e.g. paint or worn asphalt), loose gravel	35	3.60%
due to road furniture (e.g. man hole/inspection cover)	29	2.98%
<b>Near loss of control</b>		
due to shunting (vehicle from behind braking suddenly)	92	9.47%
due to tire puncture	6	0.62%
due to mechanical failure	4	0.41%
due to travelling too fast for the conditions	57	5.86%
due to potholes or grooves in the road	79	8.13%
due to flying objects (e.g. insects, bird, paper)	15	1.54%
due to tiredness or inattention (lack of focus)	12	1.23%
<b>Swerve or brake due to other vehicle (or pedestrian)</b>		
overtaking from behind	108	11.11%
coming towards you in your lane	84	8.64%
Another car turns right and cutting you off	93	9.57%

Type of Near Miss Accident	Frequency	Percent (%)
turning into your path from a side road, private driveway or opposite direction	62	6.38%
cutting you off at a junction	58	5.97%
cutting you off while performing a U turn	75	7.72%
Animal(s) walking into your path	35	3.60%
<b>Total</b>	<b>972</b>	<b>100%</b>

**Table 3. Independent Variables**

Code	Independent Variables
	<b>Traffic errors (TE)</b>
TE1	Failed to notice that pedestrians are crossing when turning into a side street from a main road
TE2	Not noticed someone stepping out from behind a parked vehicle until it is nearly too late
TE3	Not noticed a pedestrian waiting at a crossing where the lights have just turned red
TE4	Pulled out on to a main road in front of a vehicle you hadn't noticed or whose speed you misjudged
TE5	Overtaking without giving a signal in advance.
TE6	Do not turn on your signal lights in advance of your turn or lane change
TE7	If there are no cars on the road, you continue to go straight while ignoring red traffic lights.
TE8	Accelerate when approaching a traffic light at a yellow phase
TE9	When the traffic light changes to green signal, you immediately start driving the car without looking to the left or to the right.
	<b>Slips and Lapses (SL)</b>
SL1	Forget where you parked your motorcycle
SL2	Forget to signal while turning the motorcycle
SL3	Switch on one thing, such as you want to turn right, you give the left turn signal
	<b>Speed violations (SV)</b>
SV1	Exceed the speed limit on a country/rural road
SV2	Deliberately disregard the speed limits outside build-up areas when there is little traffic
SV3	Overtake a car or moped that reduces speed because you approach an area with lower speed limits
SV4	Disregard speed limit late at night or in the early hours of morning
	<b>Control errors (CE)</b>
CE1	Failing to control the motorcycle when using high speed.
CE2	Braking too quickly on a slippery road.
CE3	Brake or throttle back when going around a bend
	<b>Social media (SC)</b>
SC1	You talk on the phone or talk on the phone without using small talk / Bluetooth devices.
SC2	You type / read texts from your mobile phone while driving.
SC3	You use headphones/earbuds for listening to music while riding a motorcycle.

**Table 4. Dependent Variables**

Code	Dependent Variables
	<b>Near miss</b>
Y1	The number of near miss (1 year past)
Y2	Type of users of near miss (By yourself, Bicycle, Motorcycle, Car Pedestrian)
Y3	The parties of near miss (You, Parties, Both)
Y4	The cause of near miss

In Figure 2, According to the model analysis, speed violation has the greatest effect on causing near miss with a loading factor of 0.793 at a significant level of 0.01. The mentioned result is in consistence with the Thailand road accident statistics notifying that over speed limit driving, caused by the driver behavior, ranks first. Thus, the issue of speed used should be urgently addressed. In addition, the result is simultaneously relevant to the near miss type occurring most: Swerve or brake due to other vehicle, which is often caused by overtaking and crossing. This also corresponds to the most common road accident type which is cutting another car off and slamming the brake immediately.

Therefore, the first measure to prevent and resolve motorcycle accidents is to emphasize the rider's riding speed to control the use of vehicle speed and rider behavior due to its biggest risk to motorcycle accidents, followed by Control errors and Slips and Lapses.

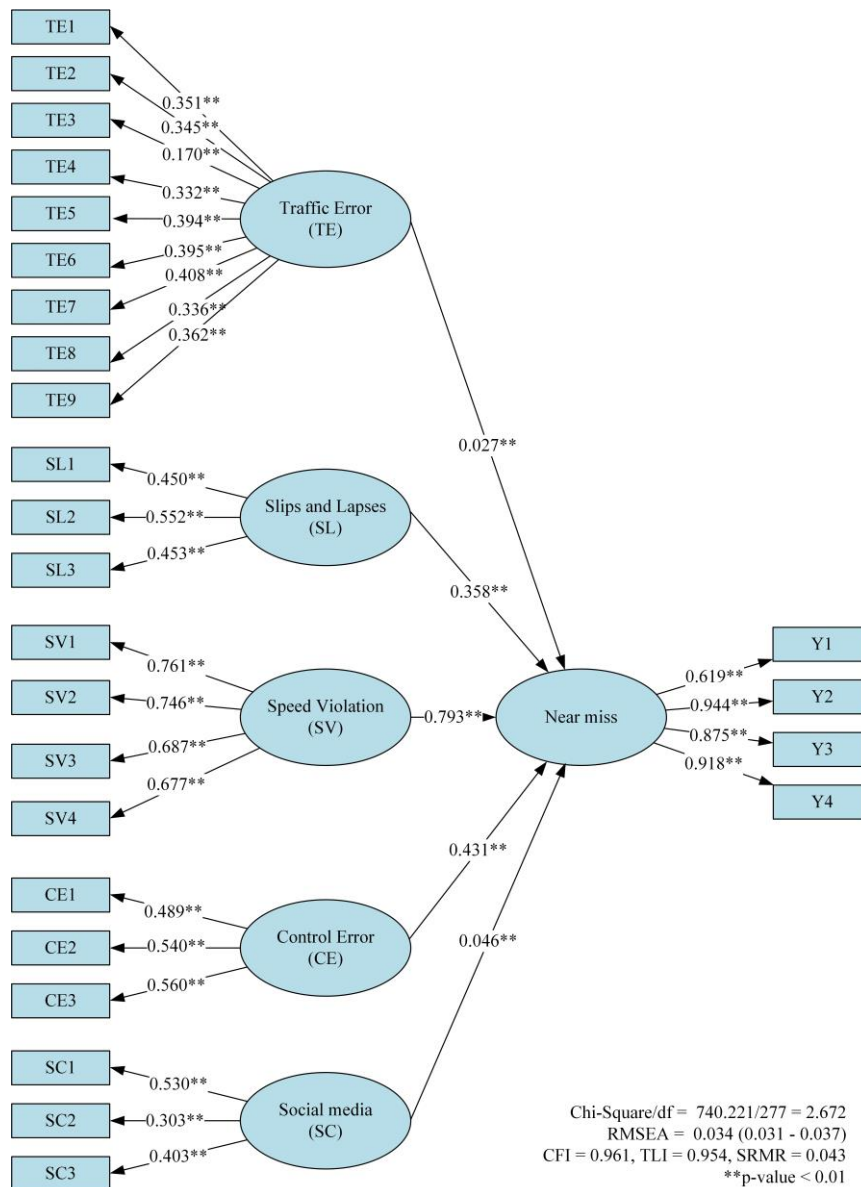


Figure 2. Structural Equation Modeling (SEM)

### Implications

- Involved agencies should have discussion or do a new study about the appropriate speed limit used which may be at too high speed limit in current urban / rural areas.
- Involved agencies should consider guidelines for clearly separating the motorcycle lanes from those of other vehicle types to reduce the accident risks between motorcycles and other vehicles.
- The speed cameras should be supported to be sufficiently installed.
- There should be strict speed limit law enforcement in terms of fine rates, point- deduction on the rider's license, and suspension of riding license in case of serious violation of law.
- There should be intensive training for the rider's license exam regarding speed used or additional training courses equipped with the riding simulator usage to control the vehicle, and use the appropriate speed.

### (g) Future Areas to Take Note of, and Going Forward

- There should be supplementary studies on the near miss occurrence in other vehicle types such as cars, trucks, etc.
- This study does not study on riders under the age of 18; however, one-third of all road traffic deaths occurs in that teenage driver group. Therefore, in further studies, this group should be considered to make the study results more comprehensive.
- There should be comparative studies on risk behaviors potentially causing near miss between groups such as between male-female, or in urban-rural areas, etc.

### (h) Means of Official Announcement of Research Results

Accident Analysis & Prevention journal (accidental injury and damage, including the pre-injury and immediate post-injury phases. Published papers deal with medical, legal, economic, educational, behavioral, theoretical or empirical aspects of transportation accidents, as well as with accidents at other sites.)