

The Relationship Between Trait Anger and Traffic Accident History in Denpasar, Manado, and Padang

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Abstract—Trait anger may increase traffic accident risk. In the current research, 9 items of the trait anger scale were translated into Indonesian and used to assess whether the 9 trait anger items were very unfit, unfit, fit very fit with the respondent's personality. Respondents also asked to tell their accident histories. Several general questions also asked such as name, gender, age, marital status, origin, address, monthly personal expense. A series of mean different t-tests were conducted to know whether trait anger is related to traffic accident risk. 600 respondents were asked to fill out the questionnaires. Each 200 respondents in Denpasar, Manado, and Padang. Half of them were car drivers and another half of them were motorcycle riders.

Keywords: *trait anger, traffic accident history, Denpasar, Manado, Padang*

I. INTRODUCTION

Ulleberg & Rundmo [1] stated that involvement in a traffic accident was high in a society with high traffic accident risk such as a society who have high trait anger and sensation seeking. Furthermore, the trait personality and risky driving behavior were correlated and mediated by an attitude toward unsafe behavior. In Taiwan, Chen [2] found that attitude toward unsafe behavior, directly affect risky driving behavior, whilst trait personality indirectly affects behavior mediated by attitude.

Mesken et al stated that the negative emotion felt when driving can adjust cognition to stimulus, reducing attention, and adjust interpretation to other drivers and accordingly escalate risky driving potential [3]. The most common emotion form studied in driving behavior research was anger. A research conducted by Underwood et al [4] using travel diary found that most of the respondents reported anger feeling at least once in every trip.

Matthews [5] stated that most of the drivers experienced anger and also found that driver with high trait anger tend to observe traffic situation in more contentious point of view, and accordingly drove faster, showed more errors and more risks. Dahlen et al [6] stated that trait driving anger also associated with accident frequency, risky and aggressive driving, anger to other drivers and impatient driving. According to Mesken et al [3], Deffenbacher et al

[7-8], and Sullman [9], compared to a driver with low trait anger, the driver with high trait anger tend to involve in speeding, experience risky situation or near-miss accident, concentration loss, and uncontrolled behavior while driving.

Deffenbacher et al [10] found trait anger associated with the frequency of collisions and traffic violations in several latest years. However, in another study, Deffenbacher et al [8] did not find a correlation between them. Moreover, Sullman [9] also stated that trait anger did not associate with the number of collision in the last five years. These inconsistent findings might be due to the essence of a traffic accident as a dependent variable which infrequently existed, difficulties in gathering correct traffic accident data, and other ancillary effects to the accidents.

There was anger which was a temporary emotional response toward a certain situation and on the other hand, there was an individual general personality to get angry. Anger as an emotional response to a certain situation is called state anger and related to heuristic physiological and autonomous response and muscle tension to make the body to do an action. This physical response will recover to the baseline again after the specific situation handled. On the contrary trait, anger refers to individual general personality to get angry in various contexts and different conditions. People with high trait anger tend to interpret surrounding events as a threat toward their ego and values. Therefore, state anger will easily and more frequently be triggered compared to other people [10].

Deffenbacher et al [10] also observed the association between trait anger and state anger among automobile drivers. They also found that driver with high trait anger showed more aggressive and risky behavior compared to a driver with low trait anger. Likewise, it happened to a driver with high state anger. These findings steadily appeared in the different method of observation, i.e. using questionnaires, trip diaries or real behaviours through a driving simulator.

Deffenbacher et al [7] conducted a study based on driving simulator finding, involving 121 students with both low and high trait anger. The result showed that driver with high trait anger drive the car with higher speed and maintain closer distance with other cars compared to low

trait anger driver. In high traffic density condition, a hot-tempered driver tends to involve in a collision, and their state anger escalated.

According to Matthews [5] and Nesbit et al [11], even though there was a clear correlation between trait anger and driver behavior, driving was very likely affected by state anger. Furthermore, data associated with trait anger may not be too beneficial for policymakers. The reason is other than in severe condition, intervention on road safety based on trait might not be acceptable by the general public, furthermore if administered as one of the prerequisites to acquire a driving license. On the other hand, understanding of how state anger affects driver behaviour might more likely affect policy and other deterrent attempts. Nevertheless, very few were understood concerning the effect of state anger toward driver behavior. According to Abdu et al [12], Jeon et al [13] and Roidl et al [14], just in this latest decade, some researchers had started to conduct a study on state emotion using a driving simulator with emotion induction method.

As cited before by Dahlen et al [6], trait driving anger associated with accident frequency, risky and aggressive driving, anger to other drivers and impatient driving. This paper will discuss whether similar relationships applied to the respondents in Denpasar, Manado and Padang, three province capital cities in Bali, North Sulawesi and West Sumatera.

II. METHOD

There were 600 respondents consist of each 200 respondents in Denpasar, Manado, and Padang. Half of the respondents were riding a motorcycle in their daily life with a valid motorcycle riding license. Another half of the respondents were driving the car in their daily life with a valid car driving license. The questionnaires consisted of two main parts, i.e. the general data and the main data.

The general data consist of questions regarding name, gender, age, marital status, origin, address, monthly

personal expense and accident involvement history. Trait anger scale consists of nine items and the respondents were asked to rate themselves, whether the following anger was very unfit, unfit, fit very fit with the respondent's personality:

- a. I am quick-tempered.
- b. I have a fiery temper.
- c. I fly off the handle.
- d. I have uncontrollable anger.
- e. I get angry when slowed down by other's mistakes.
- f. I feel annoyed when not given recognition for doing good work.
- g. It makes me furious when I am criticized in front of others.
- h. I feel infuriated when I do a good job and get a poor evaluation.
- i. I say dirty words when angry.

Item (i) was originally "I feel to hit someone when frustrated" but deliberately changed after a focus group discussion following some experts suggestions. Main analyses using $\alpha=0.05$ were:

- a. Mean different analysis with 2.5 (the departure from not angry to angry).
- b. Spearman correlation analysis between each item of the trait anger scale with the frequency of accident in the last one year.

III. PROFILE OF THE RESPONDENTS

From TABLE I, it can be seen that male respondents were more than female respondents, although the proportion of sample by gender does not necessarily reflect the proportion of drivers and riders in population by gender.

TABLE I. NUMBER OF SAMPLE IN EACH CITY BY VEHICLE TYPE, MARITAL STATUS AND GENDER

	Denpasar				Manado				Padang				Total
	Car		Motorcycle		Car		Motorcycle		Car		Motorcycle		
	M*	NM*	M*	NM*	M*	NM*	M*	NM*	M*	NM*	M*	NM*	
Male	35	20	30	27	42	11	33	21	31	22	20	31	323
Female	33	12	28	15	28	19	29	17	25	22	23	26	277
Total	68	32	58	42	70	30	62	38	56	44	43	57	600

* M: Married; NM: Not Married

TABLE II. NUMBER OF SAMPLE IN EACH CITY BY VEHICLE TYPE, MARITAL STATUS AND GENDER

	Denpasar				Manado				Padang			
	Car		Motorcycle		Car		Motorcycle		Car		Motorcycle	
	Mean	S*	Mean	S*	Mean	S*	Mean	S*	Mean	S*	Mean	S*
Male	36.4	11.1	32.7	12.9	42.3	12.5	38.2	14.1	36.9	12.7	34.9	12.3
Female	34.9	10.1	36.7	13.5	33.3	11.0	34.2	12.0	34.8	11.2	33.6	12.6

* S: Standard Deviation

TABLE II shows that the mean age of the respondents in 3 cities and 2 vehicle type were between 32.7 and 42.3 with a standard deviation of 12.9 and 12.5 respectively. When approaching the respondents, we deliberately tried

to split the sample to be almost equal between young adult group (less than 40 years old) and older group (40 years old or more). As the legal age of driving/ riding license was 17, such age range (32.7-42.3 years old) was logical.

The range of mean age of the respondents also affect the marital status of most of the respondents, i.e. married. This was the general case except for motorcycle respondents in the non-married group of Padang's respondents consist of mostly the single respondents and few widow/ widower respondents.

IV. RESULTS

TABLE III through TABLE V show the mean difference of 9 trait anger scale items with 2.5 (the departure from not angry to angry) in Denpasar, Manado, and Padang respectively. TABLES VI through TABLE VIII show Spearman correlation between accident frequency & trait anger scale Items in Denpasar, Manado, and Padang respectively.

It can be seen in TABLE III through TABLE V that in the three observed cities, in general respondents were within low trait anger in almost all items. The mean scores were generally either significantly less than 2.5 or only marginally above 2.5 with the following exceptions, i.e.:

- The item "I feel annoyed when not given recognition for doing good work" for car drivers in Denpasar.
- The item "I get angry when slowed down by other's mistakes" for car drivers in Manado & Padang and motorcycle riders in Manado.
- The item "I am furious when I am criticized in front of others" for car drivers in Padang.

It can be seen that in TABLE VI and TABLE VII that in general all items of trait anger scale were significantly and positively correlated with the accident frequency of the car drivers in Denpasar and Manado in the last one year except for:

- "Item "I feel annoyed when not given recognition for doing good work" and item "I feel infuriated when I do a good job and get a poor evaluation" for car drivers in Denpasar.
- The item "I feel annoyed when not given recognition for doing good work" for car drivers in Manado.

It can be seen that in TABLE VI and TABLE VII that in general all items of trait anger scale were not significantly and positively correlated with the accident frequency of the motorcycle riders in Denpasar and Manado in the last one year except for:

- The item "I feel annoyed when not given recognition for doing good work" for motorcycle riders in Denpasar.
- Items "I have a fiery temper" and "I fly off the handle" for motorcycle riders in Manado.

It can be seen that in TABLE VIII that in general all items of trait anger scale were not significantly and positively correlated with the accident frequency of the car drivers and motorcycle riders in Padang in the last one year except for item "I say dirty words when angry" for car drivers.

TABLE III. MEAN DIFFERENCE WITH 2.5 OF TRAIT ANGER SCALE ITEMS IN DENPASAR

Items	Car			Motorcycle		
	Mean Difference With 2.5	<i>a</i>	Significant at <i>a</i> =0.05 (Yes/No?)	Mean Difference With 2.5	<i>a</i>	Significant at <i>a</i> =0.05 (Yes/No?)
I am quick-tempered	-0.44	<0.001	Yes	-0.250	<0.001	Yes
I have a fiery temper	-0.83	<0.001	Yes	-0.571	<0.001	Yes
I fly off the handle	-0.63	<0.001	Yes	-0.470	<0.001	Yes
I have uncontrollable anger	-0.69	<0.001	Yes	-0.591	<0.001	Yes
I get angry when slowed down by other's mistakes	-0.01	0.895	No	0.010	0.880	No
I feel annoyed when not given recognition for doing good work	0.14	0.032	Yes	0.070	0.264	No
It makes me furious when I am criticized in front of others	-0.09	0.140	No	-0.076	0.253	No
I feel infuriated when I do a good job and get a poor evaluation	0.10	0.128	No	-0.096	0.087	No
I say dirty words when angry	-0.69	<0.001	Yes	-0.470	<0.001	Yes

TABLE IV. MEAN DIFFERENCE WITH 2.5 OF TRAIT ANGER SCALE ITEMS IN MANADO

Items	Car			Motorcycle		
	Mean Difference With 2.5	<i>a</i>	Significant at <i>a</i> =0.05 (Yes/No?)	Mean Difference With 2.5	<i>a</i>	Significant at <i>a</i> =0.05 (Yes/No?)
I am quick-tempered	-0.22	0.006	Yes	-0.13	0.047	Yes
I have a fiery temper	-0.58	<0.001	Yes	-0.56	<0.001	Yes
I fly off the handle	-0.63	<0.001	Yes	-0.75	<0.001	Yes
I have uncontrollable anger	-0.65	<0.001	Yes	-0.57	<0.001	Yes
I get angry when slowed down by other's mistakes	0.34	<0.001	Yes	0.23	<0.001	Yes
I feel annoyed when not given recognition for doing good work	0.10	0.119	No	0.13	0.047	No
It makes me furious when I am criticized in front of others	-0.04	0.502	No	0.40	0.475	No
I feel infuriated when I do a good job and get a poor evaluation	0.05	0.426	No	0.70	0.299	No
I say dirty words when angry	-0.71	<0.001	Yes	-0.56	<0.001	Yes

TABLE V. MEAN DIFFERENCE WITH 2.5 OF TRAIT ANGER SCALE ITEMS IN PADANG

Items	Car			Motorcycle		
	Mean Difference With 2.5	α	Significant at $\alpha=0.05$ (Yes/No?)	Mean Difference With 2.5	α	Significant at $\alpha=0.05$ (Yes/No?)
I am quick-tempered	-0.56	<0.001	Yes	-0.45	<0.001	Yes
I have a fiery temper	-0.77	<0.001	Yes	-0.72	<0.001	Yes
I fly off the handle	-0.80	<0.001	Yes	-0.93	<0.001	Yes
I have uncontrollable anger	-0.80	<0.001	Yes	-0.97	<0.001	Yes
I get angry when slowed down by other's mistakes	0.18	0.014	Yes	0.01	0.912	No
I feel annoyed when not given recognition for doing good work	0.13	0.096	No	-0.05	0.576	No
It makes me furious when I am criticized in front of others	0.17	0.046	Yes	0.13	0.134	No
I feel infuriated when I do a good job and get a poor evaluation	0.17	0.096	No	0.04	0.655	No
I say dirty words when angry	-0.82	<0.001	Yes	-0.78	<0.001	Yes

TABLE VI. SPEARMAN CORRELATION BETWEEN ACCIDENT FREQUENCY & TRAIT ANGER SCALE ITEMS IN DENPASAR

Items	Car			Motorcycle		
	Spearman Correlation	α	Significant at $\alpha=0.05$ (Yes/No?)	Mean Difference With 2.5	α	Significant at $\alpha=0.05$ (Yes/No?)
I am quick-tempered	0.30	0.001	Yes	0.12	0.110	No
I have a fiery temper	0.31	0.001	Yes	0.13	0.104	No
I fly off the handle	0.38	<0.001	Yes	-0.06	0.283	No
I have uncontrollable anger	0.28	0.002	Yes	0.14	0.086	No
I get angry when slowed down by other's mistakes	0.18	0.038	Yes	0.10	0.162	No
I feel annoyed when not given recognition for doing good work	-0.17	0.051	No	0.14	0.083	No
It makes me furious when I am criticized in front of others	0.19	0.031	Yes	0.20	0.026	Yes
I feel infuriated when I do a good job and get a poor evaluation	-0.05	0.298	No	0.16	0.054	No
I say dirty words when angry	0.29	0.002	Yes	0.09	0.182	No

TABLE VII. SPEARMAN CORRELATION BETWEEN ACCIDENT FREQUENCY & TRAIT ANGER SCALE ITEMS IN MANADO

Items	Car			Motorcycle		
	Spearman Correlation	α	Significant at $\alpha=0.05$ (Yes/No?)	Mean Difference With 2.5	α	Significant at $\alpha=0.05$ (Yes/No?)
I am quick-tempered	0.26	0.004	Yes	-0.07	0.233	No
I have a fiery temper	0.27	0.004	Yes	0.23	0.011	Yes
I fly off the handle	0.36	<0.001	Yes	0.19	0.032	Yes
I have uncontrollable anger	0.46	<0.001	Yes	0.11	0.151	No
I get angry when slowed down by other's mistakes	0.40	<0.001	Yes	-0.01	0.476	No
I feel annoyed when not given recognition for doing good work	0.38	<0.001	Yes	-0.02	0.421	No
It makes me furious when I am criticized in front of others	0.08	0.205	No	0.01	0.444	No
I feel infuriated when I do a good job and get a poor evaluation	0.29	0.002	Yes	0.09	0.180	No
I say dirty words when angry	0.28	0.003	Yes	0.03	0.379	No

TABLE VIII. SPEARMAN CORRELATION BETWEEN ACCIDENT FREQUENCY & TRAIT ANGER SCALE ITEMS IN PADANG

Items	Car			Motorcycle		
	Spearman Correlation	α	Significant at $\alpha=0.05$ (Yes/No?)	Mean Difference With 2.5	α	Significant at $\alpha=0.05$ (Yes/No?)
I am quick-tempered	-0.04	0.354	No	-0.06	0.288	No
I have a fiery temper	-0.02	0.421	No	-0.05	0.309	No
I fly off the handle	0.02	0.408	No	-0.02	0.427	No
I have uncontrollable anger	0.09	0.188	No	<-0.01	0.496	No
I get angry when slowed down by other's mistakes	0.01	0.481	No	0.07	0.233	No
I feel annoyed when not given recognition for doing good work	0.10	0.168	No	0.03	0.372	No
It makes me furious when I am criticized in front of others	0.16	0.060	No	-.15	0.073	No
I feel infuriated when I do a good job and get a poor evaluation	0.12	0.123	No	0.10	0.158	No
I say dirty words when angry	0.17	0.045	Yes		0.315	No

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