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Driving self-control: A study of driving compliance behavior of the millennial generation

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Abstract

Traffic accidents are predicted to be the leading cause of death in the world by 2030. Exceeding the speed limit is dangerous and can worsen road safety; reducing speed can mitigate this risk. The study aims to investigate the mediating role of self-control that predicts the relationship between safety attitudes and family climate in improving driving compliance behavior among millennial drivers. The population in the study consisted of young millennial drivers in DKI Jakarta Province. The study's total sample was 300 drivers who understood the speed limit regulations, and the analysis utilized the SEM method with Smart PLS. The study found that family attitudes and climate require self-control in driving to encourage successful enforcement of speed limit regulations. Self-control in driving plays a significant role in improving speed limit compliance behavior. Safety attitudes and family climate can indirectly influence speed limit compliance behavior among millennial drivers, and self-control in driving influences speed limit compliance behavior: safety attitudes and family climate influence self-control in driving. Safety attitudes and family climate towards speed limit compliance behavior are mediated (complementary) by self-control in driving. The conclusion is that self-control in driving can bridge the gap in research results regarding safety attitudes toward speed limit compliance behavior among millennial drivers. The recommendations from the research results are expected to enhance millennial drivers' speed limit compliance behavior. Road safety policies must implement road safety promotions, campaigns, and socialization focusing on safety attitudes, family climate, and driver self-control.

Keywords: Family climate, Road safety, Safety attitude, Self-control, Speed limit compliance behavior.

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1. Introduction

Road traffic accidents are recorded as the fifth most significant cause of death by 2030. Recognizing the importance of road safety, governments around the world expressed their determination in UN General Assembly Resolution 74/299 of August 31, 2020, endorsing the period 2021-2030 as the Decade of Action for Road Safety, aiming to reduce road traffic accident deaths and injuries by 50 percent during the period 2021-2030. According to the Indonesian National Police, 61 percent of accidents are due to human actions in terms of driver ability and personal characteristics, vehicle factors cause 9 percent, and 31 percent of accidents are caused by infrastructure and the environment. Of the 147 thousand accidents in 2020, 46 percent involved the young millennial generation aged 17-39 years.

Road safety issues need to be considered in terms of causal factors, including the road environment, vehicles, road users, and weather [1]. Excessive and risky speed is the biggest road safety problem in various countries [2]. Exceeding the vehicle speed limit is dangerous and detrimental, worsening road safety Farisyi, et al. [3] and Movahed, et al. [4]. Reducing speed can mitigate this risk [1, 5]. Efforts are needed to minimize the threat of traffic accidents on roads by implementing exemplary practices in each pillar of road safety, such as increasing awareness of traffic compliance [2].

There are different studies on attitudes toward speed limit compliance behavior; driver attitudes positively impact speed limit compliance behavior [6]. Meanwhile, Etika, et al. [7] found that driver attitudes did not affect driving behavior in complying with speed limit regulations in 50 km/h speed zones. Research on family climate is limited in the context of risky driving behavior in adolescent drivers with Attention Deficit-Hyperactivity Disorder (ADHD) Garner, et al. [8] and Burns, et al. [9] safety behavior [10-13].

Based on traffic accident data involving the millennial generation, more consistent research on attitudes toward driving behavior and limited research on family climate regarding speed limit compliance behavior is needed. This phenomenon opens up new opportunities for us to conduct research to fill gaps and limitations in this field. This research examines the potential for self-control to increase drivers' speed limit compliance behavior for the millennial generation in Jakarta.

2. Literature Review

2.1. Safety Attitude

Attitudes are essential in many areas of social science, including marketing. Most researchers consider attitude to be a relatively general and enduring evaluation of an object, person, or concept on a positive-to-negative scale [14]. Safety attitudes are favorable or unfavorable beliefs regarding road traffic safety [15, 16]. Attitude is essential for improving effective traffic safety programs [17, 18].

2.2. Family Climate

Workplace safety studies were symbolically adopted for road safety climate and modified as a new concept in family climate [19]. Family climate is parents' or families' values, perceptions, priorities, and practices regarding safe driving [20]. Safety climate is essential for predicting traffic safety behavior, such as accidents while driving [10].

2.3. Self-Control

Control is an individual's ability to consciously control themselves so as not to cause detrimental behavior and to adapt to social norms that are acceptable to their environment [21]. Individuals with good self-control abilities have a long-term impact on their potential actions, where individuals will have high levels of commitment, participation, trust, and connection [22, 23]. The ability to control oneself is considered a critical and essential aspect of human behavior for achieving one's life goals [24-26].

2.4. Driving Compliance Behavior

Driving compliance is the behavior of following traffic rules; these rules guide road users to comply with the regulations, impact road users positively, and reduce the risk of accidents [27]. In this research, driving compliance behavior refers to adhering to speed limits while driving. Behavior toward compliance with driving speed limits is guided by traveling below or at the set speed limit [28]. Lowering speed limits improves safety for all road users and is one of the most effective preventive measures to enhance road safety [29]. Speed limit compliance behavior is essential to monitor; increasing compliance with vehicle speed limits makes traffic flow smoother, improves discipline, and reduces the risk of accidents [30, 31].

2.5. Safety Attitudes and Speed Limit Compliance Behavior

Driving behavior and social interactions among road users are directly and indirectly determined by driver attitudes [32]. Unstable driver attitudes can be caused by implementing interventions on safety attitudes, which impact long-term changes in driver behavior and road risk [33]. Attitudes play an important role in predicting young drivers' willingness to engage in risky driving behaviors, such as texting while driving and exceeding the speed limit [34]. Safety attitudes improve safety by encouraging safe behaviors and reducing accidents [35, 36]. Therefore, the following hypotheses are proposed for the study:

H_1: Safety attitudes influence driving speed limit compliance behavior.

2.6. Family Climate and Speed Limit Compliance Behavior

During their physical and mental development, teenagers need special attention from their parents; when their planning abilities improve, they will show more positive traffic behavior [37]. The relationship between the driving behavior of parents and their teenage children and the level of parental supervision impacts reducing the number of adolescent accidents [38].

Family climate for road safety is the values, perceptions, and practices of parents or families regarding safe driving; parental involvement in driving their teenage children impacts safety [20]. Therefore, the below hypothesis is proposed for this study:

H_2: Family climate influences driving speed limit compliance behavior.

2.7. Self-Control and Driving Speed Limit Compliance Behavior

Self-control guides a person's behavior toward long-term goals that often require personal sacrifice for social benefit [39]. High self-control for someone can control thoughts, regulate emotions, and inhibit negative impulses compared to low self-control [40]. Self-control is fundamental in explaining behavior that requires individuals to give up momentary gratification for long-term goals and stop automatic habits, such as exceeding the speed limit for driving [41]. Individuals need to be aware of the importance of self-control and observe their environment. Driving allows drivers to control themselves and engage in deviant behavior [42]. Therefore, the hypothesis proposed for the study is:

H_3: Self-control influences the behavior of complying with driving speed limits.

2.8. Safety Attitude and Self-Control

The self-control of individuals who are not impulsive reflects a person who lacks perseverance and tenacity, is quick to become complacent, slow to solve problems, and has little tolerance for frustration or discomfort [43]. Therefore, self-control impacts attitudes, peer influence, anger, and frustration related to deviant behavior Piquero, et al. [44]. Clinton, et al. [41] found that the influence of affective and cognitive attitudes, as well as post-work fatigue, are causes of failure to control driving self-control. Therefore, the hypothesis proposed for this study is as follows:

H_4: Safety attitudes influence driving self-control.

2.9. Family Climate and Self-Control

Norm-based behavior requires self-control; norm compliance often involves behavior that conflicts with one's immediate ego interests [45, 46]. Self-control can be stable in some people because the quality of parenting and parental socialization does not change [47]. A predictor of self-control is the extent to which the environment and family consistently control the behavior of young drivers [48]. Therefore, the below hypothesis is proposed for this study.

H_5: Family climate influences driving self-control.

3. Research Methods

This research uses quantitative methods. The population comprises drivers aged 18 to 39 who drive in the DKI Jakarta area and already have a driver's license (SIM). The sample consisted of 300 respondents, and data were collected using an online questionnaire. Hypothesis testing was carried out using the SEM method with Smart PLS and mediation using the Mediation Analysis Procedure developed [49].

Safety attitudes are measured through three components with seven items consisting of: 1) Cognitive components, which include attitudes towards speeding (for example, exceeding the speed limit is one of the critical safety issues); 2) Affective components regarding speed limits (following speed limits makes driving safer); and 3) Behavioral components (supporting speed limit regulations) [7, 50]. Responses were given on a 5-point Likert scale, from "strongly disagree" (1) to "strongly agree" (5). The climate for road safety is measured through four dimensions with eight items developed [20]: 1) Modeling (for example, parents set an example by obeying speed limit regulations); 2) Monitoring (every ride, telling parents where to go); 3) Communication (discussing how to prevent or avoid dangerous situations on the road); and 4) Restrictions (parents will limit driving if you do not obey the speed limit). Responses use a 5-point Likert scale ranging from never (1) to always (5).

Self-control in driving is measured through four dimensions with nine items developed [51]. 1) Thought control (example item: can resist the temptation to break the speed limit on the highway). 2) Emotional control (having self-discipline when driving on the highway). 3) Impulse control (driving on the highway by prioritizing road safety). 4) Performance management (even if the travel destination is still far away, do not be tempted to break the speed limit on the highway). Responses use a 5-point Likert scale ranging from disagree (1) to agree (5). Driving speed limit compliance behavior is measured through two dimensions with six items, namely: 1) Driving carefully and alertly (for example, reducing speed if there is a vehicle behind trying to overtake), 2) Driving below the speed limit (driving below the speed limit of 50 km/h in urban areas). Responses use a 5-point Likert scale ranging from never (1) to always (5), which was developed [52].

4. Results

The outer model test aims to specify the relationship between latent variables and research items. The data processing results show that 26 items in each variable have a loading factor value greater than 0.70 and are considered valid; therefore, only 26 items from each variable can be used for further testing. There are three items in the family climate variable and one self-control item that have a loading factor value below 0.70, so these four items are not used for further testing. The output results of the research model testing can be seen in Figure 1.

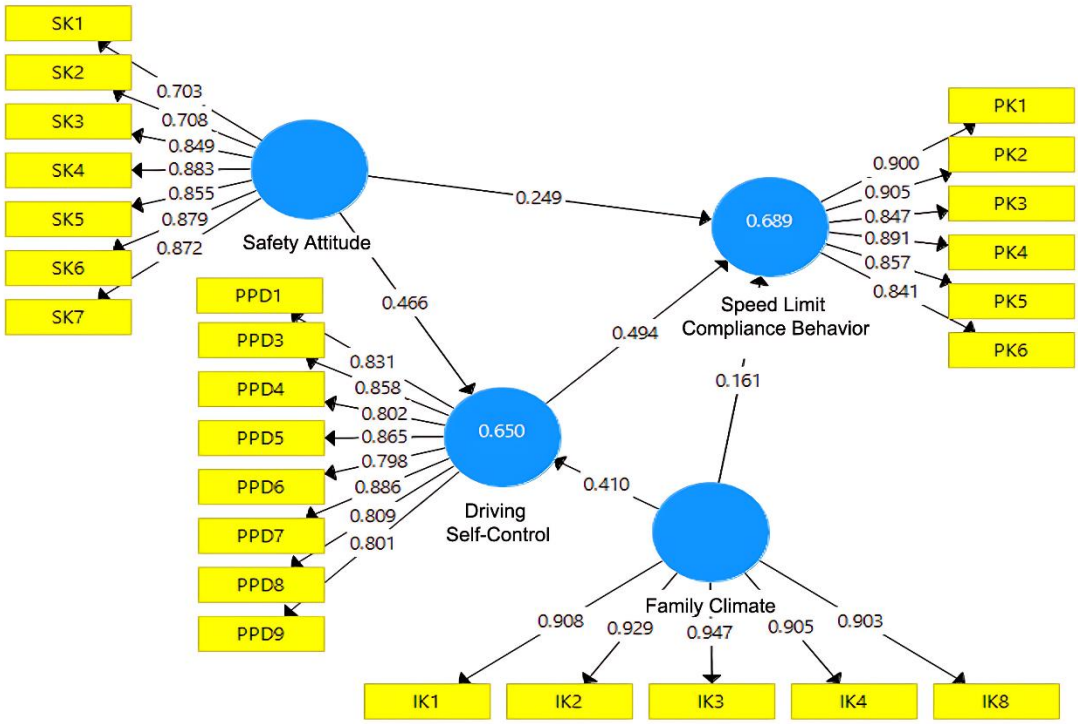

Figure 1.
Research Model Results.

Table 1 shows the validity and reliability values of the research construct based on the data processing results.

Table 1.
Construct Reliability and Validity.

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Driving Self-Control	0.936	0.938	0.947	0.692
Family Climate	0.954	0.954	0.964	0.844
Safety Attitude	0.920	0.930	0.936	0.680
Speed Limit Compliance Behavior	0.938	0.939	0.951	0.764

From Table 1, all Cronbach's Alpha, rho_A, And Composite Reliability Above the cut-off value of 0.07 means the construct reliability is very high. Hence, the research instrument has high consistency and can measure the constructed value of safety attitudes, family climate, self-control, and speed limit compliance behavior in different locations. The Average Variance Extracted values for all constructs meet the minimum cut-off criteria of 0.50, meaning that the construct values for safety attitudes, family climate, self-control, and speed limit compliance behavior can measure the substance that is built and the phenomena that occur. Next, the inner model was tested to determine the R Square value, which is presented in Table 2.

Table 2.
R-square value.

	R Square	R Square Adjusted
Driving Self-Control	0.650	0.648
Speed Limit Compliance Behaviour	0.689	0.686

From Table 2, this study's structural model (inner model) is classified as "moderate." The interpretation of the output R-square (R^2) for the dependent construct of self-control was obtained at 0.650, indicating that the safety attitude and family climate constructs were able to predict the variability of the self-control construct by 65.0%, while other constructs outside this research explained the remaining 35%. Meanwhile, safety attitudes, family climate, and self-control predicted the variability of speed limit compliance behavior by 68.9%, with other constructs outside this research explaining the remaining 31.1%. From the calculation results, the Q^2 value is 0.881 > 0, and the closer it gets to the value of 1, the more it can be said that the structural model is fit, or that this research model has predictive relevance. The output results of testing the research structural model can be seen in Table 3.

Table 3.
Testing of the Direct Influence Structural Model.

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Driving Self-Control -> Speed Limit Compliance Behavior	0.494	0.496	0.078	6.331	0.000
Family Climate -> Driving Self-Control	0.410	0.398	0.074	5.556	0.000
Family Climate -> Speed Limit Compliance Behavior	0.161	0.154	0.062	2.595	0.010
Safety Attitude -> Driving Self-Control	0.466	0.477	0.077	6.035	0.000
Safety Attitude -> Speed Limit Compliance Behavior	0.249	0.252	0.091	2.753	0.006

Table 4.
Testing of the Structural Model of Indirect Effects.

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Family Climate -> Driving Self-Control -> Speed Limit Compliance Behavior	0.202	0.199	0.052	3.862	0.000
Safety Attitude -> Driving Self-Control -> Speed Limit Compliance Behavior	0.230	0.235	0.049	4.731	0.000

From the test results (Table 3), the $_{statistical}$ t value (2.753) > t $_{table}$ (1.968) and p-value are obtained. (0.006) < 0.05, it is proven that safety attitudes have a positive and significant effect on speed limit compliance behavior among young drivers; hypothesis 1 is accepted. $_{Statistical}$ t value (2.595) > t $_{table\ (1.968)}$ and p-value (0.010) < 0.05, it is proven that family has a positive and significant effect on speed limit compliance behavior among young drivers, hypothesis 2 is accepted, $_{Statistical}$ t value (6.331) > t $_{table}$ (1.968) and p-value (0.000) < 0.05, it is proven that self-control has a positive and significant effect on speed limit compliance behavior among young drivers, hypothesis 3 is accepted. Hypothesis 4, $_{statistical}$ t value (6.035) > t $_{table}$ (1.968) and p-value (0.000) < 0.05, is proven that safety attitudes have a positive and significant effect on self-control in driving among young drivers; hypothesis 4 is accepted. Hypothesis 5, $_{statistical}$ t value (5.556) > t $_{table}$ (1.968) and p-value (0.000) <0.05, it can be concluded that it is proven that family climate has a positive and significant effect on self-control in driving among young drivers; hypothesis 5 is accepted.

From the test results (Table 4), it was found that the indirect influence of safety attitudes on speed limit compliance behavior through driving self-control had a p-value (0.000) < 0.05 is significant, meaning that driving self-control mediates the influence of safety attitudes on speed limit compliance behavior among young drivers, hypothesis 6. The indirect influence of family climate on speed limit compliance behavior through driving self-control n p-value (0.000) <0.05 is significant, meaning that driving self-control mediates the influence of family climate on speed limit compliance behavior among young drivers; hypothesis 7 is accepted. The role of medicine can be seen in Table 3: safety attitudes towards speed limit compliance behavior (a = 0.249), safety attitudes towards self-control (b = 0.466) are significant, and self-control towards speed limit compliance behavior (c = 0.494) is also significant and the product of a (0.249) * b (0.466) * (0.494) = 0.057 (positive), then the mediating role of driving self-control is partial (complementary) on the influence of safety attitudes on speed limit compliance behavior. Family climate towards speed limit compliance behavior (a = 0.161) and family climate towards self-control (b= 0.410) is significant. Self-control towards speed limit compliance behavior (c=0.494) is also significant, and the product of a (0.161) * b (0.410) * (0.494) = 0.033 (positive), then the mediating role of driving self-control is partial (complementary) on the influence of family climate on speed limit compliance behavior.

5. Discussion

This study's results align with previous research, which found that safety attitudes influence speed limit compliance behavior [7, 28, 53]. The behavioral component is the most dominant dimension perceived by drivers to increase speed limit compliance behavior among young drivers. Driving on highways is restricted by various traffic regulations to ensure safety for road users, and traffic regulations are static constructs that aim to guide road users correctly in traffic [54]. A good safety attitude towards traffic regulations is related to speed limit compliance behavior, which will reduce involvement in road traffic accidents [27, 55]. The affective component perceived in increasing speed limit compliance behavior is the dimension of affective attitudes towards speed limits.

Regarding comfort, traffic congestion is a problem that must be considered in big cities, as it causes motorists discomfort, fatigue, and frustration [56-58]. In the cognitive component, exceeding the speed limit is a significant safety problem. Drivers consider traffic safety an individual responsibility, and their driving behavior is the main factor causing traffic accidents due to exceeding the driving speed limit [59]. Individuals with positive attitudes toward road safety tend to engage in lower-risk driving behavior than those with negative attitudes [60]. Exceeding the vehicle speed limit is a dangerous and detrimental

factor that worsens all accidents that occur on the road [61]. These findings contribute to expanding attitude variables in the context of road safety to reduce the risk of accidents among millennial drivers. Based on these results, road safety interventions can focus on safety attitudes to increase speed limit compliance behavior among millennial drivers. Lucidi, et al. [62] found that interventions addressing safety attitudes can produce long-term changes in drivers that directly influence their behavior on the road. Likewise, Iversen [63] argues that improving drivers' safety attitudes, specifically attitudes related to speed rule violations can be addressed with interventions to change risky driving behavior in the future.

Climate can improve road safety for young drivers [64, 65]. Parental driving modeling influences teen driving behavior and sets norms about acceptable behavior for young drivers through the example they set. Parental influence on driving behavior begins early in a child's life. In parenting styles and parent-child bonds, adolescents are socialized through parental involvement in driving behavior [66]. Parents are role models for safe driving for young drivers; other research also found that parents are the most vital role models for children regarding traffic behavior on the road [67, 68]. In the item modeling dimension, parents talk about safe driving, but they do not practice it. This needs attention. These drivers are more likely to imitate their parents and report that their parents are also risky drivers [69]. Restrictions (limits) are perceived to increase speed limit compliance behavior. The role of parents is more effective in increasing the compliance behavior of young drivers because parents can limit their children's driving rights. Besides, parents and children have closer social ties, which results in a greater possibility for drivers to obey traffic rules [70]. Parental monitoring is critical to compensate for their children's risky behavior and to know what to do so they do not get into trouble [71]. Parents' monitoring does not directly impact risky driving behavior compared to those with stricter monitoring and restrictions [72, 73]. Based on these results, road safety interventions can focus on family climate in increasing speed limit compliance behavior among millennial drivers.

Research confirms that driving self-control affects speed limit compliance behavior among young drivers, meaning that better self-control will increase speed limit compliance behavior. Driving safely and legally requires an ongoing ability for impulse control [74]. Impulse control is related to the activity of behavior, Schmidt, et al. [75], and difficulties in controlling impulses can increase the desire to engage in other activities due to the depletion of the effect of demands on self-control resources. When a driver is involved in other activities while driving, their attention is not optimal for safe driving. Discipline is needed to enhance driving safety by consistently exercising self-discipline [76]. Another influence of emotional disturbance in driving is audio; listening to music while driving can cause hearing problems [77]. Adverse emotional sound effects (for example, screams or laughter), even though pleasant, can reduce alertness and driving performance [78]. The results of this study indicate that improving road safety will be very effective and can be enhanced if the focus is on the self-control variable, considering that this variable is the most significant predictor of speed limit compliance behavior among millennial drivers. These findings can contribute to the development of social marketing programs in road safety campaigns and promotions to increase driving speed compliance behavior among millennial drivers.

Research confirms that safety attitudes and family climate have a positive and significant effect on self-control in driving. Individuals who have inconsistent attitudes toward behavior show a lack of self-control when carrying out behaviors that they view as actions considered rational, practical, or desirable [79]. Environmental and family factors, including parents, are external factors for self-control; parental socialization continues to influence self-control during adolescence, even after individuals become adults. Informal social control, which is often influenced by the structure of the family environment, has a more substantial impact in preventing rule-breaking than formal sanctions. This is because the structure of the family environment can help develop a person's values and views related to social and legal norms [80]. Parents and the family environment have been shown to play an essential role in preventing young drivers from violating traffic rules, and a predictor of self-control is the extent to which parents and the family environment consistently control young drivers' behavior [81].

This research confirms that self-control is a partial mediation (complementary) factor in the relationship between safety attitudes and family climate with speed limit compliance behavior. This shows that safety attitudes can increase speed limit compliance behavior among young drivers through self-control. The nature of this mediation is partial mediation (complementary), meaning that without being mediated by self-control, safety attitudes can directly increase speed limit compliance behavior among millennial drivers. Attitudes can change over time and are unstable, and attitudes are not as stable as personality traits; interventions addressing attitudes can produce long-term changes in drivers that directly influence risky behavior on the road. In driving, motivated norms from people whom the driver respects will influence compliance with traffic rules (Mawanga and Ntayi [82]), but in traffic, close people are often not present when driving, which will influence driver behavior where the influence of the family climate is reduced, and action dominates. The viewpoints of other drivers on the road can influence drivers. Previous research shows that imitating others influences driver compliance behavior. Because safety attitudes can change from time to time and are unstable, and close people are often not present when driving, social influences originating from other road users in the general traffic environment will influence driver behavior, where the influence of the family climate can be minimal or reduced due to the influence of other norms. Therefore, increasing speed limit compliance behavior among young drivers can be achieved through driving self-control. This research proved that safety attitudes and a good family climate can increase speed limit compliance behavior among millennial drivers in the future through driving self-control.

Practical implications of research, safety attitudes, family climate, and self-control play a role in predicting speed limit compliance behavior among young drivers. Road safety intervention programs will be effective if they focus on safety attitudes, family climate, and self-control, considering that these components are significant predictors of speed limit compliance behavior among millennial drivers. Road safety policymakers need to carry out road safety campaigns and promotions to encourage speed limit compliance behavior among millennial drivers by focusing on and emphasizing the variables of safety attitudes, family climate, and self-control, and the need for outreach to increase public awareness of road safety, especially self-control in following the speed limit.

6. Conclusions

Attitudes and family climate require self-control in driving to encourage successful enforcement of speed limit regulations. Self-control in driving plays a significant role in increasing speed limit compliance behavior. The relationship with all variables in the empirical model indicates that all research variables have a positive and significant effect. This means that safety attitudes and family climate can indirectly influence speed-limit compliance behavior among millennial drivers, and self-control in driving affects speed-limit compliance behavior. Safety attitudes and family climate influence self-control in driving. Safety attitudes and family climate mediate the relationship with speed limit compliance behavior through self-control in driving (complimentary). The main finding of this research is that it has successfully proven that self-control in driving can bridge the gap in research results regarding safety attitudes toward speed limit compliance behavior among millennial drivers.

The nature of the study design in this research is cross-sectional, so the direction of causality of the relationship between variables in empirical research can still be further strengthened. Future studies can be carried out with a longitudinal research design to establish causal relationships between empirical research variables and determine the temporal stability of these constructs and whether they are truly dynamic. In this study, the family climate for road safety scale (family climate for road safety scale) uses four dimensions of the family climate scale for road safety; further research can be expanded by using a family climate scale for overall road safety.

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