

# Personality and Attitudes as Predictors of Risky Driving Behavior: Evidence from Beijing Drivers

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**Abstract.** The main aim of this study is to explore the relationships between personality traits, attitudes and risky driving behavior, in order to build a model of risky driving behavior that integrates the personality and social cognition approach. The study was based on a self-completion questionnaire survey carried out among 233 drivers in Beijing. The self-completion questionnaire consisted three sections: personality, attitudes towards traffic safety, and risky driving behavior. The results suggest that personality traits are valuable predictors of attitudes and risky driving behavior, and attitudes mediated the relation between the personality traits and risky driving behavior. Implications for road safety strategies are also discussed.

**Keywords:** personality, attitudes towards traffic safety, risky driving behavior, drivers.

## 1 Introduction

With the booming of the motor vehicle, risky driving behavior and traffic accidents have aroused wide public concern, and risky driving has been identified as an important contributor to road crashes [1]. Taking environmental and human factors in consideration, it is commonly believed that human factors contributed a larger proportion to risky driving behavior [2]. Within psychology, these perspectives of social cognition and personality psychology have been attempted to explain individual differences in risky driving behavior [3]. Social cognition research based on Theory of Reasoned Action [4], emphasizes central behavioral determinants such as attitudes, perceived risk, social norms [5]. Personality perspective focuses on the predictive power of personality traits, such as sensation-seeking, anger, and altruism [5,6].

Despite abundant studies within these psychology areas to identify variables which may influence risky driving behavior, few research has attempted to combine different approaches to build a general model of risky driving behavior and influences factors in the Chinese context.

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The present study attempts to establish a model of risky driving behavior that integrates the personality approach and the social cognition approach, in order to understand the formation of various risky driving behavior in traffic. More specifically, the aim of this present study is to explore the relationship between personality traits, attitudes towards traffic safety, and risky driving behavior among drivers. And the study is expected to provide useful information for road safety strategies and the development of driver education and training programs.

## **2 Method**

### **2.1 Sample**

The study was based on a self-completion questionnaire survey carried out among 233 drivers with license in Beijing. Of these, 37.8% were men and 72.2% were women. The respondents' other demographic information and driving behavioral information were listed in Appendix Table A with four items: age, education level, total kilometrage, and license tenure.

### **2.2 Measurement**

The self-completion questionnaire consisted three sections: personality, attitudes towards traffic safety, and risky driving behavior.

Through literature review, five personality traits were selected as significant predictors of risky driving behavior in traffic [5-7]. They contained five questionnaires which measured anger (the tendency to experience anger and frustration), sensation-seeking (i.e., the need for excitement and stimulation), altruism (characterized by active concern for others), normlessness (i.e., the belief that socially unapproved behavior are required to achieve certain goals) and self-control (i.e., the tendency to control over one's thought and behavior), respectively. Anger, sensation-seeking and altruism were assessed using facets of the NEO-Personality Inventory-Revised [8], and each facet consisted of ten items. Normlessness was measured using Kohn and Schooler's [9] normlessness scale, which consists of four items. Tangney's short term self-control scale [10] was adopted to assess self-control, including 11 items. All of items were answered on five-point Likert scales ranging from "strongly disagree" (1) to "strongly agree" (5). The alpha coefficients were 0.62, 0.71, 0.66, 0.64, and 0.61, respectively.

Attitudes towards traffic safety consisted of five dimensions: traffic flow vs. rule obedience (4 items), speeding (7 items), drinking and driving (4 items), funriding (3 items), and showing off driving skills to others (3 items). These items were extracted from the studies of Ulleberge and Rundmo [5], Iversen [10], and Yilmaz and Celik [11]. All of items were answered on five-point Likert scales ranging from "strongly disagree" (1) to "strong agree" (5).The confirmatory factor analysis of the five-factor model indicated a satisfactory fit of the data:  $\chi^2/df= 1.334$ , GFI=0.912, AGFI=0.887, CFI=0.953, RSMEA=0.038. The alpha coefficients were 0.65, 0.85, 0.72, 0.65, and 0.68, respectively.

Risky driving behavior were measured with Driver Behavior Questionnaire (DBQ), a 28-item version of the scale which consists of aggressive violation (4 items), ordinary violation (8 items), errors (8 items) and lapses (8 items), developed by Lawton et al. [12]. Respondents were required to answer on a five-point Likert scale from “never” (1) to “all the time” (5), which indicated how often in the past year they committed specific risky driving behavior. The alpha coefficients were 0.75, 0.74, 0.80, and 0.69, respectively.

### 3 Results

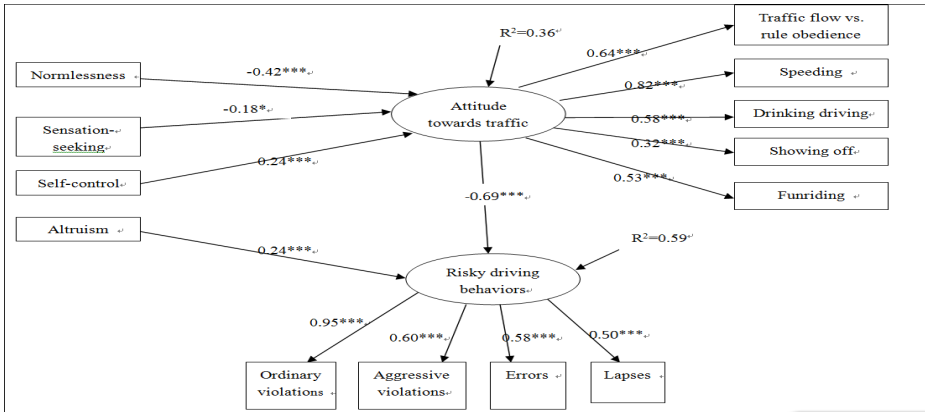
As correlation analysis shown in table 1, all the five personality traits were significantly correlated with attitudes towards safety driving and risky driving behavior. Those who got high scores on altruism and self-control tended to have a positive attitude towards traffic safety, as well as they reported less risky driving behavior. By contrast, those scoring high on sensation seeking, anger and normlessness demonstrated a negative attitude towards traffic safety, and reported more risky driving behavior. In addition, attitudes towards traffic safety were negatively related to risky driving behavior, indicating that drivers with a positive attitude towards traffic safety were less likely to report risky driving behavior.

**Table 1.** Correlations between personality traits, attitudes towards traffic safety and self-reported risky driving behavior

	1	2	3	4	5	6
1normlessness						
2angry	.227**					
3sensationseeking	.246**	.106				
4self-control	-.305**	-.378**	-.207**			
5altruism	-.223**	-.303**	-.031	.333**		
6attitudes towards traffic safety	-.483**	-.174**	-.270**	.339**	.146*	
7risky driving behavior	.354**	.330**	.278**	-.347**	-.348**	-.497**

\* $p < 0.05$  \*\* $p < 0.01$  \*\*\* $p < 0.001$ .

A structural modeling analysis was performed to investigate the inter-relationships between personalities, attitudes toward traffic safety, and risky driving behavior. The estimated model was shown as Fig.1 with standardized path coefficients. The fit indices indicated that the correction model fitted the data well:  $\chi^2/df$  (57,  $n=233$ ) = 1.892, GFI=0.938, AGFI=0.897, CFI=0.935, RSMEA=0.062. The path model explained 59% of the total variance in risky driving behavior.



**Fig. 1.** Path diagram of the relationship between personality traits, attitudes, risky driving behavior

The effect of attitudes towards traffic safety on risky driving behavior was significantly negative ( $\beta=0.69$ ,  $p<0.001$ ), indicating that individuals with a positive attitude towards traffic safety were likely to engage less risky driving behavior compared to those with a negative attitude towards traffic safety.

When it came to the effects of personality on attitudes toward traffic safety, all personality traits except for altruism demonstrated their significant, direct influences on driver’s safety attitudes. Specifically, self-control had a positive effect on driver’s safety attitudes ( $\beta=0.24$ ,  $p<0.001$ ), while normlessness ( $\beta=-0.42$ ,  $p<0.001$ ) and sensation-seeking ( $\beta=-0.18$ ,  $p<0.05$ ) had negative effects on attitudes. Those who got high scores on self-control tended to report less risky driving behavior. By contrast, those scoring high on sensation seeking, and normlessness demonstrated a negative attitude towards traffic safety, and reported more risky driving behavior.

Regarding the direct effects of personality traits on risky driving behavior, only altruism was found to have significant coefficients. Turning to the other three personality traits, all of normlessness, sensation-seeking and self-control had no direct but indirect effects on risky driving behavior mediated by attitudes towards traffic safety. As the direct, indirect and total effect of personality traits on risky driving behavior shown in Table 2, the findings indicated that individuals scoring high on altruism and self-control were less likely to exhibit risky driving behavior. On the contrary, the higher the scores for sensation-seeking and normlessness, the more likely those individuals engaged in risky driving behavior.

**Table 2.** Direct, indirect and total effect of personality traits on risky driving behavior

	Altruism	Normlessness	Self-control	Sensation-seeking
Direct effect	-0.242			
Indirect effect		0.277	-0.168	0.122
Total effect	-0.242	0.277	-0.168	0.122

Furthermore, as shown in the path model, a total of 36% of the variance in attitude towards traffic safety were explained by the three different personality traits, implying that attitude towards traffic safety has incremental validity in predicting risky driving behavior beyond personality traits.

## 4 Discussion and Conclusion

The present study attempts to explore the relationship between personality traits, attitudes towards traffic safety, and risky driving behavior among drivers and to establish a model of risky driving behavior that integrate the personality approach and the social cognition approach, in order to understand the mechanisms underlying risky driving behavior in Chinese context.

The effect of attitudes towards traffic safety on risky driving behavior is significantly negative, indicating that individuals with a positive attitude towards traffic safety are likely to engage less risky driving behavior compared to those with a negative attitude towards traffic safety, in accordance with previous studies [6,10]. As the Theory of Reasoned Action [4] stated, attitudes are central determinants of behavior. Therefore, attitudes towards traffic safety serve as central determinants of risky driving behavior in traffic. As a result, strategies of promoting road safety can be aimed at changing individuals' attitudes related to risky driving.

When it comes to the effects of personality on attitudes toward traffic safety, all personality traits except for altruism demonstrate their significant, direct influences on driver's safety attitudes. Specifically, self-control has a positive effect on driver's safety attitudes, while normlessness and sensation-seeking have negative effects on attitudes. Those who get high scores on self-control tend to report less risky driving behavior. By contrast, those scoring high on sensation seeking, and normlessness demonstrate a negative attitude towards traffic safety, and report more risky driving behavior. The findings are consistent with previous studies [7,12]. For example, drivers scoring high on self-control are good at controlling over their thoughts and interrupting undesired behavioral tendencies, and this mirrors itself in risky attitudes towards drinking driving, speeding, and rule violation in traffic. Sensation-seekers tend to seek stimulation and excitement in driving, probably leading to risky driving behavior. Referring to normlessness, individuals scoring high on this trait are likely to have low barriers towards socially unapproved behavior, which reflect in risky attitudes towards speeding, rule violation, and funriding, and risky driving behavior in traffic.

Regarding the direct effects of personality traits on risky driving behavior, only altruism is found to have a significant coefficient, consistent with previous study [6]. In other words, individuals with high scores on altruism are less likely to exhibit risky driving behavior. A possible explanation is that drivers scoring higher on altruism are expected to consider the interests of others and show more active concern for others in traffic and thus reduce risky driving behavior.

Turning to the other three personality traits, all of normlessness, sensation-seeking and self-control have no direct but indirect effects on risky driving behavior mediated by attitudes towards to traffic safety. The lack of direct effects of the three personality traits suggests that personalities primarily influenced risky driving behavior through

attitudes towards traffic safety. The findings indicate that individuals scoring high on altruism and self-control are less likely to exhibit risky driving behavior. On the contrary, the higher the scores for sensation-seeking and normlessness, the higher the likelihood individuals engage in risky driving behavior. Therefore, personality traits should be taken into account when designing road safety programs.

To sum up, personality traits primarily influence risky driving behaviors through attitudes towards traffic safety. Taking personality and attitudes into account, the integration of both personality and social cognition approaches provides a comprehensive model to understand the mechanisms underlying drivers' risky driving behaviors in traffic. This study's findings provide useful information for road safety interventions and the development of driver education and training programs [6]. For example, road safety interventions could target drivers' attitudes towards traffic safety to reduce risky driving behavior and traffic accidents. Moreover, as those who possess certain personality traits with negative attitudes towards traffic safety are more likely to commit risky driving behaviors, road safety program and driver training should be tailored to certain personality traits of drivers [6].

Appendix:

**Table 3.** A Demographic distribution of respondents in the sample

Variable	Category	n	%	Variable	Category	n	%
Age	21-25	27	11.6	Total kilometrage	<10,000 km	63	27.0
	26-30	58	24.9		10,000-50,000 km	75	32.2
	31-35	67	28.8		50,000-100,000 km	38	16.3
	36-40	37	15.9		100,000-300,000 km	40	17.2
	41-45	26	11.1		>300,000 km	10	4.3
	>46	18	7.7		License tenure	0-1 year	40
Education level	High school	17	7.3	2-3 years		65	27.9
	College	38	16.3	3-5 years		31	13.3
	University	146	62.7	5-15 years		72	30.9
	Master's degree/ doctorate	32	13.7	15-20 years		17	7.3
				>20years	4	1.7	

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