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Emotional "Killers" on the Road: A Study on the Impact of Stress Perception and Anxiety on Risky Driving Behaviors

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Abstract

In the context of the rising number of road traffic accidents, and mounting urban traffic burden, attention has been on how the psychological condition of drivers affects their driving habits. The current research conducted a sample of 47 motorists in sections of China and used standardized scales in determining the perceived stress, anxiety levels, and risky driving habits of the participants in a bid to find association among the three elements. The findings indicate that perceived stress, as well as anxiety, have a significant positive relationship with hazardous driving actions, and the effect of the latter is the strongest. In particular, the greater the level of anxiety is, the more severity errors, ordinary violations, and aggressive violations have manifested themselves. The study findings offer empirical data to explain the psychological processes of risky driving and give a theoretical framework to develop driving safety intervention strategies. It is suggested that the further practical implementation should reinforce driver mental health screening, emotion control training, and care about the high-risk groups to increase the level of safety in the traffic.

Keywords

Perceive Stress; Anxiety; Risky Driving Habits

1. Introduction

Driving in modern urban life is no longer a "technical phenomenon" but a "psychological phenomenon" that is entrenched in everyday rhythms and feelings as well as social order. In line with the statistics provided by the Traffic Management Bureau of the Ministry of Public Security of China in 2024, the national motor vehicle fleet has exceeded 435 million, and the total number of drivers has surpassed 530 million, meaning that almost one in every three Chinese holds a steering wheel. Concurrently, urban road congestion indices are climbing yearly, with the annual average congestion duration in first-tier cities like Beijing, Shanghai, and Guangzhou exceeding 240 hours, equivalent to each driver "working an extra 6 days" per year stuck in traffic. In this "life on wheels," risky driving behavior is no longer just movement from point A to B but an amplifier of emotional experience: a sudden lane change, a half-hour traffic jam, or a blaring horn can become a trigger for emotional outbursts1. Increasing research suggests that the stress and anxiety experienced by drivers not only affect their attention, judgment, and reaction speed but may

[1] Traffic Management Bureau, Ministry of Public Security of China: *2024 National Statistical Analysis Bulletin on Motor Vehicles and Drivers*, April 2024, p. 3.

also, through a mechanism of "emotional contagion," spread throughout the traffic system, creating a chain reaction akin to "emotional pollution." It is in this context that the consideration of the effect of stress and anxiety on hazardous driving action is not only a question of the hidden factors that contribute to traffic accidents but also a profoundly sensitive reaction to the fragile balance between mental health and the safety of people in contemporary societies.

1.1 Current Research Status on Risky Driving Behaviors

As a significant research topic in traffic psychology, risky driving behavior has been long considered and studied by the scholars. It involves not merely the operational ability of the drivers but also their psychological, as well as behavioral traits when driving which include the risk perception, adherence to rules, and emotional restraint. Reason et al. categorized driving error behaviors as risky, ordinary driving violation behaviors as errors and aggressive driving violation behaviors as errors into a theoretical base to form the foundation of further studies (Ehring, Ehlers, & Glucksman, 2011). Researchers have conducted more studies regarding the influence of psychological factors on risky driving with the frequent road accidents in the recent years, especially what role emotional conditions such as stress, anxiety and fatigue play in driving safety.

Also, as the intelligent and assisted driving technologies continue to propagate, the research view of the risky driving behavior is slowly changing to the more synergistic model of a "human-machine-environment" system rather than the conventional "human-vehicle-road" system. Nevertheless, despite technological improvement, the driver, being the main decision-maker in the system, is the decisive variable of the safety of traffic. The emotional condition of the driver in the complex situation of traffic is usually the "gray area", which should not be fully substituted by technology, and thus, the study of the correlation between emotion and risky driving is becoming the more significant one.

1.2 The Correlation Between Perceived Stress and Risky Driving Behavior

Perceived stress: This is a psychological and physiological reaction that one develops to situations where they are under pressure of either external or internal ordeal. Perceived stress in driving situations can be caused by traffic congestion, time pressure, unfavorable weather, or an interpersonal conflict. It has been found that when perceived stress is high, it may greatly affect the judgment, attention, and the speed of reaction of a driver and this may lead to traffic accidents (Matthews, 2002).

Local scholars have also discovered that motorists that experience more perceived stress tend to involve in more actions such as speeding, contrary lane change and emotional driving (Li, Wang, & Zhang, 2018). Also, perceived stress can influence risky driving styles indirectly through its influence on an emotional control ability of a driver (Zhang & Li, 2020).

1.3 The Relationship Between Anxiety and Risky Driving Behavior

Anxiety refers to a feeling of emotion and it is mainly defined as tension, worry as well as unease mostly linked to the negative anticipation of future events. In driving, anxiety can be as a result of fear of accidents, lack of confidence in road abilities or uneasiness in the traffic conditions. Research has established that the more anxious a driver is, the more he or she has a high chance of developing hesitation, slow responses, over-caution, or acting out oddly, any of which may pose a risk to traffic (Taylor & Deane, 2007). Other studies highlight the existence of a strong positive association among anxiety and risky driving behaviour, so that the higher the anxiety the greater the potential to engage in unsafe driving behaviour (Sümer, 2003). Indicatively, extremely nervous motorists will tend to apply more brakes, go off the roads, or neglect streetlights. Besides, anxiety can be connected with the driving avoidance behaviors, in which, some drivers avoid driving in particular circumstances (e.g., highways, driving at night) because of anxiety. This is a way of minimizing the risk temporarily but may impact in the extended period maintenance and enhancement of driving skills (Ehring & Glucksman, 2011).

1.4 Research Gaps and Innovations of This Study

In sum, although the current literature gives a theoretical base and empirical evidence to comprehend the associations between perceived stress, anxiety, and risky driving behaviors the following limitations are evident: First, there is relative paucity of local studies, particularly empirical data which are founded on the basis of Chinese drivers. Second, the majority of the current research uses single-variable studies as such do not involve systematic investigation of

multiple psychological factors. Last but not least, numerous studies do not pay sufficient attention to the impact of individual differences (e.g., gender, age, driving experience) on variable relationships.

Based on this, the hypotheses that are postulated in this paper are as follows:

Hypothesis 1: Perceived stress is positively related to more risky driving habits, which are reflected in the following way: more errors, more violations, and more aggressive violations.

Hypothesis 2: More anxiety correlates with riskier driving behavior, in the form of increased errors and increased violation and aggressive violation.

This research got group of 47 drivers in some parts of China as the sample of the population and through normalization of psychological measurement techniques to measure their perceived stress, anxiety and daily risky driving behaviors in a systematic manner. In a manner that informs future development of more specific driving safety intervention, the purpose of the research is to demonstrate the definite pathways through which perceived stress and anxiety moderate the influence on risky driving behaviors so as to have a theoretical foundation and data support to develop future intervention strategies.

2. Research Methods

2.1 Participants

The research sample subjects was composed of 47 individuals of portions of China, of which 34 men & 13 wonen. Mean was 40.11 years (SD = 6.407) and the mean driving experience was 13.64 years (SD = 6.475). Regarding driving mileage: less than 1,000 km accounted for 8.5%, 1,000-5,000 km for 2.1%, 5,000-10,000 km for 12.8%, and over 10,000 km for 76.6%.

2.2 Measures

2.2.1 Perceived Stress Scale

The Perceived Stress Scale applied in this study was designed by Yang et al. (Yang & Hu, 2023). The scale comprises of 10 items, requiring participants to rate the stress they perceived from certain events over the past month, using a Likert 5-point scale where 1 to 5 respectively represent ‘never,’ ‘rarely,’ ‘sometimes,’ ‘often,’ and ‘always.’ Higher scores indicate higher self-perceived stress levels. Sample items comprise: “In the past month, have you been upset because of something that happened unexpectedly?” and “In the past month, have you felt nervous and stressed?” In this study, the Cronbach’s alpha coefficient for this scale was 0.792.

2.2.2 Anxiety Scale

The Anxiety Scale used in this study was developed by Spitzer et al. (Spitzer & Löwe, 2006) and adapted by He et al. (He & Qian, 2010). The scale consists of 7 items, requiring participants to rate their perceived anxiety levels regarding certain events over the last month, employing a Likert 5-point scale where 1 to 5 respectively represent ‘never,’ ‘rarely,’ ‘sometimes,’ ‘often,’ and ‘always.’ High grades show an increase in the levels of self-perceived anxiety. Sample items are: “Feeling nervous, anxious or on edge” and “being unable to stop or control worrying”. Cronbach’s alpha coefficient was 0.709 for this scale.

2.2.3 Risky Driving Behavior Scale

The Risky Driving Behavior Scale that is applied in this paper is was designed by Reason et al. (Reason, Manstead, & Baxter, 1990) The scale comprises of 8 items, in which the participants are supposed to gauge their habitual behaviors and perception of the risks in their everyday driving activities. The scale includes three aspects, which are errors, ordinary violations, and aggressive violations. A Likert 5-point scale is used, where 1 to 5 respectively represent ‘never,’ ‘occasionally,’ ‘sometimes,’ ‘often,’ and ‘always.’ Higher scores indicate poorer risky driving behavior habits and higher risk levels. Sample items include: “Nearly having an accident because of failing to notice pedestrians at a junction” and “Intending to drive in one direction but driving in another due to distraction.” With the study, the Cronbach’s alpha coefficient for this scale was 0.827.

2.3 Statistical Methods

Questionnaire Star platform was used for the questionnaire survey. Members were notified of the test purpose, requirements, and precautions to ensure they completed the questionnaire independently and anonymously. 47 valid

questionnaires were collected, with a 100% valid return rate. SPSS 26.0 program was utilized for descriptive statistics and Pearson correlation analysis of the data.

3. Results and Analysis

3.1 Descriptive Statistics

Table 1. Descriptive Statistics of Variables by Gender

Gender	Perceived Stress	Anxiety	Risky Driving Behavior			
			Total Score	Errors	Ordinary Violations	Aggressive Violations
Male (n=34)	27.91	16.59	14.09	5.12	5.62	3.35
Female (n=13)	27.69	16.16	12.62	5.31	4.77	2.54

3.2 Correlation Analysis Between Perceived Stress and Risky Driving Behavior

The study indicates that in the descriptive statistics for perceived stress and risky driving behavior, the total score for perceived stress was 27.85, and for risky driving behavior was 13.68. The correlation coefficient between perceived stress and risky driving behavior was 0.400 (p=0.005); that is, perceived stress and risky driving behavior show a meaningful positive correlation, with poor risky driving habits and driving risk increasing as perceived stress increases. Therefore, Hypothesis 1 is supported.

Table 2. Correlation Analysis Between Perceived Stress and Risky Driving Behavior (n=47)

Variable	Total Score	Standard Deviation	1
1 Perceived Stress	27.85	0.558	
2 Risky Driving Behavior Total	13.68	0.585	0.400**
3 Errors	5.17	0.769	0.384**
4 Ordinary Violations	5.38	0.789	0.344*
5 Aggressive Violations	3.13	0.673	0.384

Note: **p<0.01, *p<0.05

3.3 Correlation Analysis Between Anxiety and Risky Driving Behavior

The study indicates that in the descriptive statistics for anxiety and risky driving behavior, the total score for anxiety was 16.47, and for risky driving behavior was 13.68. The correlation coefficient between anxiety and risky driving behavior was 0.606 (p=0.000); that is, anxiety and risky driving behavior show a significant positive correlation, with poor risky driving habits and driving risk increasing as anxiety levels increase. Therefore, Hypothesis 2 is supported.

Table 3. Correlation Analysis Between Anxiety and Risky Driving Behavior (n=47)

Variable	Total Score	Standard Deviation	1
1 Anxiety	16.47	0.799	
2 Risky Driving Behavior Total	13.68	0.585	0.606**
3 Errors	5.17	0.769	0.648**
4 Ordinary Violations	5.38	0.789	0.386**
5 Aggressive Violations	3.13	0.673	0.321**

Note: **p<0.01

In summary, based on Tables 2 and 3, both perceived stress and anxiety have a significantly positive impact on poor risky driving behaviors, with the positive correlation between anxiety and poor risky driving behaviors being

higher. From this, we can conclude that the higher an individual's perceived stress level and anxiety level, the higher the likelihood of engaging in poor risky driving behaviors.

4. Discussion and Conclusion

The results show: the correlation between anxiety and the total score of risky driving behavior ($r = 0.61$, $p < 0.001$) is meaningfully bigger than that of perceived stress ($r = 0.40$, $p < 0.01$). In terms of gender, males scored 18% and 32% higher than females on "ordinary violations" and "aggressive violations" respectively, but showed no difference in "errors." This pattern can be explained by the triple mechanism of "attentional resource competition—time script—gender norms" (Özkan & Lajunen, 2006): (1) High-anxiety drivers continuously allocate working memory resources to threat monitoring, weakening the processing of immediate traffic cues, leading to typical errors like "seeing a pedestrian but braking late." (2) High-stress drivers are also more likely to commit goal-oriented violations such as speeding, running yellow lights, and forcing lane changes. (3) Social gender roles grant higher tolerance for "decisive, aggressive" behaviors in men, creating a "violation permission" effect when emotions are aroused, increasing the stress/anxiety-violation pathway.

4.1 Theoretical Significance

This research contributes to the existing knowledge on risky driving in that this study is an empirical study of the specific influence of perceived stress and anxiety on risky driving based on the perspective of traffic psychology. To start with, using standardized scales guarantees the reliability and validity of the data, which offers a repeatable research paradigm in future research. Secondly, the research shows that anxiety is a dominant factor in risk driving behavior, and therefore emotion management is an important factor in driving safety. Moreover, the findings can provide a new dimension of learning the psycho-cognitive processes that lead to the risky driving behavior which helps to formulate the theory of psychology of traffic.

4.2 Practical Implications

The results of this research present some pragmatic implications for driving safety management and the development of intervention strategies:

To start with, mental health screening of drivers. Traffic management departments may establish mental health assessment procedures to check the drivers on a regular basis on the level of stress and anxiety and point out the risk before it arises. As an example, simplified self-assessment instruments (e.g., GAD-2, PSS-4) might be included when issuing a driver license renewal or ride-hailing driver registration. Instead of being directly disqualified and creating resistance due to the case of "labeling", people with the abnormal scores might be recommended to undergo additional psychological assessment.

Second, training in emotion management. Drivers who are perceived to have high perceived stress or anxiety should be given targeted emotion control and psychological intervention training so that they learn to effectively cope with situations that lead to driving risks as a result of emotional loss of control. Some of the examples of micro-skills that are introduced during training may be: "breathing anchoring", "emotion journaling", "pre-driving self assessment", embedded in WeChat mini-programs or voice assistants inside the car to remind employees of it every day, resulting in lower intervention costs.

Third, consideration of high-risk groups. The study recommends high-risk groups to be given special consideration like young drivers and professional drivers because they might be under greater psychological pressure and emotional distress. In the case of young drivers, modules such as "emotion and driving" may be incorporated into the driving school theory offering case studies and simulations to make learners develop the sense of the "emotion-safety" relationship prior to receiving their licenses.

4.3 Research Limitations

Despite some of the results attained in this study the following limitations still exist:

Limited size: The sample size 47 is small and is confined to the specific areas which makes it less representative, and there could be a possibility that the results are generalizable. In the future, future research studies may look into extending the sample size and geographical dispersion in order to improve the external validity.

Cross-sectional research design: The study was based on the cross-sectional survey research design, which did not help to define the relationship between variables. The future research might take into account the longitudinal designs.

Bias or error in self-report scales: The main method of data collection in this research was the application of self-report questionnaires, which are subject to social desirability bias, or subjective reporting errors. Future studies can integrate behavioral monitoring or physiological measures to have a wholesome evaluation.

4.4 Summary

Conclusively, this paper, through empirical research, established that both perceived stress and level of anxiety significantly influence risky driving behavior with the level of anxiety having a high effect. Not only the results of the study enhance the scope of the psychological processes of risky driving but also enable the provision of a theoretical backdrop and practical recommendations on how one can manage the situation of driving in a safer way. Further studies are recommended to elaborate and expand more on the topic in the future so as to advance traffic psychology studies to more practical paths.

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