MLS – PSYCHOLOGY RESEARCH (MLSPR)
http://mlsjournals.com/Psychology-Research-Journal
ISSN: 2605-5295

(2025) MLS-Psychology Research, 8(2), pp-pp. doi.org/10.33000/mlspr.v8i2.4066

Psychological Factors in driving: Analysis of the Relationship between Attributional Styles and Risk Behaviors

Factores Psicológicos en la Conducción: Análisis de la Relación entre Estilos Atribucionales y Conductas de Riesgo

Beatriz Vargas Carrascón
Universidad Europea del Atlántico (Spain)
(beatriz.vargas@master.uneatlantico.es) (https://orcid.org/0009-0008-1759-4649)
David Herrero Fernández
Universidad Europea del Atlántico (Spain)
(david.herrero@uneatlantico.es) (https://orcid.org/0000-0001-9323-7426)

Manuscript information:

Recibido/Received:02/05/25
Revisado/Reviewed: 17/07/25
Aceptado/Accepted: 09/10/25

Keywords:
causal attribution, locus of control, risk behaviors, driving behavior.

ABSTRACT

Traffic accidents comprise one of the main causes of mortality and economic damage worldwide. Driving is a complex behavior influenced by cognitive and behavioral factors that play a significant role in the occurrence of accidents and violations, often due to risky behaviors. The objective of this research is to analyze the relationship between the dimensions of causal attribution (locus of control, controllability and stability) and aberrant behaviors (violations, aggressive violations, errors and lapses) in driving. To this end, a sample of 42 drivers (13 men and 28 women) completed a series of self-reported measures. The results revealed a positive association between internal locus of control and stability with a higher prevalence of aggressive behaviors. Likewise, a negative association was found between the perception of controllability and risk behaviors, suggesting that a greater perception of control decreases the probability of presenting risk behaviors. These findings highlight the role of attributional styles in predicting risky driving behaviors, which has important implications for the promotion of road safety and the design of preventive interventions.

Palabras clave:
atribución causal, locus de control, conductas de riesgo, comportamiento en la conducción.

RESUMEN

Los accidentes de tráfico comprenden una de las principales causas de mortalidad y daños económicos a nivel mundial. La conducción es una conducta compleja influenciada por factores cognitivos y conductuales que desempeñan un papel significativo en la ocurrencia de accidentes e infracciones, a menudo debidos a conductas de riesgo. La presente investigación tiene como objetivo analizar la relación entre las

	dimensiones de atribución causal (locus de control, controlabilidad y estabilidad) y las conductas aberrantes (violaciones, violaciones agresivas, errores y lapsus) en la conducción. Para ello, una muestra de 42 conductores (13 hombres y 28 mujeres) completó una serie de medidas autoinformadas. Los resultados revelaron una asociación positiva entre el locus de control interno y la estabilidad con una mayor prevalencia de conductas agresivas. Asimismo, se encontró una asociación negativa entre la percepción de controlabilidad y las conductas de riesgo, sugiriendo que una mayor percepción de control disminuye la probabilidad de presentar conductas de riesgo. Estos hallazgos subrayan el papel de los estilos atribucionales en la predicción de comportamientos de riesgo en la conducción, lo cual tiene importantes implicaciones para la promoción de la seguridad vial y el diseño de intervenciones preventivas.

Introduction

Nowadays, transportation has become one of the main characteristics of a country's economy and development, but it also represents one of the main challenges faced by cities due to population growth and the complexity of modern societies (Mardanian and Bahari, 2024). In this context, road traffic crashes constitute one of the leading causes of mortality and economic damage, especially in middle-income and developing countries (Rejali et al., 2023). In addition, the continued increase in vehicles has exacerbated road safety problems, generating annual costs estimated at around US$518 billion globally due to accidents and an estimated 1.19 million deaths due to traffic accidents in 2023 around the world (WHO, 2023). Given the seriousness of this problem, understanding the causes behind traffic accidents is essential to mitigate their negative consequences and strengthen road safety. To this end, it is necessary to analyze driving not only as a mechanical process but as a complex behavior influenced by various behavioral and psychological factors.

Driving involves multiple cognitive and emotional processes that can influence the driver's decision making and behavior. Many authors have proposed theoretical models to help conceptualize these factors, which have commonly given little weight to driver beliefs and self-control behaviors (Gosselin et al., 2010). Furthermore, compared to research that has remarked on structural factors such as road engineering or technical vehicle conditions, there is very little research concerning the role of human factors (Alavi et al., 2017). In this line, one of the emotions that has been most investigated is anger, mainly because it is a shared and frequently experienced experience among drivers (Herrero-Fernández, 2011). Anger in research has been associated with traffic rule violation (Gaianu et al., 2020; González-Iglesias et al., 2012; Stephens et al., 2021) and with the production of risky driving behaviors (Failde-Garrido et al., 2023; Liu et al., 2021) and its detrimental effect on certain cognitive functions (Yu et al., 2022). Therefore, anger should be studied and conceptualized, not only as an emotional experience, but also as an expression related to aggression and risk behaviors in drivers (Deffenbacher et al., 2016; Zhang et al., 2019); although this relationship is not entirely clear (Herrero-Fernandez, 2013). Thus, we find research that concludes that anger does not always trigger an aggressive response (Baron and Richardson, 1994) and, on the other hand, research that has found a positive correlation between anger as a trait and its subsequent expression (Dahlen and Ragan, 2004). The expression of driving aggressiveness and other variables such as sensation seeking or impulsivity can lead to risky behaviors that increase the probability of being involved in accidents (Deffenbacher et al., 2000; Liu et al., 2021; Yu et al., 2022). Such risky driving behaviors include excessive speeding, driving too close to another vehicle, and driving under the influence of psychoactive substances (Harre and Sibley, 2007).

However, human factors have received relatively little attention despite their relevance in accident prediction. This highlights the importance of the role of risky behaviors as a cause of traffic accidents and, therefore, the importance of conducting studies to fill the gap in the scientific literature. In conceptualizing the possible causes of traffic accidents, it is important to note that the term "human error" by itself does not encompass all the ways in which people contribute to accidents. In their model of aberrant behavior (on which the present research is based), Reason et al. (1990) delineated three types of aberrant driving behaviors: violations (deliberate deviations from practices deemed necessary to maintain the safe operation of a potentially dangerous system), lapses (unintentional deviations from intention due to deficits in attention or memory), and errors (departures from planned actions toward a desired goal due to errors in judgment). Subsequently, Lawton et al. (1997) differentiated two subtypes of violations: ordinary (violations of traffic rules) and aggressive (related to hostility at the wheel).

Appraisal theory developed by Lerner and Keltner (2001) suggests that people who are more predisposed to anger are more optimistic about risk. This finding is interesting because it supports the need to understand the causal attributions behind driving behavior. Motivation is an internal state that activates, directs, and maintains behavior directed toward a target activity (Pinillos, 1977; Schunk et al., 2014) and is one of the most studied constructs in educational psychology (Koenka, 2020). The first motivational theory to be developed is Weiner's attributional theory (Weiner, 1985). A causal attribution refers to a set of beliefs and factors that a person identifies as the cause of an outcome or behavior, noting that the causes to which outcomes are attributed have salient emotional, cognitive and motivational consequences (Fernandez et al., 2015). Thus, the theory developed by Weiner (1986) conceptualizes behaviors through the causal attributions that people identify in previous situations and the consequences they attribute to them (Manassero and Vazquez, 1995). The author proposed the existence of three dimensions involved in the realization of attributions (Weiner, 1979).

The first dimension is internality, which refers to the perception of the source of the internal or external cause (the locus of control). The relationship between the traffic locus of control (T-LOC) and driving behavior has been investigated in numerous previous studies (Holland et al., 2010; Huang and Ford, 2012; Rejali et al., 2023). The findings indicate that internal locus of control orientation has a significant positive impact on predicting the number of traffic accidents, errors, and aggressive and ordinary violations, such that drivers who attribute the reasons for accidents to their own behavior are involved in traffic accidents more frequently than those who attribute the reasons for accidents to external factors (Özkan and Lajunen, 2005). The main problem in a highly internal locus of control orientation in traffic is that it may increase risky driving, because optimism transcends global perceptions of driving ability and the likelihood of accidents (DeJoy, 1989), also reflecting the role of overconfidence bias (Mohammadpour and Nassiri, 2021).

The second dimension is controllability, which refers to whether the cause is perceived as controllable or not (Davis et al., 2017). The importance of controllability observed in the face of various health threats and life events suggests that optimism may arise because people persistently overestimate the degree of control they have over events (DeJoy, 1989). In fact, studies show that young drivers, who are more optimistic about control in driving situations involving reflexes and vehicle handling, are more likely to be involved in accidents (Matthews and Moran, 1986). Biases in cognitive evaluations related to illusion of control and optimism about outcome accentuate aberrant behaviors, as they are empirically linked to poorer judgments and greater expression of risky behaviors (Stephens and Ohtsuka, 2014). The perception of excessive controllability or illusion of control has been investigated mainly in the field of gambling (Ohtsuka, 2013) although results have also been found on its predictive capacity for risky driving behaviors (Hammond and Horswill, 2002).

Finally, the third dimension is stability, a concept that the author developed because he saw that the attribution of some causes fluctuated (were perceived as transitory), while others remained constant (Weiner, 1971). In Weiner et al. (1976), it was shown that changes in expectations are related to the stability dimension and not to the locus of causality, which is important, not only because two attributional dimensions are discriminated, but also because a large proportion of the literature relates changes in expectations to the locus dimension. The stability of attributions produces a maintenance and even an increase in expectations (Manassero and Vazquez, 1995), playing a role in the repetition of risky behaviors. If a driver perceives that a risky maneuver had a positive outcome and attributes this success to a stable factor, he is more likely to repeat such behavior in the future. Unfortunately, this dimension has

little research on its relationship to risky driving behaviors, which underscores the importance of filling the gap in the literature with additional research.

However, the main objective of the present study is to analyze the relationship between the attributional styles of a sample of drivers and the frequency of their risk behaviors. Specifically, we will assess how locus of control, controllability and stability influence the prediction of aberrant driving behaviors, taking into account a number of covariate variables such as demographic factors (e.g., age and gender).

The hypotheses that have been put forward are specifically evidenced as follows:

- Hypothesis 1: A positive relationship between internal locus of control and risky driving behaviors is expected for both positive and negative outcomes.
- Hypothesis 2: A positive relationship between controllability and risky driving behaviors is expected for both positive and negative outcomes.
- Hypothesis 3: A positive relationship between stability and risky driving behaviors is expected for both positive and negative outcomes.

Method

Participants

A total of 42 drivers, of which 28 are women (66.7%), 13 are men (31.0%) and 1 non-binary person (2.4%), completed the survey, 100% of them being of Spanish nationality. Participants ranged in age from 22 to 68 years (*M = 35.09; SD = 16.52*). The marital status of 57.1% is single compared to 38.1% whose marital status is married or living with a partner. In terms of educational level, 69% of the participants had a university education, compared to 11.9% with a professional education, 14.3% with no education and 4.8% with secondary education. To continue, the range of family incomes of the participants is very wide, but the majority (26.2%) is in the range of between 21,000-30,000 euros per year. Finally, the length

of time in possession of a driver's license varies between 1 year and 47, with an average of 14 years; and the average number of participants drives 181 kilometers per week on average.

The sample is selected using a self-administered survey that includes three different assessment instruments. Inclusion criteria include all persons over 18 years of age who have a valid driver's license and are fluent in Spanish. As for the exclusion criteria, all persons without Spanish or Dominican nationality were excluded from the study.

Instruments

Sociodemographic questionnaire: A questionnaire was administered with general sociodemographic questions, collecting information on age, gender, marital status, nationality, educational level, annual family income and driving experience (measured by the number of years of possession of a driver's license and the average number of kilometers driven per week).

Driving attributional styles questionnaire: The questionnaire consists of a total of 16 Likert-scale items with seven response options, which present a variety of situations among which a series of positive or negative events are presented. Its main objective is to evaluate the different attributional styles in the specific field of driving, and to this end, each of its items explores three factors: Locus, Stability and Controllability. The Locus factor refers to the point at which a person believes that the event may be due to him/herself or to other circumstances or people (1=it is totally due to myself to 7=it is totally due to other circumstances/people). The Stability factor indicates the degree of frequency with which you believe the event will happen again in the future (1=never happen again to 7=certain to happen again). Finally, the Controllability factor indicates the degree of control each person perceives about an event happening again (1=I have no control at all over it happening again to 7=I can totally control it happening again). The present questionnaire is a newly created and newly applied instrument and therefore does not yet have data on its validity or reliability. It is based on the *Traffic Locus of Control* (T-LOC) questionnaire, which focuses only on the locus of causality dimension (Özkan and Lajunen, 2005); and on the *Attributional Style Questionnaire* (ASQ), which explores the dimensions of locus, stability and globality (Peterson et al., 1982).

Driver Behavior Questionnaire (DBQ) (Reason et al., 1990): The DBQ is a Likert-type response style questionnaire with 6 response options ranging from 0=Never to 5=Always, originally developed and designed to measure aberrant driving behavior. In this case, we administered the reduced version of the same (Parker et al., 2002), which consists of a total of 28 items organized into 4 factors: lapses (unintentional behaviors that are carried out due to attention or memory deficits, e.g., skipping the freeway exit), errors (unintentional acts that fail to achieve the planned and intended outcome due to errors in judgment, e.g., braking too abruptly), ordinary violations (acts about which the person is largely conscious related to breaking traffic rules, e.g., running a red light) and aggressive violations (conscious acts related to hostility behind the wheel, e.g., arguing with other drivers) (Martinussen et al., 2014). The *Driver Behavior Questionnaire* has good cross-cultural validity and internal reliability with a high Cronbach's alpha for all factors (Özkan et al., 2006).

Procedure

Participants were contacted through different social networks (forums, Whatsapp, Instagram, etc.), providing brief information about the study and attaching a link to the survey in Google Forms. It is important to mention that the survey included a section that requested the consent of the participants to be part of the study, and it was strictly mandatory that they gave it in order to complete the survey. In this, the voluntary nature of participation, the anonymous and confidential nature of the survey in question and the possibility of abandoning the form at any time without any negative consequences are declared. In addition, a general description of the study was included which ensured that all participants could understand the

objectives, and which, in turn, stressed the need to possess a vehicle driving license in order to complete the form. Finally, a brief explanation of the evaluation protocol is included, where the greatest possible sincerity is requested in the answers, since there are no right or wrong answers, in order to prevent social desirability bias.

Before proceeding with the survey, a section was dedicated to collecting the sociodemographic data of the patients (age, nationality, marital status, etc.). The survey in question was composed of a total of 51 items and its response time was approximately 10 to 15 minutes.

Data collection took place between October 31 and January 7. Once this date was reached, the data were stored in a file and analyzed. For this data collection, no identifying data of the participants were recorded.

Finally, it is important to mention that the research has been approved by the Ethics Committee of the Universidad Europea del Atlántico.

Results

First, a descriptive analysis of the sample participants was performed considering the different demographic variables surveyed.

To follow, a Pearson correlation analysis was conducted to explore the relationship between the dimensions of causal attribution, demographic variables and aberrant driving behaviors, determining the strength and direction of the relationships between pairs of variables. Thus, correlations have been analyzed between causal attribution dimensions (locus, control and stability, positive and negative), sociodemographic variables (age and weekly kilometers) and aberrant driving behaviors (violations, aggressive violations, errors and lapses). The results, summarized in Table 1, showed several significant correlations. To begin with, looking at the trends between causal attributions and aberrant behaviors in positive situations, the following findings should be highlighted: an external locus of control correlates positively with the probability of having a lapse at the wheel; the attribution of stability to positive events is positively related to the probability of making mistakes; and there is a significant correlation between controllability and all the dimensions of aberrant behaviors, showing that the higher the perception of controllability, the lower the probability of carrying out risky behaviors, except in the case of lapses, where a higher perception of controllability will increase the latter. On the other hand, the following findings stand out regarding the trends between causal attributions and aberrant behaviors in negative situations: there is a positive correlation between an internal locus of control and aberrant behaviors, showing that the greater the internality, the greater the probability of committing lapses and aggressive driving violations; and controllability again shows a negative correlation with all the dimensions of aberrant behavior, so that a greater perception of controllability will cause the latter to be diminished. It is also interesting to comment on the results found when looking at how attributional styles are related to each other: the internal locus of control is positively correlated with a greater perception of controllability in the case of positive situations, just as a greater attribution of stability to positive situations is also positively correlated with a greater perception of controllability. Finally, it should be noted that age presented a significant negative correlation with rape and aggressive rape.

Finally, the t-test for independent samples was used to compare the means of the variables between two groups of cases, specifically, to compare the scores of the dimensions of causal attribution and aberrant behaviors in the population of men (N=13) and women (N=28). This analysis evaluates whether the differences observed in the means of the two groups are

statistically significant. The results, presented in Table 2, showed significant differences related to the causal attribution dimensions in the stability scores in positive situations, where women obtained significantly higher scores than men. For their part, with regard to aberrant behaviors, significant differences were found in rape scores, where males scored higher than females; as well as in aggressive rapes, where males also scored significantly higher than females. No significant differences were found between men and women for the rest of the variables. It is worth noting that the highest mean score in the case of men was in the controllability variable in negative situations, while the highest mean score in the case of women was found in the stability variable in negative situations.

Table 1

Correlation analysis between attributional dimensions and aberrant driving behaviors

	Age	Km	Locus +	Stab +	Control +	Locus -	Stab -	Control -	Viol	Viol agres	Errors	Lapsus
Age	-	.39**	.14	-.01	-.27	-.16	.08	.05	-.36*	-.39**	.20	.03
Km		-	-.19	-.19	.05	-.02	-.04	.01	.08	-.02	.29	.31
Locus +			-	-.30	-.31*	.36*	.24	.04	-.18	.14	-.22	.32*
Stability +				-	.31*	-.15	.19	.11	-.37	.15	.33*	.21
Control +					-	-.07	.01	.04	-.32*	-.37**	-.36*	.32*
Locus -						-	.22	-.31*	-.25	-.39**	-.28	-.37*
Stability							-	-.26	-.08	-.18	-.01	-.12
Control -								-	-.37*	-.41**	-.36*	-.48***

Note. $*p < .05$,$**p < .01$,$***p < .001$. The "+" symbol refers to positive events, and the "-" symbol refers to negative events.

Tabla 2

Diferencias en las puntuaciones entre hombres y mujeres

	Género				*t*
	Hombres (n = 13)		Mujeres (n = 28)		
	M	SD	M	SD	
Locus +	9.00	3.27	9.07	3.80	-0.60
Estabilidad +	19.15	5.19	22.25	4.06	-2.08*
Control +	19.38	4.59	19.64	4.19	-1.78
Locus -	34.38	9.70	39.21	8.30	-1.64
Estabilidad -	47.84	9.42	53.21	10.41	-1.58
Control -	56.76	10.34	52.96	9.88	1.13
Violaciones	6.78	1.56	5.12	2.16	2.97*
Viol. Agresivas	6.24	2.58	4.32	2.07	2.14*
Errores	5.45	3.01	5.21	2.37	1.12
Lapsus	5.87	2.56	6.11	2.89	0.89

Nota. *$p < .05$. El símbolo "+" hace referencia a eventos positivos y el símbolo "-" a eventos negativos.

Discussion and Conclusions

The present research was developed with the aim of analyzing the relationships between the dimensions of causal attribution and aberrant driving behaviors, exploring also the differences in gender and age of the participants. The results reflect a number of patterns consistent with previous studies and offer new data that contribute to the understanding of psychological factors associated with driving.

In line with the first hypothesis, a positive correlation was observed between internal locus of control and certain risky driving behaviors, such as lapses and aggressive violations. This means that the greater the internal locus of control in negative situations, the more aggressive behaviors will be presented. On the other hand, it has been found that in the case of positive situations, a higher external locus of control is associated with a higher probability of committing a lapse. Thus, the hypothesis is partially confirmed. These results are congruent with previous research that has indicated that an internal locus of control in traffic may be associated with a greater perception of control over outcomes, which may reinforce risky behaviors due to unrealistic optimism about one's own driving abilities (DeJoy, 1989; Matthews and Moran, 1986). This overconfidence bias could explain why drivers with internal locus are more likely to engage in risky maneuvers, attributing their success to personal skills and underestimating external factors such as environmental conditions or the actions of other drivers. On the other hand, the fact that a more external attributional style is related to more aggressive behavior in positive situations may have to do with the same factor of overconfidence and unrealistic optimism about external conditions, which leads the driver to a state of relaxation that is more conducive to the occurrence of lapses.

In relation to the second hypothesis, the controllability dimension showed the most consistent relationships with aberrant behaviors, with significant correlations in each of the 4 dimensions (violations, aggressive violations, errors and lapses) in both positive and negative situations. The results show a clear trend of negative correlation between controllability and aberrant behaviors, suggesting that the higher the perception of controllability, whether in positive or negative situations, the lower the probability of carrying out aberrant driving behaviors. The only exception is lapses, which in the case of positive situations, a greater perception of controllability would lead to a higher probability of committing the latter. Thus, the hypothesis is rejected and the need for further research on this dimension and its

relationship with aberrant driving behavior is raised. Although previous research has pointed to the influence of the illusion of control on aggressive driving (Hammond and Horswill, 2002), the current data indicate that this effect should be more extensively investigated because of its powerful relationship with risky driving behaviors.

One possible explanation for these findings is that the illusion of control (which in previous research has been shown to be related to risky driving behaviors) refers to a perception of excessive controllability, and in our case, the sample presents a low-moderate perception of controllability. Thus, the perception of controllability seems to act as a protective factor, but if a higher controllability were present, the results could be the opposite. Therefore, it would be very interesting for future lines of research to explore the differences in aberrant behaviors between low/moderate controllability and high controllability.

Finally, the third hypothesis is confirmed, since stability also showed significant positive associations with risk behaviors, although these relationships were weaker than those observed for locus of control or controllability. This finding suggests that the attribution of stability of outcomes may influence drivers' predisposition to engage in risky behaviors, specifically, showing a significant correlation between the attribution of stability and the likelihood of making mistakes (unintentional acts that fail to achieve the intended outcome due to errors in judgment) in the case of positive situations. The attribution of success to stable causes in risky maneuvers could reinforce expectations of future achievement as raised in the theoretical framework (Manassero and Vázquez, 1995), leading the person to perform maneuvers that may trigger errors more easily. However, the literature on stability in the driving setting is scarce, and our findings highlight the need to further investigate this dimension in road risk contexts, due to the observed relationship. It is also noteworthy that stability correlates with controllability significantly only in positive situations, which highlights that it is easier to attribute the probability of something happening again in the future and controllability when we talk about a success, rather than when we talk about a failure.

On the other hand, in terms of sociodemographic variables, it is important to note the negative correlation between age and ordinary and aggressive violations, suggesting that the older the age, the lower the probability of engaging in risky driving behaviors, acting as a protective factor. This is consistent with previous research claiming that young people are involved to a greater extent in traffic accidents due to driver negligence or poor vehicle handling (Aberg and Rimmo, 1998; Matthews and Moran, 1986). Likewise, the gender differences observed in the variables studied are relevant and are in line with previous research. Females scored significantly higher on positive stability, while males showed a higher prevalence of rape and aggressive rape. These results can be interpreted from theories that relate gender differences to distinct attributional and emotional patterns. For example, women tend to show a more external locus of control in certain situations, which could act as a protective factor against risky behaviors (Özkan and Lajunen, 2005). On the other hand, men tend to engage more in aggressive driving behaviors, probably due to factors such as sensation seeking or a greater predisposition to act impulsively under intense emotions such as anger (Liu et al., 2021).

The study findings have important implications for road safety, especially for the design of preventive interventions. On the one hand, it would be relevant to develop educational programs that address optimistic expectations and attributional styles in driving, fostering greater awareness of the risks associated with specific behaviors. We can find some examples of this type of programs in the context of sport psychology (Castellano and Rodriguez, 2007) or educational psychology (Torre and Godoy, 2002). On the other hand, integrating emotional components into these interventions could be key, given that variables such as anger and aggression appear to play a mediating role between attributional dimensions and risk

behaviors (Stephens et al., 2021; Zhang et al., 2019). In addition, as Failde-Garrido et al. (2023) in their research, the results may have practical implications for the detection and rehabilitation of offenders, as well as for the imposition of penalties for road safety offenses.

The findings also highlight the need for further research on stability and its interaction with other psychological factors in driving. Specifically, future research could explore the role of variables such as impulsivity, frustration tolerance and/or emotional regulation in the relationship between attributional styles and aberrant behaviors. This line of work could help clarify how stable attributions may reinforce risky behaviors and design more effective strategies to counteract this effect. In addition, as previously mentioned, it would be relevant to examine the influence of cognitive biases, such as the illusion of control, which could enhance the repetition of risky driving behaviors and may be explanatory of the results found in this study. Finally, the gender differences identified suggest that future studies devoted to preventive interventions should be tailored to the specific characteristics of men and women, taking into account their attributional and behavioral patterns.

Although this study offers valuable contributions, it also has some limitations that should be considered. First, the sample size, especially the group of men, is relatively small, which could limit the generalizability of the findings. To continue, the research relied entirely on self-reported measures, which may imply response biases due to social desirability or subjective perception of one's own behavior. Thus, it would be interesting to replicate the results using other types of objective behavioral measures. Some alternatives could include the use of driving simulators/virtual reality, from which the decisions and reactions of participants in risk situations are directly evaluated; observational studies in real or controlled environments that allow behavioral patterns to be recorded; or through records of traffic incidents. In addition, the cross-sectional design of the research prevents the establishment of causal relationships between the variables studied, since it is not completely clear whether drivers' predisposition to adopt risky behaviors is due to their attributional styles or whether they develop as a result of previous driving experiences. To address this limitation, it is recommended that longitudinal studies be developed to analyze the evolution of these variables over time.

References

Aberg, L., and Rimmo, P.-A. (1998). Dimensions of aberrant driver behavior. *Ergonomics*, *41*(1), 39-56. https://doi.org/10.1080/001401398187314

Alavi, S. S., Mohammadi, M. R., Soori, H., and Ghanizadeh, M. (2017). The cognitive and psychological factors (personality, driving behavior, and mental illnesses) as predictors in traffic violations. *Iranian Journal of Psychiatry*, *12*(2), 78-86.

Baron, R. A., and Richardson, D. R. (1994). *Human aggression*. Springer Science & Business Media.

Castellano, N. C., and Rodriguez, M. C. (2007). Diseño y evaluación de un programa de cambio de estilo atribucional en deportistas adolescentes de una institución educativa privada ubicada en la ciudad de Bogotá. *Cuadernos de Psicología del Deporte*, *7*(2), 5-25. https://revistas.um.es/cpd/article/view/54571/52581

Dahlen, E. R., and Ragan, K. M. (2004). Validation of the propensity for angry driving scale. *Journal of Safety Research*, *35*(5), 557-563. https://doi.org/10.1016/j.jsr.2004.09.002

Davis, M. L., Witcraft, S. M., Baird, S. O., and Smits, J. A. J. (2017). Learning principles in CBT. In G. Asmundson & S. Hoffman (Eds.), *The Science of Cognitive Behavioral Therapy* (pp. 51-76). Elsevier.

Deffenbacher, J. L., Stephens, A. N., and Sullman, M. J. M. (2016). Driving anger as a psychological construct: Twenty years of research using the Driving Anger Scale. *Transportation Research. Part F, Traffic Psychology and Behaviour*, *42*, 236-247. https://doi.org/10.1016/j.trf.2015.10.021

Deffenbacher, Jerry L., Huff, M. E., Lynch, R. S., Oetting, E. R., and Salvatore, N. F. (2000). Characteristics and treatment of high-anger drivers. *Journal of Counseling Psychology*, *47*(1), 5-17. https://doi.org/10.1037/0022-0167.47.1.5

DeJoy, D. M. (1989). The optimism bias and traffic accident risk perception. *Accident; Analysis and Prevention*, *21*(4), 333-340. https://doi.org/10.1016/0001-4575(89)90024-9

Failde-Garrido, J. M., Rodríguez-Castro, Y., González-Fernández, A., and García-Rodríguez, M. A. (2023). Traffic Crimes and risky driving: The role of personality and driving anger. *Current Psychology (New Brunswick, N.J.)*, *42*(14), 12281-12295. https://doi.org/10.1007/s12144-021-02634-2

Fernández, A., Arnaiz, P., Mejía, R., and Barca, A. (2015). Atribuciones causales del alumnado universitario de República Dominicana con alto y bajo rendimiento académico || Causal attributions in low and high academic achievement university students in the Dominican Republic. *Revista de estudios e investigación en psicología y educación*, *2*(1), 19–29. https://doi.org/10.17979/reipe.2015.2.1.1319

Gaianu, P.-A., Giosan, C., and Sârbescu, P. (2020). From trait anger to aggressive violations in road traffic. *Transportation Research. Part F, Traffic Psychology and Behaviour*, *70*, 15-24. https://doi.org/10.1016/j.trf.2020.02.006

González-Iglesias, B., Gómez-Fraguela, J. A., and Luengo-Martín, M. Á. (2012). Driving anger and traffic violations: Gender differences. *Transportation Research. Part F, Traffic Psychology and Behaviour*, *15*(4), 404-412. https://doi.org/10.1016/j.trf.2012.03.002

Gosselin, D., Gagnon, S., Stinchcombe, A., and Joanisse, M. (2010). Comparative optimism among drivers: An intergenerational portrait. *Accident; Analysis and Prevention*, *42*(2), 734-740. https://doi.org/10.1016/j.aap.2009.11.001

Hammond, T. B., and Horswill, M. S. (2002). The influence of desire for control on drivers' risk-taking behavior. *Transportation Research. Part F, Traffic Psychology and Behaviour*, *4*(4), 271-277. https://doi.org/10.1016/s1369-8478(01)00028-6

Harre, N., and Sibley, C. G. (2007). Explicit and implicit self-enhancement biases in drivers and their relationship to driving violations and crash-risk optimism. *Accident; Analysis and Prevention*, *39*(6), 1155-1161. https://doi.org/10.1016/j.aap.2007.03.001

Herrero-Fernández, D. (2011). *Adaptación psicométrica de la versión reducida del Driving Anger Scale en una muestra española. Diferencias por edad y sexo*. *27*(2), 544-549. https://doi.org/10.6018/analesps

Herrero-Fernandez, D. (2013). Do people change behind the wheel? A comparison of anger and aggression on and off the road. *Transportation Research. Part F, Traffic Psychology and Behaviour*, *21*, 66-74. https://doi.org/10.1016/j.trf.2013.09.008

Holland, C., Geraghty, J., & Shah, K. (2010). Differential moderating effect of locus of control on effect of driving experience in young male and female drivers. *Personality and Individual Differences*, *48*(7), 821-826. https://doi.org/10.1016/j.paid.2010.02.003

Huang, J. L., and Ford, J. K. (2012). Driving locus of control and driving behaviors: Inducing change through driver training. *Transportation Research. Part F, Traffic Psychology and Behaviour*, *15*(3), 358-368. https://doi.org/10.1016/j.trf.2011.09.002

Ivers, R., Senserrick, T., Boufous, S., Stevenson, M., Chen, H.-Y., Woodward, M., and Norton, R. (2009). Novice drivers' risky driving behavior, risk perception, and crash risk: Findings from the DRIVE study. *American Journal of Public Health*, *99*(9), 1638-1644. https://doi.org/10.2105/ajph.2008.150367

Koenka, A. C. (2020). Academic motivation theories revisited: An interactive dialog between motivation scholars on recent contributions, underexplored issues, and future directions. *Contemporary Educational Psychology*, *61*(101831), 101831. https://doi.org/10.1016/j.cedpsych.2019.101831

Lawton, R., Parker, D., Manstead, A. S. R., and Stradling, S. G. (1997). The role of affect in predicting social behaviors: The case of road traffic violations. *Journal of Applied Social Psychology*, *27*(14), 1258-1276. https://doi.org/10.1111/j.1559-1816.1997.tb01805.x

Lerner, J. S., and Keltner, D. (2001). Fear, anger, and risk. *Journal of Personality and Social Psychology*, *81*(1), 146-159. https://doi.org/10.1037/0022-3514.81.1.146

Liu, Y., Wang, X., and Guo, Y. (2021). The moderating effects of emotions on the relationship between self-reported individual traits and actual risky driving behaviors. *Psychology Research and Behavior Management*, *14*, 423-447. https://doi.org/10.2147/prbm.s301156

Manassero, M. A., and Vazquez, A. (1995). La atribución causal como determinante de las expectativas. *Psicothema*, *7*(2), 361-376. https://www.psicothema.com/pi?pii=982

Mardanian, S., and Bahari, A. (2024). An analysis of factors influencing accidents outside urban areas in Sistan and Baluchestan province. *Advances in Civil Engineering*, *2024*(1). https://doi.org/10.1155/2024/6690964

Martinussen, L. M., Møller, M., & Prato, C. G. (2014). Assessing the relationship between the Driver Behavior Questionnaire and the Driver Skill Inventory: Revealing sub-groups of drivers. *Transportation Research. Part F, Traffic Psychology and Behaviour*, *26*, 82-91. https://doi.org/10.1016/j.trf.2014.06.008

Matthews, M. L., and Moran, A. R. (1986). Age differences in male drivers' perception of accident risk: The role of perceived driving ability. *Accident; Analysis and Prevention*, *18*(4), 299-313. https://doi.org/10.1016/0001-4575(86)90044-8

Mohammadpour, S. I., and Nassiri, H. (2021). Aggressive driving: Do driving overconfidence and aggressive thoughts behind the wheel, drive professionals off the road? *Transportation Research. Part F, Traffic Psychology and Behaviour*, *79*, 170-184. https://doi.org/10.1016/j.trf.2021.04.008

Ohtsuka, K. (2013). Views on luck and winning, self-control, and gaming service expectations of culturally and linguistically diverse Australian poker machine gamblers. *Asian Journal of Gambling Issues and Public Health*, *3*(1). https://doi.org/10.1186/2195-3007-3-9

Organización Mundial de la Salud (OMS). (2023). *Global status report on road safety 2023.* World Health Organization. https://www.who.int/publications/i/item/9789240086517

Özkan, T., and Lajunen, T. (2005). Multidimensional Traffic Locus of Control Scale (T-LOC): factor structure and relationship to risky driving. *Personality and Individual Differences*, *38*(3), 533-545. https://doi.org/10.1016/j.paid.2004.05.007

Özkan, T., Lajunen, T., and Summala, H. (2006). Driver behaviour questionnaire: A follow-up study. *Accident; Analysis and Prevention*, *38*(2), 386-395. https://doi.org/10.1016/j.aap.2005.10.012

Parker, D., Lajunen, T., and Summala, H. (2002). Anger and aggression among drivers in three European countries. *Accident; Analysis and Prevention*, *34*(2), 229-235. https://doi.org/10.1016/s0001-4575(01)00018-5

Peterson, C., Semmel, A., von Baeyer, C., Abramson, L. Y., Metalsky, G. I., and Seligman, M. E. P. (1982). The attributional style questionnaire. *Cognitive Therapy and Research*, *6*(3), 287-299. https://doi.org/10.1007/bf01173577

Pinillos, J. L. (1977). *Principles of psychology*. Alianza Universidad.

Reason, J., Manstead, A., Stradling, S., Baxter, J., and Campbell, K. (1990). Errors and violations on the roads: a real distinction? *Ergonomics*, *33*(10-11), 1315-1332. https://doi.org/10.1080/00140139008925335

Rejali, S., Emami, E., Tayarani Najjaran, E., and Mohammadzadeh Moghaddam, A. (2023). Calm down, please: Exploring the effects of driving anger expression (DAX) on traffic locus of control (T-LOC) and crash involvement among drivers in Tehran, Iran. *Transportation Research. Part F, Traffic Psychology and Behaviour*, *94*, 286-304. https://doi.org/10.1016/j.trf.2023.02.016

Schunk, D. H., Meece, J. L., and Pintrich, P. R. (2014). *Motivation in Education: Theory, research, and Applications*. Pearson.

Stephens, A. N., Newnam, S., and Young, K. L. (2021). Who's more angry? Comparing driver anger and aggression within work and personal driving contexts. *Transportation Research. Part F, Traffic Psychology and Behaviour*, *81*, 408-416. https://doi.org/10.1016/j.trf.2021.07.002

Stephens, A. N., & Ohtsuka, K. (2014). Cognitive biases in aggressive drivers: Does illusion of control drive us off the road? *Personality and Individual Differences*, *68*, 124-129. https://doi.org/10.1016/j.paid.2014.04.016

Torre, C., and Godoy, A. (2002). Influencia de las atribuciones causales del profesor sobre el rendimiento de los alumnos. *Psicothema*, *14*(2), 444-449. http://www.redalyc.org/articulo.oa?id=72714240

Weiner, B. (1971). *Perceiving the Causes of Success and Failure*. General Learning Press, New York.

Weiner, B. (1979). A theory of motivation for some classroom experiences. *Journal of Educational Psychology*, *71*(1), 3-25. https://doi.org/10.1037/0022-0663.71.1.3

Weiner, B. (1985). An attributional theory of achievement motivation and emotion. *Psychological Review*, *92*(4), 548-573. https://doi.org/10.1037/0033-295x.92.4.548

Weiner, B. (1986). *An attributional theory of motivation and emotion*. Springer US.

Yu, Z., Qu, W., and Ge, Y. (2022). Trait anger causes risky driving behavior by influencing executive function and hazard cognition. *Accident; Analysis and Prevention*, *177*(106824), 106824. https://doi.org/10.1016/j.aap.2022.106824

Zhang, T., Chan, A. H. S., Xue, H., Zhang, X., and Tao, D. (2019). Driving anger, aberrant driving behaviors, and road crash risk: Testing of a mediated model. *International Journal of Environmental Research and Public Health*, *16*(3), 297. https://doi.org/10.3390/ijerph16030297

Aberg, L., and Rimmo, P.-A. (1998). Dimensions of aberrant driver behavior. *Ergonomics*, *41*(1), 39-56. https://doi.org/10.1080/001401398187314

Alavi, S. S., Mohammadi, M. R., Soori, H., and Ghanizadeh, M. (2017). The cognitive and psychological factors (personality, driving behavior, and mental illnesses) as predictors in traffic violations. *Iranian Journal of Psychiatry*, *12*(2), 78-86.

Baron, R. A., and Richardson, D. R. (1994). *Human aggression*. Springer Science & Business Media.

Castellano, N. C., and Rodriguez, M. C. (2007). Diseño y evaluación de un programa de cambio de estilo atribucional en deportistas adolescentes de una institución educativa privada ubicada en la ciudad de Bogotá. *Cuadernos de Psicología del Deporte*, *7*(2), 5-25. https://revistas.um.es/cpd/article/view/54571/52581

Dahlen, E. R., and Ragan, K. M. (2004). Validation of the propensity for angry driving scale. *Journal of Safety Research*, *35*(5), 557-563. https://doi.org/10.1016/j.jsr.2004.09.002

Davis, M. L., Witcraft, S. M., Baird, S. O., and Smits, J. A. J. (2017). Learning principles in CBT. In G. Asmundson & S. Hoffman (Eds.), *The Science of Cognitive Behavioral Therapy* (pp. 51-76). Elsevier.

Deffenbacher, J. L., Stephens, A. N., and Sullman, M. J. M. (2016). Driving anger as a psychological construct: Twenty years of research using the Driving Anger Scale.

Transportation Research. Part F, Traffic Psychology and Behaviour, *42*, 236-247. https://doi.org/10.1016/j.trf.2015.10.021

Deffenbacher, Jerry L., Huff, M. E., Lynch, R. S., Oetting, E. R., and Salvatore, N. F. (2000). Characteristics and treatment of high-anger drivers. *Journal of Counseling Psychology*, *47*(1), 5-17. https://doi.org/10.1037/0022-0167.47.1.5

DeJoy, D. M. (1989). The optimism bias and traffic accident risk perception. *Accident; Analysis and Prevention*, *21*(4), 333-340. https://doi.org/10.1016/0001-4575(89)90024-9

Failde-Garrido, J. M., Rodríguez-Castro, Y., González-Fernández, A., and García-Rodríguez, M. A. (2023). Traffic Crimes and risky driving: The role of personality and driving anger. *Current Psychology (New Brunswick, N.J.)*, *42*(14), 12281-12295. https://doi.org/10.1007/s12144-021-02634-2

Fernández, A., Arnaiz, P., Mejía, R., and Barca, A. (2015). Atribuciones causales del alumnado universitario de República Dominicana con alto y bajo rendimiento academico || Causal attributions in low and high academic achievement university students in the Dominican Republic. *Revista de estudios e investigación en psicología y educación*, *2*(1), 19–29. https://doi.org/10.17979/reipe.2015.2.1.1319

Gaianu, P.-A., Giosan, C., and Sârbescu, P. (2020). From trait anger to aggressive violations in road traffic. *Transportation Research. Part F, Traffic Psychology and Behaviour*, *70*, 15-24. https://doi.org/10.1016/j.trf.2020.02.006

González-Iglesias, B., Gómez-Fraguela, J. A., and Luengo-Martín, M. Á. (2012). Driving anger and traffic violations: Gender differences. *Transportation Research. Part F, Traffic Psychology and Behaviour*, *15*(4), 404-412. https://doi.org/10.1016/j.trf.2012.03.002

Gosselin, D., Gagnon, S., Stinchcombe, A., & Joanisse, M. (2010). Comparative optimism among drivers: An intergenerational portrait. *Accident; Analysis and Prevention*, *42*(2), 734-740. https://doi.org/10.1016/j.aap.2009.11.001

Hammond, T. B., and Horswill, M. S. (2002). The influence of desire for control on drivers' risk-taking behavior. *Transportation Research. Part F, Traffic Psychology and Behaviour*, *4*(4), 271-277. https://doi.org/10.1016/s1369-8478(01)00028-6

Harre, N., and Sibley, C. G. (2007). Explicit and implicit self-enhancement biases in drivers and their relationship to driving violations and crash-risk optimism. *Accident; Analysis and Prevention*, *39*(6), 1155-1161. https://doi.org/10.1016/j.aap.2007.03.001

Herrero-Fernández, D. (2011). *Adaptación psicométrica de la versión reducida del Driving Anger Scale en una muestra española. Diferencias por edad y sexo*. *27*(2), 544-549. https://doi.org/10.6018/analesps

Herrero-Fernandez, D. (2013). Do people change behind the wheel? A comparison of anger and aggression on and off the road. *Transportation Research. Part F, Traffic Psychology and Behaviour*, *21*, 66-74. https://doi.org/10.1016/j.trf.2013.09.008

Holland, C., Geraghty, J., & Shah, K. (2010). Differential moderating effect of locus of control on effect of driving experience in young male and female drivers. *Personality and Individual Differences*, *48*(7), 821-826. https://doi.org/10.1016/j.paid.2010.02.003

Huang, J. L., and Ford, J. K. (2012). Driving locus of control and driving behaviors: Inducing change through driver training. *Transportation Research. Part F, Traffic Psychology and Behaviour*, *15*(3), 358-368. https://doi.org/10.1016/j.trf.2011.09.002

Ivers, R., Senserrick, T., Boufous, S., Stevenson, M., Chen, H.-Y., Woodward, M., and Norton, R. (2009). Novice drivers' risky driving behavior, risk perception, and crash risk: Findings from the DRIVE study. *American Journal of Public Health*, *99*(9), 1638-1644. https://doi.org/10.2105/ajph.2008.150367

Koenka, A. C. (2020). Academic motivation theories revisited: An interactive dialog between motivation scholars on recent contributions, underexplored issues, and future directions.

Contemporary Educational Psychology, *61*(101831), 101831. https://doi.org/10.1016/j.cedpsych.2019.101831

Lawton, R., Parker, D., Manstead, A. S. R., and Stradling, S. G. (1997). The role of affect in predicting social behaviors: The case of road traffic violations. *Journal of Applied Social Psychology*, *27*(14), 1258-1276. https://doi.org/10.1111/j.1559-1816.1997.tb01805.x

Lerner, J. S., and Keltner, D. (2001). Fear, anger, and risk. *Journal of Personality and Social Psychology*, *81*(1), 146-159. https://doi.org/10.1037/0022-3514.81.1.146

Liu, Y., Wang, X., and Guo, Y. (2021). The moderating effects of emotions on the relationship between self-reported individual traits and actual risky driving behaviors. *Psychology Research and Behavior Management*, *14*, 423–447. https://doi.org/10.2147/prbm.s301156

Manassero, M. A., and Vazquez, A. (1995). La atribución causal como determinante de las expectativas. *Psicothema*, *7*(2), 361-376. https://www.psicothema.com/pi?pii=982

Mardanian, S., and Bahari, A. (2024). An analysis of factors influencing accidents outside urban areas in Sistan and Baluchestan province. *Advances in Civil Engineering*, *2024*(1). https://doi.org/10.1155/2024/6690964

Martinussen, L. M., Møller, M., and Prato, C. G. (2014). Assessing the relationship between the Driver Behavior Questionnaire and the Driver Skill Inventory: Revealing sub-groups of drivers. *Transportation Research. Part F, Traffic Psychology and Behaviour*, *26*, 82-91. https://doi.org/10.1016/j.trf.2014.06.008

Matthews, M. L., and Moran, A. R. (1986). Age differences in male drivers' perception of accident risk: The role of perceived driving ability. *Accident; Analysis and Prevention*, *18*(4), 299-313. https://doi.org/10.1016/0001-4575(86)90044-8

Mohammadpour, S. I., and Nassiri, H. (2021). Aggressive driving: Do driving overconfidence and aggressive thoughts behind the wheel, drive professionals off the road? *Transportation Research. Part F, Traffic Psychology and Behaviour*, *79*, 170-184. https://doi.org/10.1016/j.trf.2021.04.008

Ohtsuka, K. (2013). Views on luck and winning, self-control, and gaming service expectations of culturally and linguistically diverse Australian poker machine gamblers. *Asian Journal of Gambling Issues and Public Health*, *3*(1). https://doi.org/10.1186/2195-3007-3-9

Organización Mundial de la Salud (OMS). (2023). *Global status report on road safety 2023.* World Health Organization. https://www.who.int/publications/i/item/9789240086517

Özkan, T., and Lajunen, T. (2005). Multidimensional Traffic Locus of Control Scale (T-LOC): factor structure and relationship to risky driving. *Personality and Individual Differences*, *38*(3), 533-545. https://doi.org/10.1016/j.paid.2004.05.007

Özkan, T., Lajunen, T., and Summala, H. (2006). Driver behavior questionnaire: A follow-up study. *Accident; Analysis and Prevention*, *38*(2), 386-395. https://doi.org/10.1016/j.aap.2005.10.012

Parker, D., Lajunen, T., and Summala, H. (2002). Anger and aggression among drivers in three European countries. *Accident; Analysis and Prevention*, *34*(2), 229-235. https://doi.org/10.1016/s0001-4575(01)00018-5

Peterson, C., Semmel, A., von Baeyer, C., Abramson, L. Y., Metalsky, G. I., and Seligman, M. E. P. (1982). The attributional style questionnaire. *Cognitive Therapy and Research*, *6*(3), 287-299. https://doi.org/10.1007/bf01173577

Pinillos, J. L. (1977). *Principles of psychology*. Alianza Universidad.

Reason, J., Manstead, A., Stradling, S., Baxter, J., and Campbell, K. (1990). Errors and violations on the roads: a real distinction? *Ergonomics*, *33*(10-11), 1315-1332. https://doi.org/10.1080/00140139008925335

Rejali, S., Emami, E., Tayarani Najjaran, E., and Mohammadzadeh Moghaddam, A. (2023). Calm down, please: Exploring the effects of driving anger expression (DAX) on traffic locus of control (T-LOC) and crash involvement among drivers in Tehran, Iran. *Transportation*

Research. Part F, Traffic Psychology and Behaviour, *94*, 286-304. https://doi.org/10.1016/j.trf.2023.02.016

Schunk, D. H., Meece, J. L., & Pintrich, P. R. (2014). *Motivation in Education: Theory, research, and Applications*. Pearson.

Stephens, A. N., Newnam, S., & Young, K. L. (2021). Who's more angry? Comparing driver anger and aggression within work and personal driving contexts. *Transportation Research. Part F, Traffic Psychology and Behaviour*, *81*, 408-416. https://doi.org/10.1016/j.trf.2021.07.002

Stephens, A. N., & Ohtsuka, K. (2014). Cognitive biases in aggressive drivers: Does illusion of control drive us off the road? *Personality and Individual Differences*, *68*, 124-129. https://doi.org/10.1016/j.paid.2014.04.016

Torre, C., and Godoy, A. (2002). Influencia de las atribuciones causales del profesor sobre el rendimiento de los alumnos. *Psicothema*, *14*(2), 444-449. http://www.redalyc.org/articulo.oa?id=72714240

Weiner, B. (1971). *Perceiving the Causes of Success and Failure*. General Learning Press, New York.

Weiner, B. (1979). A theory of motivation for some classroom experiences. *Journal of Educational Psychology*, *71*(1), 3-25. https://doi.org/10.1037/0022-0663.71.1.3

Weiner, B. (1985). An attributional theory of achievement motivation and emotion. *Psychological Review*, *92*(4), 548-573. https://doi.org/10.1037/0033-295x.92.4.548

Weiner, B. (1986). *An attributional theory of motivation and emotion*. Springer US.

Yu, Z., Qu, W., and Ge, Y. (2022). Trait anger causes risky driving behavior by influencing executive function and hazard cognition. *Accident; Analysis and Prevention*, *177*(106824), 106824. https://doi.org/10.1016/j.aap.2022.106824

Zhang, T., Chan, A. H. S., Xue, H., Zhang, X., and Tao, D. (2019). Driving anger, aberrant driving behaviors, and road crash risk: Testing of a mediated model. *International Journal of Environmental Research and Public Health*, *16*(3), 297. https://doi.org/10.3390/ijerph16030297