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The Role of Coping Strategies in the Relationship between Anger and Risky Driving Behavior

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ABSTRACT

The aim of this study was to analyze the moderating role of coping mechanisms in the relationship between anger and risky driving behaviour in professional drivers and implicitly, investigate the associations between the concept of road rage and risky driving behaviour on one hand and between risk taking as a personality trait and the manifestation of risk behaviour behind the wheel on the other. The moderating role of coping mechanisms in the relationship between risk taking and risky driving behaviour was also studied in this paper. The study involved 81 participants, professional drivers, both male (58) and female (23), aged between 19 and 59 ($M = 37.77$, $SD = 12.13$). The instruments used were The Aggression Questionnaire, The Cognitive Emotion Regulation Questionnaire, The Jackson Personality Inventory – Risk Taking and The Freight Driving Behaviour Questionnaire. The results showed that both anger and risk taking explained a significant percentage of the risky driving behaviour and were also positively associated with it. At the same time, the results obtained from the moderating analyzes implied that maladaptive coping mechanisms have a moderating role in the relationship between anger and risky driving behaviour, but the adaptive ones did not. Nor the adaptive neither the maladaptive strategies had a significant moderating role in the relationship between risk taking and risky driving behaviour. The conclusions of this study highlighted the theoretical and practical implications of risk related research in matter of developing occupational safety programs and increasing awareness about factors that may influence the manifestation of risky driving behaviour in an organizational environment..

Keywords: *anger, road rage, risk taking, risky driving behavior, coping mechanisms*

1. INTRODUCTION

The concepts of anger and risk-taking have important implications both in theorizing the manifestation of risky driving behaviors and in (public and organizational) road safety practice and understanding individual choices to engage in such behaviors. In industrial-organizational terms, studies from the specialized literature can help to develop anger management and risk-taking programs, significantly contributing to the promotion of occupational safety.

In this paper there are two objectives. The first is to establish the relationship between anger and risky driving behaviors in professional drivers, and the second is to establish the role of coping mechanisms in this relationship. The main reasons underlying the interest in this topic are the general attention given to the concept of risk in professional areas (Slovic, 2000), the need to be aware of its existence and of the consequences such as accidents and organizational-operational errors, but also the curiosity of exploring the influence of situational and personality factors on the manifestation of risky behaviors in traffic.

Anger (state)

Anger is defined as a strong emotion associated with negative feelings towards the cause of its triggering (Zhang & Chan, 2016), which usually occurs as a 'response to an external threat or harm perceived as deliberate, or as a disruption of ongoing behavior' (Hamleton et al., 2004). Anger as an emotional state (or situational anger) is characterized by the feeling of annoyance, anger or fierceness, being also a state often experienced while driving (Zhang et al., 2016). Situational anger refers to a certain temporary emotional state experienced by drivers while driving (Deffenbacher et al., 1994), whose intensity can vary significantly from one event to another, within a short period of time, and whose level increases as a reaction to a specific set of circumstances, in this case, in traffic (Capowich et al., 2001). The distinction between trait anger and state anger is made on the basis of a widely accepted concept in psychology relating to behaviors related to both trait and state concepts, namely Catell's State-Trait Model and Scheier (1961). This model states that emotions can be experienced in two ways: as a temporary state of mind (also called situational) or as a stable and continuous personality dimension (as a trait). Stephens and Groeger (2008) describe situational anger as a driver's current level of anger at a given moment behind the wheel. Negative affective states (anger and other related emotions) occur as a subsequent reaction to stimuli such as negative relationships with others, failure to achieve set goals, or the loss of a meaningful relationship, these facts creating a need for corrective action as a means of managing or alleviating those negative emotions (Agnew, 1992). Although it has been shown (Deffenbacher et al., 2003, Deffenbacher et al.,

2001, Deffenbacher et al., 2005) that trait anger in the driving context was a significant predictor of situational anger at the wheel and the results suggested that drivers who have scored higher on trait anger in the driving context, were more likely to both trigger and experience situational anger more frequently and more intensely while driving in a wider range of situations, situational anger as such can affect driving seriously (Matthews, 2002, Nesbitt et al., 2007).

Numerous studies (Brown et al., 2016, Ross et al., 2015, Starkey & Isler, 2016) claim that anger translated into aggressive expressions is due to limited cognitive resources, and more precisely to factors such as poor cognitive control, poor control of impulses, unfavorable decision-making, an underdeveloped working memory and negative coping mechanisms, all demonstrating a positive relationship in relation to possible risky, reckless and therefore unsafe driving behavior. Love et al. (2022) explain that individuals more likely to engage in such traffic behaviors do so because of poor executive control over impulses resulting from previous negative emotional reactions (Pharo et al., 2011, Reynolds et al., 2019).

Risk taking (trait)

According to Nigg (2017), risk-taking has been described in various ways over time, but 'common topics in its definition involve balancing rewards against the probability of loss'. Risky behaviors, state Skeel et al. (2007) involve a certain level of danger and excitement and are often preceded by planning and critical risk-reward analysis. Thus, the probability of loss occurrence is abandoned at the expense of the possibility of perceived reward (Shead & Hodgins, 2009). Substance abuse, unprotected sex, smoking, driving and gambling (Zuckerman & Kuhlman, 2000) all represent "self-focused hedonic acts with the potential for negative consequences" (Egan & Bull, 2020, Boyer, 2006). Sensations of arousal and excitement, driven by biological mechanisms, increase when such behaviors occur (Maples-Keller et al., 2016). Following the development of a 12-instrument scale to assess past and present risk taking in 6 different domains (Egan & Bull, 2020), Nicholson et al. (2005) obtained results suggesting that general predilection for risk-taking is correlated with high levels of extraversion and openness and low levels of neuroticism, agreeableness, and conscientiousness. As summarized by Egan and Bull (2020), Nicholson et al. (2005) theorized that high levels of extraversion and openness serve as mechanisms for coping with risk, low levels of neuroticism and agreeableness help block emotional reactions and guilt, and low levels of conscientiousness predispose the individual to deviate from social norms.

Zuckerman and Kuhlman (2000) claim that some personality traits such as sensation-seeking and impulsivity have great relevance in an individual's general predisposition to take risks, as they represent the approach aspect of the risk-reward conflict ratio. As a result, we should expect that trait anxiety-neuroticism and risk avoidance are components that determine the degree to which the risk component manifests in this relationship. As also reviewed in Zuckerman (2007), various personality traits such as sensation seeking, impulsivity, and poor self-control are associated with risk behavior in multiple domains. Sensation seeking was described in 1994 by the same author as the preference for 'stimulating and varied experiences', the individual willingly engaging in risky behavior in order to obtain these kinds of experiences. A high level of impulsivity implies an individual's tendency to choose short-term rewards without analyzing immediate costs or planning for future ones (Eysenck et al., 1985). Self-control, according to Marcus (2003), involves "the tendency to focus on momentary temptations", thereby adopting risky behavior and ignoring future implications.

Risky driving behavior

A risky driving behavior is defined, according to Abdu et al. (2012), as 'behavior that increases the possibility of an accident and includes speeding and running red/yellow lights'. According to this definition, a driver who speeds up instead of braking is taking an increased risk in traffic. Jafarpour and Rahimi-Movaghar (2014) argue that the vast majority of aberrant driving behaviors have at least the potential to endanger the driver or other road users. 'Patterns of traffic behavior limited or not to legal violations, such as unauthorized speeding, forcing the approach of another vehicle, improper passing, improper lane use, violation of rights of way, illegal turns and violation of control signals, which put drivers at risk of morbidity and mortality are called risky driving behaviors' (Jafarpour & Rahimi-Movaghar, 2014). Intentional violations of the traffic code, according to the authors, fall into deliberate risk behaviors, and the unintentional ones into risk behaviors such as errors or distractions.

Hu et al. (2021) state that the basis of studies aimed at traffic safety research is the traffic behavior of drivers and that 70% of all road accidents are due to human factors rather than factors such as vehicles, roads design, construction, maintenance or general road environment. Driving mistakes by drivers can be produced by a multitude of causes, such as 'their subjective reasons, management of road rules or environmental factors', while the main cause of accidents is the risky behavior of drivers themselves (Hu et al., 2021). In the study cited above, operational and cognitive errors (wrong reasoning), violation of rules, negligence and aberrant behaviors at the wheel are factors

that directly and indirectly (unintentional mistakes) affect road safety.

In the study proposed by Simons-Morton et al. (2005) about the risky behavior observed in adolescents, it is theorized that talking, changing the music and moving around, for example, are actions of young people that can cause driver distractions and implicitly their risky behaviors behind the wheel. The social influence of the group is an important factor in addressing adolescent risk behaviors (Ennett & Bauman, 1994; Jaccard et al., 2005; Simons-Morton et al., 2004). They can contribute to risk-taking behavior in traffic in a 'direct and intentional way, by encouraging them to accelerate, overtake or pass other vehicles' (Simons-Morton et al., 2005). At the same time, the driver's perception of the expectations of his colleagues or friends when they are in the same vehicle can be a disruptive factor at the wheel, as he can be influenced to adopt a more aggressive, risky or reckless driving style, considering this kind of behavior as desirable in the opinion of other passengers (Simons-Morton et al., 2005).

Anger and risky driving behavior

A big role in road safety is played by road rage and aggressive driving (Abdu et al., 2012), which causes a general increased tendency to be involved in an accident and to violate the traffic code in force (Li et al. al., 2004). In the article published by Abdu et al. (2012), the concept of aggression at the wheel is defined as a 'syndrome of instrumental behaviors generated by frustration, characterized by manifest annoyance towards other traffic participants or by inconsideration towards them, either by forcing proximity to vehicles, repetitive use of flashes, insistent and loud honking or deliberate dangerous driving with the aim of saving time, at the expense of other drivers (not stopping at a red light or stop sign, obstructing the road, overtaking)'. The concept of driving anger as a state, that is, a driver's current level of anger, as Stephens and Groeger (2008) call it, has been studied significantly less in the context of driving aggression than the concept of driving anger as a trait (Deffenbacher et al., 2001). The high frequency of feelings of aggression, anger, rage or fierceness led to the recording of a greater number of accidents caused or almost caused as a result of drivers' own risky behavior in traffic (Underwood et al., 1999). Anger is a much more common concept in the road context than in any other general context of life (Parkinson, 2001), numerous factors contribute to increasing the level of aggression behind the wheel, a fact that promotes aberrant driving (Dahlen et al., 2005, Deffenbacher et al. al., 2001, Lajunen et al., 1998) and subsequently, a high risk of accidents, injuries and fatalities (de Winter & Dodou, Iversen & Rundmo, 2002; Paleti et al., 2010). Among these problematic factors we mention the lack of desire of drivers to initiate effective communication with other traffic

participants and implicitly, the misinterpretation of road messages (Parkinson, 2001), the presence of anonymity due to the physical barrier of the vehicle and, as a result, the lack of effective identification in view of the application of a legal penalty (Ellison-Potter et al., 2001) and not finally, situational factors such as time pressure or congested traffic (Deffenbacher et al., 1994).

Both the safety of the driver and other road participants can be greatly endangered by deliberate risky and/or aggressive driving behaviors, Zhang and Chan (2016) state. Any form of driving that leads to injury, damage or physical or psychological harm to road users such as the use of flashes, the horn, shouting or obscene gestures, all fall under different forms of driving aggression (Zhang & Chan, 2016, Lajunen et al., 1994). Basically, driving rage and risky driving behaviors mostly involve thrill-seeking and general rushing, which can be classified as behaviors based on exclusively selfish and self-centered motives (Dula & Geller, 2003, Richer & Bergeron, 2012).

The relationship between driving anger and risky driving behaviors has been widely studied, but the concept of trait anger or the predisposition of drivers to become nervous in various traffic situations has been mostly emphasized (Deffenbacher et al., 1994). However, almost all studies reported a positive correlation between anger and aberrant risk behaviors, Zhang and Chan (2016) state in a meta-analysis where they synthesized the literature on anger as a state, as a trait and as a general concept and where they investigated several types of consequences of anger at the wheel, including risky behaviors in traffic. Here we talk about the two main goals of drivers, namely to reach the destination and to promote safety (Roidl et al., 2013) and what happens when these are blocked due to situational factors such as traffic congestion or dangerous behavior of other drivers. As a result, it is very possible to experience frustration or anger, which can later lead to aggressive road behavior (honking, speeding, changing lanes, running red lights, blocking other drivers).

Lawton and Nutter (2002) state that in traffic, unlike non-traffic situations, people are more likely to show anger externally and more aggressively due to the fact that the reason for this anger is also other drivers, but also anonymity, which creates a concept of protection. Although these types of factors predict a positive association between the experience of anger at the wheel and risk behaviors in traffic, there are others that can be taken into account when talking about a possible influence on road aggression such as impatience or the negative influence of other traffic participants (Shinar, 1998). Blanchette and Richards (2010) argue that anger in turn affects a significant number of cognitive performances of the human brain, such as attention allocation, reasoning, judgment and decision making, which could explain the role of one of the main

variables in this study on anger behaviors: risk behind the wheel.

Abdu et al. (2012) study the cause-effect relationship between the driver's current anger state and driving behaviors and compare these behaviors in the same person (in a neutral and an angry state) in a between-subjects design, inducing anger by a specific protocol. The results indicated that induced anger significantly increased the likelihood of passing a yellow traffic light and quite significantly the likelihood of speeding. Effects of situational anger on some driving styles were thus obtained, especially on the tendency to take risks, but not on the possibility of causing an accident, since the first instinct of action of drivers in this case is to brake. Therefore, the driving skills and level of control in crisis situations was not affected.

Following the above, we set as part of the first objective in the present study the establishment of the relationship between anger and risky driving behaviors and, implicitly, the first hypothesis:

H1. *A high level of anger is associated with the manifestation of risky driving behaviors among professional drivers.*

Risk taking and risky driving behavior

The positive correlation between road rage and risky driving behaviors can be explained by the fact that generally aggressive individuals tend to perceive a lower level of risk and, at the same time, adopt a much more inclined attitude in favor of risk-taking (Lerner & Keltner, 2001, Taubman-Ben-Ari, 2012).

In 2012, Abdu et al. studied the distinction between the effects of state (situational) anger on the threshold limit of risk-taking versus driving skills. The results suggested that induced anger increases a driver's chances of engaging in risk-taking behaviors, such as speeding, but did not affect the 'frequency of collisions in near-crash situations' (Zhan & Chan, 2016), concluding that road rage alters the risk-taking threshold, but does not in any way influence a driver's driving skills. Also in this study, the results showed that drivers with a high level of anger tend to maintain a shorter distance and a shorter time interval from the vehicles in front and adopt more varied lateral positions in relation to them, a behavior valued as being risky according to Dulla and Geller (2003). A driver's risk tolerance is often measured by judging the distance for a left turn (Yan et al., 2007), and in the present case study, nervous drivers judged shorter distances than emotionally neutral drivers to make this kind of turn, indicating that 'higher risk taking was associated with driving anger as a situational state' (Zhan & Chan, 2016). This result supports the first hypothesis of the two authors, which states that situational anger at the wheel increases the possibility of adopting risky behavior in the road context.

In the analysis of the effects of situational anger on risky driving behaviors, in the research carried out by Abdu et al.

(2012), it is suggested that the effect of anger on drivers may be due to a general principle that anger compromises self-restraint. In this direction, there is research of neuropsychological nature (Aron et al., 2004), which states that inhibition is linked to the integrity of the left side of the prefrontal cortex, a region of the brain that is inactive when experiencing states of anger (Carver & Harmon-Jones, 2009), its functionality thus decreasing. The conclusion that was the basis of the study mentioned above was that anger as a state affects risky driving behavior by increasing risk taking, but without changing the driving skills that prevent possible accidents.

Drivers' attitude towards risky driving is also theorized and studied in the work of Teye-Kwadjo (2019) along with conceptions of traffic fatalism and risk perception, on the Ghanaian population. Attitudes related to risk-taking behind the wheel, such as breaking traffic rules or speeding, are assessed here on a continuum with positive and negative valences. Thus, drivers who evaluate driving at speed in a positive style and believe that it helps, for example to reduce travel time or to confer a certain enthusiasm, are more likely to accelerate than those who evaluate it in a negative way, i.e. believe that speed kills or breaks traffic rules (Teye-Kwadjo, 2019). Numerous previous studies have shown that 'a favorable attitude towards speeding predicts risky driving behaviors' (Iversen, 2004, Lucidi et al., 2014, Ulleberg & Rundmo, 2002, Warner & Aberg, 2008). The first hypothesis from the presented study is confirmed, the attitudes regarding the risky driving behavior being positively associated with the road risky behavior itself.

Taking into account the above, we propose as the second part of the first objective of the present study to establish the relationship between risk-taking and risky driving behaviors, and we also build the second hypothesis, namely:

H2. *A high level of risk-taking is associated with the manifestation of risky driving behaviors among professional drivers.*

Coping mechanisms, anger and risky driving behavior

When anger is triggered suddenly at the wheel, the individual's feelings become difficult to control (Yoo et al., 2022), but in such situations, until reaching the risk behavior manifested by aggressiveness in traffic, anger can be mediated through various mechanisms. The cited study talks about the mediating role of social interaction in the relationship between anger and risky driving behaviors and the implementation of an assistance robot for drivers experiencing anger at the wheel. It was developed based on five different cognitive coping strategies and was used experimentally in road rage situations, thus promoting risky driving behaviors. The results of the study indicated that an effective coping strategy for reducing driving aggression

following the onset of anger was blaming other traffic participants, perceived empathy and social support without any cognitive involvement. Presented as a maladaptive coping mechanism discussed in Love et al. (2022), rumination is a thinking style associated with poor executive control and emotional disturbances, 'reminiscence of negative experiences consuming attentional resources' (Denson et al., 2009, Pedersen et al., 2011). Anger-inducing experiences arising from repetitive and negative cognitions (ruminations) may have consequences from the maladaptive spectrum listed by Sukhodolsky et al. (2001) and Denson (2013) as 'negative interpretation of events, thoughts and feelings of anger and even revenge plans'. The results of studies suggest that anger rumination was associated with a high number of road risks such as dangerous, risky and aggressive driving, but also with high degree of driver anger (Suhr & Dula, 2017). Furthermore, this coping mechanism may act as a mediator in the relationship between driver anger and risky driving behaviors (Suhr & Nesbit, 2013, Wang et al., 2018). Love et al. (2022) presents the concept of 'Cognitive-Attentional Syndrome', which maintains emotional disturbances and dysfunctions and is representative of the maladaptive emotional regulation strategies such as the negative and repetitive thoughts encountered in anger rumination mentioned above.

Often, positive metacognitive beliefs are influenced by negative ones such as the dangerous and uncontrollable consequences of repetitive thoughts (Wells, 2009). These dysfunctional thoughts reduce cognitive flexibility and attentional resources, promoting negative feelings such as worry and implicitly, the vulnerability present in multiple psychological conditions (Wells, 2019).

In their study of anger conditions, Simpson and Papageorgiou (2003) state that rumination helped patients with anger management problems both to gain a better understanding of the events that caused the anger and to justify their own aggressive behaviors. Examining the relationship between dysfunctional metacognitions and rumination, the experience and expression of anger (Salguero et al., 2019), the results indicated that individuals with a higher degree of dysfunctional metacognitions had more frequent negative ruminations of anger, while also having higher levels of anger and a much greater tendency to act on their behalf.

The study by Ben-Zur and Reshef-Kfi (2003) presents the relationship between coping strategies and risk taking, among the main results being that the perception of the benefits brought by taking a certain risk brings with it the involvement in a greater degree of risk, the mere perception of risk not having the same consequences. The most notable results of this study confirmed that 'avoidant coping strategies are associated with a high degree of involvement in risky behaviors', and together with the perceived benefits

of possible risk-taking, they represent a significant factor in the individual's decision to take risks. As the coping strategies involve less effort (avoidance, denial), individuals are more likely to engage in maladaptive coping mechanisms that can lead, in turn, to the adoption of risky behaviors because the stressors are not properly managed, but only the affects negative (Dariotis & Chen, 2020). Previous research (Eftekari et al., 2004, McConnell et al., 2014, Wills et al. 2001) indicates that coping strategies that require the individual to engage in the task (active problem solving and behavioral solutions) are negatively related to initiating and the increase in risk behaviors over time, while coping strategies based on avoidant and disengaged mechanisms (anger and withdrawal) were positively associated with the adoption of risk behaviors.

Following the theorized above, firstly we establish the third hypothesis of the present study, namely:

H3. *Coping strategies moderate the relationship between anger and risky driving behaviors among professional drivers.*

2. METHODOLOGY

Participants and procedure

A total of 81 professional drivers aged between 19 and 59, $M = 36.77$, $SD = 12.13$, participated in the present study, of which 58 were men (72%) and 23 were women (28%). Regarding the length of service of the participants, it is between one and 40 years, $M = 14.46$, $SD = 10.77$, and regarding the working hours worked weekly, they are between two and 60, $M = 36.25$, $SD = 12.56$. Of the total participants, 26 are single (32%) and the remaining 55 are in a relationship (68%).

Inclusion criteria: Participants must be employed in a company as professional drivers, be at least 18 years old and have at least one year of experience in the field. The sampling method is one of convenience.

Out of a total of 100 people invited to participate in the study, only 81 agreed to participate to the end by completing the questionnaire (81%). The questionnaire was administered to professional drivers employed in a courier company, having previously been sent to them through a supervisor, namely the transport manager of the employees who are part of the target sample. Prior information regarding the purpose and nature of the study was achieved through both written and oral information prior to administration, in which the individuals were informed that participation in the study is anonymous, voluntary and serves a scientific research, without having any professional involvement or follow-up. Accordingly, desirable responses were kept under control. Participants were not rewarded for completion.

The conditions regarding research ethics related to the processing and interpretation of the data, as well as the monitoring of data security conditions, were met. The data

H3a. *Adaptive coping strategies moderate the relationship between risky driving behaviors among professional drivers.*

H3b. *Maladaptive coping strategies moderate the relationship between risky driving behaviors among professional drivers.*

Second, we establish the fourth hypothesis of this study:

H4. *Coping strategies moderate the relationship between risk taking and risky driving behaviors among professional drivers.*

H4a. *Adaptive coping strategies moderate the relationship between risk taking and risky driving behaviors among professional drivers.*

H4b. *Maladaptive coping strategies moderate the relationship between risk taking and risky driving behaviors among professional drivers.*

were initially organized in encrypted Excel spreadsheets to which only the author of this study had access. No participants' names or other data that could link the participant's identity to the data provided by them were requested.

The sample size determined by GPower analysis is 89, for a power of .95 and an effect size of .15 at a significance level of .05, but there were 81 participants in the present study.

Instruments

Sociodemographic data were collected through a list of questions regarding gender, age, marital status, length of employment, and hours worked per week.

Anger. The Aggression Questionnaire / AQ / BPAQ was used to measure anger. The instrument includes 29 items and measures four aspects: 'Physical Aggression', 'Verbal Aggression', 'Anger' and 'Hostility' (Buss & Perry, 1992). Example item: 'I have difficulty controlling my impulsiveness'. Answers are measured on a five-point Likert scale, where 1 – does not describe me at all and 5 – describes me exactly. When analyzing the internal consistency, a Cronbach Alpha coefficient $\alpha = .89$ was obtained at the global level and respectively $\alpha = .85$ for the subscale 'Physical Aggression', $\alpha = .72$ for the subscale 'Verbal Aggression', $\alpha = .83$ for the subscale 'Anger' and $\alpha = .77$ for the 'Hostility' subscale.

Coping strategies. To measure coping strategies, the Cognitive-Emotional Coping Questionnaire (CERQ) (Garnefski et al., 2002), adapted in Romanian by Perțe and Țincaș, was used. The instrument comprises 36 items, which refer exclusively to what a person thinks, not what

they actually do, when going through threatening or stressful life experiences. The items are divided proportionally across nine scales, so the first CERQ subscale contains 4 items. The names of the subscales are as follows: 'Self-blame', 'Acceptance', 'Rumination', 'Positive refocusing', 'Refocus on planning', 'Positive reappraisal', 'Putting into perspective', 'Catastrophizing', 'Other-blame'. Sample item: 'I think that what happened to me is the worst thing that can happen to someone'. Answers are given on a five-point Likert scale from 1 - '(almost) never' to 5 - '(almost) always', depending on the extent to which certain coping strategies are used. When analyzing the internal consistency, a Cronbach Alpha coefficient between $\alpha = .70$ and $\alpha = .80$ was obtained for the different subscales, within the various populations. Even lower values such as $\alpha = .68$ for the scales 'Self-blame' in the case of older adolescents and 'Other-blame' in the case of minor adolescents are acceptable values, considering the number of items of each scale.

Risk behaviors. To measure risk behaviors, Risk Taking [Jackson Personality Inventory (JPI-R)] (Goldberg et al., 2006), adapted in Romanian (Iliescu et al., 2015) was used. The instrument comprises 10 items, measured on a Likert scale from 1 to 5, with options from 1='very untrue' and 5='very true'. High scores indicate high emotional stability, including positive items such as 'I like to be reckless', 'I take risks', 'I look for danger' and negative items such as 'I know

how to obey the rules', 'I would never make a high-risk investment'. The internal consistency analysis reported a Cronbach Alpha coefficient $\alpha = .78$ (Goldberg, 1999).

Risk behaviors at the wheel. To measure risky driving behaviors, a Romanian-translated version of the F-DBQ (Freight Driving Behavior Questionnaire), a short version of the DBQ (Driving Behavior Questionnaire), adapted to occupational driving conditions and the typical risky driving behaviors of drivers, was used of cargo (Useche et al., 2021). It can be used to assess road traffic violations and errors among long-distance drivers, taking into account specific load conditions (which differ qualitatively from other driver groups), while also having applications in occupational research and road safety. The instrument includes nine items that have demonstrated good fidelity and validity. Item number two was eliminated when evaluating the scale, due to the impossibility of adaptation in Romanian and the cumbersome translation, which would have meant an impediment in applying the questionnaire to the target participants.

Research design

The present study has a cross-sectional, descriptive and correlational design. IBM statistical analysis software was used for data organization and hypothesis testing. SPSS.24 (IBM Corp, 2016) and the medmod module from Jamovi (The jamovi project, 2022).

3. RESULTS

Descriptive statistics

Table 1. *Descriptive statistics*

| | M | SD | α | ADCO | MACO | Anger | RT | RDB |
|-------|-------|-------|----------|-------|-------|-------|-------|-----|
| ADCO | 68.23 | 15.63 | .92 | 1 | | | | |
| MACO | 40.77 | 11.48 | .89 | .47** | 1 | | | |
| Anger | 15.58 | 6.80 | .85 | .21 | .54** | 1 | | |
| RT | 25.98 | 6.87 | .67 | .18 | .41** | .64** | 1 | |
| RDB | 18.10 | 7.60 | .86 | .21 | .60** | .50** | .53** | 1 |

** . $p < .01$, * . $p < .05$.

ADCO – Adaptive coping, DEZCO – Maladaptive coping, RT – Risk taking, RDB – Risky driving behavior

It is observed that the scores obtained by the participants for adaptive coping are relatively high, $M = 68.23$, $SD = 15.63$, and for maladaptive coping they are relatively low, $M = 40.77$, $SD = 11.48$. The level of anger is low, $M = 15.58$, $SD = 6.80$, risk-taking is also at a low level, $M = 25.98$, $SD =$

6.87 , and so is the risky driving behavior $M = 18.10$, $SD = 7.60$.

Skewness and kurtosis are in the range $(-1, 1)$, which reflects a normal data distribution.

Hypotheses testing

H1. *A high level of anger is associated with the manifestation of risky driving behaviors among professional drivers.*

In order to test this hypothesis, a simple linear regression analysis was performed, with anger as the predictor and risky driving behavior as the dependent variable.

Table 2. Simple linear regression analysis for anger, as a predictor for risky driving behavior

| | B | SE | Beta | | |
|-------|-----|-----|------|------|-----|
| Anger | .56 | .11 | .50 | 5.09 | .00 |

Dependent variable : risky driving behavior

 $R^2 = .25$

Anger is responsible for 25% of the variation in risky driving behavior, the regression equation being statistically significant, $F(1, 80) = 25.93$. Anger is strongly and significantly positively associated with the manifestation of risky driving behaviors, $\beta = .56$, $p < .01$.

Considering this result, we can affirm that hypothesis H1 is supported by the analyzed data.

H2. A high level of risk-taking is associated with the manifestation of risky driving behaviors among professional drivers.

In order to test this hypothesis, a simple linear regression analysis was performed, with risk-taking as the predictor and risk-taking driving behavior as the dependent variable.

Table 3. Simple linear regression analysis for risk taking as a predictor for risky driving behavior

| | B | SE | Beta | | |
|-------|-----|-----|------|------|------|
| Anger | .59 | .11 | .53 | 5.57 | .000 |

Dependent variable : risky driving behavior

 $R^2 = .28$

Risk taking is responsible for 28% of the variation in risky driving behavior, the regression equation being statistically significant, $F(1, 80) = 31.04$. Risk taking is strongly and significantly positively associated with risky driving behavior, $\beta = .53$, $p < .01$.

Considering this result, we can say that hypothesis H2 is supported by the analyzed data.

H3. Coping strategies moderate the relationship between anger and risky driving behaviors among professional drivers.

H3a. Adaptive coping strategies moderate the relationship between risky driving behaviors among professional drivers.

H3b. Maladaptive coping strategies moderate the relationship between risky driving behaviors among professional drivers.

In order to test this hypothesis, two moderation analyzes were performed, with the level of anger as the predictor, the risk behavior behind the wheel as the dependent variable, and the adaptive and maladaptive coping strategies as the moderating variables.

Table 4. Moderating estimates for adaptive coping in the relationship between anger and risky driving behavior

| | Estimate | SE | 95% CI | | Z | p |
|-------------------------|----------|-----|--------|-------|------|--------|
| | | | Lower | Upper | | |
| Anger | .53 | .11 | .33 | .74 | 5.06 | < .001 |
| Adaptive Coping | .06 | .05 | .03 | .15 | 1.36 | .175 |
| Anger * Adaptive coping | .01 | .01 | .00 | .02 | 1.58 | .115 |

Adaptive coping strategies do not moderate the relationship between anger and risky driving behavior, $\beta = .01$, CI

95%(.00, .02), $z = 1.58$, $p > .05$, which leads us to state that hypothesis H3a is not supported by the analyzed data.

Table 5. *Moderation estimates for maladaptive coping in the relationship between anger and risky driving behavior*

| | Estimate | SE | 95% CI | | Z | p |
|----------------------------|----------|-----|--------|-------|------|--------|
| | | | Lower | Upper | | |
| Anger | .20 | .11 | -.00 | .41 | 1.92 | .055 |
| Maladaptive coping | .28 | .06 | .17 | .40 | 5.05 | < .001 |
| Anger * Maladaptive coping | .01 | .01 | .01 | .03 | 1.94 | .043 |

Table 6. *Mediation estimates for social comparison in the relationship between social media addiction and counterproductive person-oriented work behavior*

| | Estimate | SE | 95% CI | | Z | p |
|-------------|----------|-----|--------|-------|------|--------|
| | | | Lower | Upper | | |
| Medium | .20 | .11 | -.01 | .41 | 1.89 | .058 |
| Low (-1SD) | .05 | .16 | -.27 | .36 | .28 | .780 |
| High (+1SD) | .36 | .10 | .16 | .56 | 3.54 | < .001 |

Maladaptive coping strategies moderate the relationship between anger and risky driving behavior, $\beta = .01$, CI95% (.01, .03), $z = 1.94$, $p < .05$. At low and medium levels of maladaptive coping, the relationship between anger and risky driving behavior remains unchanged, but it intensifies at high levels of maladaptive coping, $\beta = .36$, 95% CI(.16, .56), $z = 3.54$, $p < .01$.

Considering this result, we can say that hypothesis H3b is supported by the analyzed data, in the sense that a high level of anger in interaction with a high level of maladaptive coping is positively associated with risky driving behavior.

H4. *Coping strategies moderate the relationship between risk taking and risky driving behaviors among professional drivers.*

H4a. *Adaptive coping strategies moderate the relationship between risk taking and risky driving behaviors among professional drivers.*

H4b. *Maladaptive coping strategies moderate the relationship between risk taking and risky driving behaviors among professional drivers.*

In order to test this hypothesis, two moderation analyzes were performed, with the level of risk-taking as the predictor, the risk-taking behavior at the wheel as the dependent variable and the moderating variables, alternatively the adaptive and maladaptive coping strategies respectively.

Table 7. *Moderation estimates for maladaptive coping in the relationship between risk taking and risky driving behavior*

| | Estimate | SE | 95% CI | | Z | p |
|-------------------------------|----------|-----|--------|-------|------|--------|
| | | | Lower | Upper | | |
| Risk taking | .57 | .10 | .37 | .77 | 5.63 | < .001 |
| Adaptive coping | .07 | .04 | -.02 | .16 | 1.60 | .110 |
| Risk taking * Adaptive coping | .01 | .01 | -.00 | .03 | 1.87 | .061 |

Adaptive coping strategies do not moderate the relationship between risk taking and risky driving behavior, $\beta = .01$, CI 95%(.00, .03), $z = 1.87$, $p > .05$. Taking this result into account, we can say that hypothesis H4a is not supported by

the analyzed data, in the sense that a high level of risk-taking in interaction with a high level of adaptive coping is not positively associated with the manifestation of risky driving behaviors.

Table 7. Moderation estimates for maladaptive coping in the relationship between risk taking and risky driving behavior

| | Estimate | SE | 95% CI | | Z | p |
|----------------------------------|----------|-----|--------|-------|------|--------|
| | | | Lower | Upper | | |
| Risk taking | .37 | .09 | .19 | .55 | 4.06 | < .001 |
| Maladaptive coping | .27 | .05 | .17 | .38 | 5.08 | < .001 |
| Risk taking * Maladaptive coping | .01 | .01 | -.00 | .03 | 1.72 | .086 |

Maladaptive coping strategies do not moderate the relationship between risk taking and risky driving behavior, $\beta = .01$, CI 95%(-.00, .03), $z = 1.72$, $p > .05$. Taking this result into account, we can say that hypothesis H4b is not

supported by the analyzed data, in the sense that a high level of risk-taking in interaction with a high level of maladaptive coping is not positively associated with risky driving behavior.

4. DISCUSSION

The main goal of the present study was to explore the moderating role of coping strategies in the relationship between anger and risky driving behaviors. First, the study looked at the relationship between anger and, respectively, risk-taking and risky driving behaviors. Then, the moderating role of coping mechanisms (adaptive and maladaptive) was analyzed in the relationship between anger and risky driving behaviors and, respectively, between risk taking and risky driving behaviors. A total of 81 female and male professional drivers participated in the study, who, in the descriptive analysis of the data, obtained relatively high scores for adaptive coping, relatively low scores for maladaptive coping and low scores for the variables anger, risk-taking and respectively risk behind the wheel. In the first hypothesis of the study, it is stated that a high level of anger is associated with the manifestation of risky driving behaviors among professional drivers. This hypothesis is confirmed by performing a simple linear regression analysis, with anger not only strongly and significantly associated with risky driving behaviors, but also explaining 25% of the total variation in risky driving behavior. A possible explanation why anger is responsible for such a significant percentage of the variation of the dependent variable in this case can be represented by the multitude of factors of a road nature that can lead to the manifestation of aggression in this context, such as the high level of frustration reached following the impossibility of reaching a goal, either because of circumstances or because of other people, a theory conceptualized in Dollard et al., 1939. This later manifests itself in expressed aggression towards other traffic participants (Zhang & Chan, 2016). The primary goals set in traffic, that of arrival and that of safety (Roidl et al., 2013a), are often blocked due to environmental, human or situational factors, thus promoting the experience of anger and

frustration through the manifestation of aggressive behaviors much more significantly and exacerbated on other road users compared to other non-road contexts (Lawton & Nutter, 2002).

The second hypothesis emphasizes that risk-taking is positively associated with the manifestation of risky driving behaviors. The results of the study indicate that the relationship between the two is positive, strong and significant, and that risk-taking explains 28% of the total variation in risky driving behaviors, which leads us to state that the above hypothesis is confirmed. The concept of risk-taking was studied in this paper from the point of view of risk-taking as a trait that shapes risk-taking behavior to then involve risk-taking behavior itself. Like anger, risk taking not only explains a significant percentage of the variance in risk behaviors, but is positively associated with them; this similarity may be based on the theory of inconsistent manifestation in different life situations (Nicholson et al., 2005). Just as drivers are more inclined to display their anger visibly, outwardly and outrageously due to the protection and anonymity afforded by the vehicle from other road users (Ellison-Potter et al., 2001), the road context is equally a space in which the predilection for sensation seeking (Zuckerman et al., 1964) and the underestimation of the risk-loss ratio are freely manifested when the perfect combination of situational factors and individual perceptual characteristics regarding threat and opportunity occurs (Hollenbeck et al., 1994). Distorted perception of these two components applied in the road context may involve a high number of intentional impulsive decisions, compulsive thrill-seeking at the wheel and participation in risky activities that may involve errors and distractions and may lead to accidents or serious injuries to the driver or of other traffic participants (Hu et al., 2021).

The third hypothesis involves the moderating role of coping mechanisms in the relationship between anger and risky driving behaviors, and it is partially confirmed as follows: adaptive coping mechanisms do not moderate the relationship between anger and risky driving behaviors, which leads us to state that hypothesis H3a is not confirmed; maladaptive coping mechanisms, on the other hand, moderate the relationship between the two variables, which remains unchanged at lower and medium values of this type of coping and intensifies at higher values – this fact leads us to state that hypothesis H3b is confirmed. We find in the literature examples of studies in which similar results are suggested, such as Dariotis and Chen (2020), where adaptive, positive coping strategies do not significantly impact risky driving behaviors, but maladaptive ones do. It would seem that negative coping mechanisms have a greater influence on risk behaviors compared to positive ones, a possible explanation for this being that positive strategies are over-promoted and publicized both in the therapeutic and online environments (Haggerty et al. 1996, Kraag et al. 2006), thus coming to represent a common, repetitive factor, internalized as usual and implicit, ignored at a subconscious level, thus losing its methodological significance through the theory of deficit (applied on a social level as well as in the economic one): the value of an object or service increases in relation to its unavailability (De Bruijn & Antonides, 2021, Lynn, 1991). The high level of maladaptive and dysfunctional coping strategies, which also include avoidance, denial, intrusion of repetitive negative thoughts or rumination (Suhr and Nesbit, 2013), is often rather a latent element of the visible personal and social plan, being the first thing which surfaces in situations triggering impulses and behaviors with negative (risky) valence, in the absence of an active awareness of the problematic situation and its effective management from a psychological point of view.

The fourth and final hypothesis involves the moderating role of coping strategies in the relationship between risk taking and risky driving behaviors. This is also divided into two other sub-hypotheses, related to both adaptive (H4a) and maladaptive (H4b) mechanisms, but which, however, following the statistical analysis, are not confirmed and we can state that the two types of mechanisms do not in any way moderate the relationship between risk taking and risky driving behaviors. A possible explanation for this result would be that coping mechanisms, both positive (such as awareness and active problem solving) and negative (avoidance, denial, rumination, self- and/or other-blame) represent, depending on the valence they acquire, current, short-term problem management strategies, as also emerges from Holton et al., 2016, a study that involves the examination of adaptive and maladaptive strategies in relation to the health and stress of employees in the organizational environment. On the other hand, the concept

of risk taking studied as a trait implies the externalization of individual differences already formed, existing and manifested in a manifest predilection as part of the personality. This problem seems to be rather instinctual, based on biological mechanisms (Maples-Keller et al., 2016), the search for good sensations, experimentation, impulsivity and disinhibition rather being associated with high levels obtained on the openness and extraversion scales, these marking the general predisposition towards taking risks (Nicholson et al., 2005). Therefore, we conclude that personality traits and implicitly the type of temperament (Lauriola & Weller, 2018) can have a great influence in decision-making characterized by a finality marked by risk-taking, lack of control, ignoring possible losses and social norms. External, tangible experiences are expected to guide and motivate an individual with high extraversion scores (Sadi et al., 2011) towards the formation of risky driving behaviors as his focus is oriented towards triggers in the external environment rather than what happens internally, such as, in the present case, internal regulation through coping mechanisms.

Practical implications of the study

The implications of the present study will be discussed from an industrial-organizational point of view since one of the objectives of his enterprise, in addition to establishing association and moderation relationships, was to analyze both the risky behaviors at work and the coping mechanisms of professional drivers and to implement possible ways to improve safety, emotional regulation in the assigned task and awareness of the existence of risks in the organizational environment. Observing the presence and the role of risky driving behaviors among a company's drivers can be the first step in developing an intervention procedure to prevent accidents at work, but also the safety of personnel in traffic. Such an intervention could require, from the point of view of the employee-company fit, the analysis in selection and recruitment of personality structures and implicitly, of the predispositions manifested in behaviors. Thus, if the company's culture implies a visible inclination towards risk-taking, then it can benefit from hiring personnel with values and characteristics in accordance, thus synchronizing the personality types with the profiles suited to the situational demands for specific roles. Otherwise, this type of analysis can inform employers in advance about the traits of individuals that, in the face of various social-psychological factors, can predict certain responses, such as: the manifestation of deviant behaviors by the compulsive search for sensations at the wheel, by experiencing the loss control in the face of road challenges and by making impulsive decisions in crisis situations. Therefore, the intervention developed through the analysis aimed at the response to stimuli depending on the characteristic predispositions can be carried out with informative and preventive purposes.

As for the actual intervention on emotional regulation in order to reduce risky behaviors, it can aim to manage anger and aggressive manifestations for each individual driver before they end up producing risky behaviors at work. This can be done, referring to the study results, by actively trying to decrease maladaptive coping mechanisms, instead of superficially promoting adaptive mechanisms, since these do not moderate the relationship between anger and risky driving behavior. Reducing the negative mechanisms associated with the high level of anger at the wheel can be tried through organizational therapy sessions once or twice a week, depending on the case, in which the cultivation of the concept of mindfulness through meditation, cognitive restructuring, minimizing frequency of negative thoughts, distracting attention to the present moment (to replace impulse control), and learning compassion for self and other traffic participants. Thus, risk management within the company can be promoted by identifying possible road threats, evaluating the factors associated with them and controlling them within the therapeutic procedures implemented at the workplace. The organizational climate can include all these procedures, which it can integrate depending on what the company's management considers appropriate for the current problematic situation.

Limitations and future directions

The present study, in addition to the important implications it brings, presents certain limitations that should be taken into account in the interpretation of the results. For starters, age and length of service values vary quite a bit. In a future study, risky driving behaviors could be analyzed by severity and degree of manifestation among employees of the same age category for more specificity. Moreover, the study does not report the association of the female or male gender of the participants with any of the predictors or the dependent variable under study. In the future, its moderating role on the relationship between anger and risk-taking on one hand and risk-taking behaviors on the other can be investigated.

Second, the influence on risk behaviors of only two factors was considered: state anger and trait risk taking. Future studies may deepen the influence of other social, psychological, situational or demographic factors related to risk behaviors in traffic. Additionally, the role of coping

strategies was investigated as a moderator of the relationship between anger/risk-taking and risky driving behaviors. In future studies, we propose that it should also be tested as a mediator. Also, the relationship between coping mechanisms, both adaptive and maladaptive, and risky driving behaviors could represent a general point of departure for future investigations aimed at deepening the determinants, predisposing factors and causes of this type of behavior in traffic.

Third, in the research, the subscales specific to coping mechanisms were divided into adaptive and maladaptive, thus receiving positive and negative valences. As a future direction, one can investigate the role of each of the nine subscales of coping mechanisms (self-blame, acceptance, rumination, positive refocus, planning refocus, positive reappraisal, perspective-taking, catastrophizing, other-blame) in relation to anger, and respectively risk-taking on one hand and risky driving behaviors on the other.

Conclusions

The present study primarily aimed to examine the role of coping strategies in the relationship between anger and risk behaviors. The objectives aimed to establish the relationship between anger and risk-taking, on one hand, and risk-taking behaviors at the wheel, on the other hand, and to establish the role of coping mechanisms in the relationship between anger and risk-taking, on one hand, and risk-taking behaviors behind the wheel, on the other hand. The results indicate that anger and risk-taking are positively and significantly associated with the manifestation of risky driving behaviors and that they explain 25 and respectively 28% of its variation. Also, maladaptive coping mechanisms have a moderating role on the relationship between anger and risky driving behaviors, but not on the relationship between risk taking and risky driving behaviors. Adaptive coping mechanisms have no moderating role on any of the relationships. The findings of this study have both research and practical implications for public safety and for the workplace, where aberrant traffic behaviors continue to be a serious threat, increasing the risk of traffic accidents and serious injuries. Next, the need for intervention programs and treatment strategies in the organizational field was found. Future directions regarding the investigation of specific groups and the influence of various factors on risky driving behaviors are outlined in this study..

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