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The perceived effectiveness of penalties in traffic offender and non-offender groups: the role of the Dark Triad and Behavior Inhibition/Activation Systems

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ABSTRACT: Although the number of studies about the perception of traffic enforcement has increased, the importance of personality characteristics on these perceptions remain under-researched. Thus, this study aimed to investigate the relationship between the Dark Triad personality trait and the perceived effectiveness of traffic penalties for traffic offenders and non-offenders and to test whether BIS and BAS mediate this relationship. A convenience sample of 694 Lithuanian drivers participated in the study (55.3 percent males; aged 18-73 years). More than half (57.9 percent) of the drivers were non-offenders, while 42.1 percent reported having been sanctioned for at least one traffic offence in the last year. A scale containing ten specific sanctions for traffic offences was developed to measure the perceived effectiveness of traffic penalties. In addition, the Dirty Dozen and BIS/BAS scales were included in the questionnaire, together with a number of demographic questions. There was a weak negative correlation between the Dark Triad personality trait and the perceived effectiveness of traffic penalties. Non-offenders scored lower than traffic offenders on the BIS scale, but the perceived effectiveness of traffic penalties, the Dark Triad personality trait and the BAS scores did not differ between traffic offenders and non-offenders. The mediation analysis showed that BAS mediated the positive relationship between the Dark Triad personality trait and the perceived effectiveness of traffic penalties. However, BIS did not mediate this relationship. Therefore, the present study revealed two opposite mechanisms regarding the relationship the Dark Triad personality trait has with the perception of penalty effectiveness: a direct negative path and an indirect positive path via higher BAS.

KEYWORDS: Dark Triad; traffic penalties; perceived effectiveness; BIS/BAS

1. INTRODUCTION

Perceived justice and the effectiveness of regulation measures on undesirable behaviors in society are related to the willingness to comply with the rules (Barkworth & Murphy, 2015; Bowers & Robinson, 2012). Therefore, it is expected that people will adhere more strictly to the traffic rules if they perceive the potential sanctions to be adequate and equal for every traffic user (Varet et al., 2021). The perceived legitimacy of safety regulations and sanctions has received increasing attention from scholars (Varet et al., 2021), but the effectiveness of traffic penalties remains an unresearched topic (Castillo-Manzano & Castro-Nuño, 2012; Castillo-Manzano et al., 2010; Du Plessis, Hartig, Jansen & Siebrits, 2020). Deterrence theory deals with the perception of punishment, and assumes that traffic penalties should serve as deterrent when they have three characteristics: certainty, severity, and celerity of punishment (Nagin, 2013). Nevertheless, these three factors provide little understanding about how traffic users, especially drivers, evaluate punishments for traffic violations.

There are several studies which have researched drivers' perceptions about the effectiveness of traffic safety regulations. For example, Alonso Plá, Esteban Martínez, Calatayud Miñana & Egido Portela (2015) found that 97 percent of participants thought that speeding should be punished, and 90 percent thought that the speeding penalty should involve both monetary fines and license suspension. Furthermore, Alonso, Esteban, Montoro and Useche (2017) found that 65.9 percent of drivers perceived police supervision to be poor, while only 5.5 percent considered it to be excessive. Almost half of the respondents believed that the main purpose of traffic penalties was tax collection, while more than 60 percent of respondents believed traffic penalties had an educational purpose (Alonso et al., 2017). Conversely, a group of traffic offenders reported the main purpose of traffic penalties to be punishment (Alonso et al., 2017). However, surprisingly none of these studies investigated whether personality characteristics affected drivers' perceptions of traffic enforcement.

Personality (e.g., traits, beliefs, motives, etc.) has an effect on how a person perceives their surroundings, as well as how they behave. Previous research has reported the Dark Triad personality trait to be related to the justification of aberrant behaviors, as well as risk-favorable attitudes and judgements (Moore, Ross & Brosius, 2020). The Dark Triad personality trait (composed of narcissism, Machiavellianism, and psychopathy) is characterized by low rates of conscientiousness, a sense of entitlement and perceived superiority, as well as high rates of impulsivity, risky behavior, overconfidence, and manipulation (Crysel, Tully & Egan, 2013; Jones & Paulhus, 2011; Paulhus & Williams, 2002; Suchanek, 2021; Vazire & Funder, 2006). Previous research has frequently found that men score higher on the Dark Triad personality trait (or "dark" personality") than women (e.g., Mertens, von Krause, Denk & Heitz, 2021; Muris, Merckelbach, Otgaar & Meijer, 2017). Furthermore, previous research has shown the Dark Triad personality trait to be related to criminal behavior (Pechorro, Curtis, DeLisi, Maroco, & Nunes, 2022), aggressive behavior (e.g., verbal, physical; Pailing, Boom & Egan, 2014), aggressive driving (Burtăverde, Chraif, Aniței, & Mihăilă, 2016; Ball, Tully & Egan, 2018; Monteiro, de Holanda Coelho, Hanel, Pimentel & Gouveia (2018), risk taking attitudes towards traffic safety and risky driving (Endriulaitienė et al., 2018;

Monteiro et al., 2018), dangerous behavior in traffic, negative emotions and cognitions in traffic (Monteiro et al., 2018), and involvement in corruption (Zhao, Zhang & Xu, 2016). Although, the Dark Triad personality trait has been associated with different types of driving behaviors and attitudes, much less is known about how drivers high in this trait perceive traffic safety legislation and traffic safety enforcement. More specifically, there has been no research on the relationship the Dark Triad personality trait has with the perceived effectiveness of traffic penalties.

Deterrence theory proposes that any offender considers the costs and benefits of an offence before deciding whether or not to engage in the illegal activity (Pratt, Cullen, Blevins, Daigle & Madensen 2017). In addition, the Dark Triad personality trait predicts and affects an individuals' irrational and unrealistic beliefs. For example, according to Zhao et al. (2016) that the Dark Triad personality trait was related to a belief in good luck. It could be proposed that Dark Triad personality predicts perceived lower chances for any kind of punishment, including traffic penalties. A belief in good luck and the expectation of avoiding punishment may affect how a person perceives penalties (i.e., traffic penalties), but this relationship has not yet been tested.

Neria, Vizcaino and Jones (2016) suggested investigating the behavioral motivations of "dark" personalities, instead of focusing on only one personality trait. In addition, Jonason & Jackson (2016) pointed out that studying individual differences in behavioral activation and inhibition could help us to understand the Dark Triad personality trait and to explain gender differences in "dark" personalities. Previous research has shown that the Dark Triad personality trait is related to Behavioral activation and Behavioral inhibition systems (Jonason & Jackson, 2016; Neria et al., 2016; Stenason & Vernon, 2016; Włodarska, Zyskowska, Terebus & Rogoza, 2021). Thus, it is worth investigating the effect of those two related personality dimensions ("dark" personality and approach and avoidance motivation) on drivers' attitudes and behaviors.

The Behavior Activation System (BAS) and Behavior Inhibition System (BIS) are well-researched neurobiological systems that are used to describe how behavior (e.g., driving behavior) and emotion are controlled (Franken, Muris & Rassin, 2005; Franken & Muris, 2006). As Gray (1990) states, BAS is an appetitive "go" motivation that is activated by stimuli associated with reward or the omission/termination of punishment and results in the stimulation of behavior (Constantinou, Panayiotou, Konstantinou, Loutsiou-Ladd & Kapardis, 2011; Franken & Muris, 2006; Torrubia, Avila, Moltó & Caseras, 2001), as well as impulsive and risky behavior (Constantinou et al., 2011; Harbeck & Glendon, 2013; Scott-Parker & Weston, 2017; Voigt et al., 2009). In contrast, BIS is sensitive to punishment or the potential termination of rewards, and results in the termination of behavior (Constantinou et al., 2011; Franken & Muris, 2006; Torrubia et al., 2001) and lower involvement in risky behavior (Voigt et al., 2009; Harbeck & Glendon, 2013; Scott-Parker & Weston, 2017). However, it is not yet known how BAS and BIS are related to the perception of penalties, especially in the traffic enforcement context. To our knowledge, only two studies have evaluated this relationship. For example, Kaye, White and Lewis (2013) found that sensitivity to reward and punishment influenced the cognitive processing of road safety messages. In addition, Beullens, Rhodes & Eggermont (2016) reported that a positive attitude towards joyriding was positively related to BAS and negatively related to BIS.

2. CURRENT STUDY

This is the first known study to evaluate the relationship between the Dark Triad personality trait and the perceived effectiveness of traffic penalties. The results of this study will allow a better understanding of the way people perceive traffic penalties and whether several personality traits affect this assessment. In addition, this research will investigate whether BIS and BAS mediate and/or help to explain the relationship between the Dark Triad personality trait and the perceived effectiveness of traffic penalties among traffic offenders and non-offenders. As personality, in this case the Dark Triad personality, is thought to have an indirect effect on behavior, or other outcome variables such as attitudes and perceptions towards social groups and events (Jonason & Jackson, 2016; Stenason & Vernon, 2016), it is important to look for more proximal antecedents that better explain how people evaluate their surroundings.

As the Dark Triad personality trait is related to risky behavior and a belief in good luck, it is hypothesised that the Dark Triad personality trait will be related to a lower perceived effectiveness of traffic penalties. When a person with high Dark Triad personality acts in a risky or impulsive manner, they believe that they will not be punished and can get away with it, suggesting that any kind of punishment will be ineffective against them.

Hypothesis 1: The Dark Triad personality trait predicts a lower perceived effectiveness of traffic penalties.

People with high behavioral inhibitions may be more aware of the consequences of breaking the law and are thus less prone to engage in risky behavior, while drivers high on behavioral activation may be more likely to commit driving violations due to the pursuit of a goal and impulsive behaviors, which are also characteristics of the Dark Triad personality trait (Harbeck & Glendon, 2013; Scott-Parker, & Weston, 2017). Castellà & Pérez (2004) found that traffic offenders were higher in BAS and lower in BIS than non-offenders. In addition, Rogier, Roberti, Garofalo & Velotti (2021) found that offenders tended to score more highly on measures of the Dark Triad personality trait than non-offenders.

Hypothesis 2: Traffic offenders will report higher levels of BAS and the Dark Triad personality trait, than non-offenders, but lower levels of BIS.

The behavioral pattern associated with the Dark Triad personality can be partially explained by its association with BIS/BAS, as people with a Dark Triad personality have low BIS and high BAS scores, meaning they tend to seek pleasure and rewards (Sellbom & Glenn, 2015). In a recent meta-analysis, Włodarska et al. (2021) stated that there was convincing evidence that BAS was more strongly related to the Dark Triad personality trait than BIS. Therefore, BIS and BAS might be treated as more proximal variables than the Dark Triad personality trait when explaining the evaluation of punishment effectiveness. Previous research also found that BIS and BAS were separately related to the perceived effectiveness of anti-speeding messages: BIS was positively correlated with the acceptance of physical loss-framed messages, whereas BAS was positively associated with the acceptance of social gain-framed messages (Kaye et al., 2013). Therefore, based on previous research it can be hypothesized that BIS and BAS will act as mediators in the relationship between the "dark" personality and the perceived effectiveness of traffic penalties.

Hypothesis 3: Both BIS and BAS will mediate the relationship the Dark Triad personality trait has with the perceived effectiveness of traffic penalties.

3. METHODS

3.1 Participants

A total sample of 694 (n=384 males) Lithuanian drivers participated in the study. More than half (57.9 percent, n=402) of the drivers reported having had no traffic penalties over the past year, and thus were classified as non-offenders. The remaining 42.1 percent (n=292) reported either a monetary fine over the last year or having had their driving license suspended at least once in their driving career, and this group were called the offenders group. A Chi -Squared test revealed that there were significantly less females, than males, who reported traffic penalties ($\chi 2(2) = 45.45$, $p < .001$). Participants` ranged from 18 to 73 years old (M=32.60, SD=12.53) and had a mean driving experience of 12.49 years (SD=11.40). Males had significant more years of driving experience than females (Mmale=15.10, Mfemale=9.26, $t(680.91) = 7.12$, $p < .001$) and the majority of participants (n=443) drove every day.

3.2 Measures

The perceived effectiveness of traffic penalties were measured using a questionnaire that was developed for this research, using the procedure described by Rosenbloom and Shahar (2007). Participants were asked to evaluate the effectiveness of the penalties for ten traffic offenses (see Table 1) using a 5-point Likert scale (from 1 = totally ineffective to 5 = totally effective). Exploratory factor analysis with oblique rotations (Promax) produced two correlated factors (KMO = .841, Barlett`s Test of Sphericity: $\chi 2(45) = 3630.25$, $p < .001$). However, the second factor was very weak and was only composed of items with large cross loadings. Thus, a one factor solution with factor loadings ranging from .59 to .79 was chosen for further analysis. The single factor explained 49.52 percent of the variance and had an alpha coefficient of .88. A higher score indicated a higher perceived effectiveness, meaning a stronger agreement that the penalties for these traffic offences were effective at improving road safety.

The Dark Triad personality trait was measured using the Dirty Dozen (DD) scale (Jonason & Webster, 2010). The DD is a 12-item scale developed to measure the overall Dark Triad personality trait and its three subscales measure Machiavellianism, sub-clinical narcissism, and sub-clinical psychopathy. Participants rated each statement from 1 (strongly disagree) to 7 (strongly agree), with higher scores indicating higher levels of the Dark Triad personality trait. The overall Dirty Dozen score has been used previously (e.g., Carter et al., 2015; Czarna et al., 2016; Dragostinov & Mõttus, 2022; Jonason et al., 2009), and was used in the present study. The alpha coefficient for the DD in this study was .87.

Behavioral inhibition and Behavioral activation were measured using the 24-tem BIS/BAS scale (Carver & White, 1994). Participants rated each statement on a four point Likert scale, which ranged from 1 (strongly disagree) to 4 (strongly agree). Higher scores indicated higher levels of BIS and BAS. The combined BAS score was used, as several authors have found the three subscales to be highly intercorrelated (e.g., Jorm et al., 1998; Li et al., 2014; Quilty & Oakman, 2004). The alpha coefficients for the BIS and BAS scales were .74 and .79, respectively.

3.3 Procedures

The research used self-reported data and a cross-sectional design. The majority of the drivers (n=617) participated in the survey online, and were invited using various social media channels (e.g., LinkedIn, Facebook, ResearchGate) or through university emails. In addition, 77 drivers were invited to participate in the study during training for traffic offenders' sessions at several different driving schools. All drivers participated in the study on a voluntary basis, and no incentives were provided. The study plan was approved by the Institutional Review Board (permission No. EKL-2021.01).

3.4 Data analysis

All statistical analyses were performed using SPSS 21.0 and AMOS. As all items were approximately normally distributed (the range of skewness and kurtosis for all scales was from -1 to 1), parametric statistics were used. Mean comparisons were performed using t-tests, while Pearson correlations were used to test the relationships between the Dark Triad personality trait, BIS, BAS, and the perceived effectiveness of traffic penalties. Finally, structural equation modelling (mediation analysis) was used to explore the direct and indirect path between the Dark Triad personality trait and the perceived effectiveness of traffic penalties through BIS and BAS. Mediation significance was tested using the bootstrapping (95% CI; n=5000) method. The indicators of a good fit were: $\chi 2$ p-value> 0.05; Comparative fit index (CFI) ≥0.95; and Root mean square error of approximation (RMSEA) <0.06 (Schreiber et al., 2006).

4. RESULTS

The means, standard deviations, and bivariate correlations of the study variables are presented in Table 2. Table 2 shows that the Dark Triad personality trait was positively related to BAS and was negatively related to the perceived effectiveness of traffic penalties. The perceived effectiveness of traffic penalties was only positively related to BAS.

Table 3 presents the sex differences for the Dark Triad personality trait, BIS/BAS and the perceived effectiveness of traffic penalties. This shows that females scored significantly higher than men on both BIS and BAS.

Traffic violation	Penalty
DUI of alcohol when BAC is less than 1.5	Monetary fine from 800 to 1000 EUR and license suspension from 12 to 18 months
DUI of alcohol when BAC is 1.51 and more	Monetary fine from 579 to 868 EUR and license suspension from 24 to 36 months or 10-30 days of arrest
Driving 11-30 KPH above speed limit	Monetary fine from 12 to 90 EUR
Driving 31-50 KPH above speed limit	Monetary fine from 120 to 230 EUR
Driving 51 KPH or more above speed limit	Monetary fine from 450 to 550 EUR and license suspension from 1 to 6 months
Using cell phone without free-hand equipment	Monetary fine from 60 to 90 EUR and/or license suspension from 1 to 3 months
Dangerous overtaking violating the rules	Monetary fine from 170 to 230 EUR and/or license suspension from 3 to 6 months
Reckless driving	Monetary fine from 450 to 550 EUR and/or license suspension from 12 to 24 months
Seatbelt non-use (driver, or passenger, or child)	Monetary fine from 30 to 50 EUR
Ignoring and disobeying different road signs	Monetary fine from 30 to 90 EUR and/or license suspension from 1 to 3 months

Table 1. The traffic offences measured and their penalties.

	Mean (SD)	1.	2.	3.
1. Dark Triad personality	3.07 (1.13)			
2. BIS	2.92 (.56)	-.03		
3. BAS	2.88 (.42)	.29*	.18*	
4. The perceived effectiveness of traffic penalties	3.02 (.73)	-.11*	.05	.11*

* $p < .01$;

Table 2. Means, standard deviations, and correlation coefficients between the Dark Triad personality trait and BIS/BAS.

	Mean (SD)		*t*	*d*
	Male (n=384)	Female (n=309)		
1. Dark Triad personality	3.10	3.03	.75	.05
2. BIS	2.76	3.11	-8.54*	-.66
3. BAS	2.81	2.96	-4.43*	-.34
4. The perceived effectiveness of traffic penalties	3.04	3.00	.72	.03

* $p < .001$

Table 3. Sex differences for the Dark Triad personality trait, BIS/BAS, and the perceived effectiveness of traffic penalties

Comparisons were made between offenders and non-offenders (see Table 4). Table 4 shows that there were no significant differences between traffic offenders and non-offenders for the Dark Triad personality trait, BAS, or the perceived effectiveness of traffic penalties. The only significant difference was that drivers who reported no traffic penalties during past year scored higher on the BIS scale than those in the offenders group. Therefore, hypothesis 2 was only partially confirmed, since only the BIS was significantly different.

	Mean (SD)		*t*	*d*
	Non-offenders (n=402)	Offenders (n=292)		
1. Dark Triad personality	3.06	3.10	-.45	-.03
2. BIS	2.99	2.82	3.87**	.13
3. BAS	2.87	2.88	-.31	-.02
4. The perceived effectiveness of traffic penalties	2.98	3.07	-1.57	-.06

* $p < .001$

Table 4. Differences between traffic offenders and non-offenders for the Dark Triad personality trait and BIS/BAS.

Firstly, the mediation analysis in the traffic non-offenders group revealed that the model was a bad fit and modifications were needed ($\chi2(1) = 19.40$; $p < .001$; CFI = .54; RMSEA = .21). A similar result was found in the traffic offenders group ($\chi2(1) = 10.95$; $p < .001$; CFI = .86; RMSEA = .19). The same modification indices were recommended for improving model fit. After allowing covariance between residuals (see Fig. 1 and Fig. 2), the results revealed model saturation for both traffic offenders and non-offenders ($\chi2(0) = .00$; CFI = 1.00).

The results show that the Dark Triad personality trait predicts lower perceived effectiveness of traffic penalties, but only in the traffic offenders groups. Therefore, hypothesis 1 was only partially confirmed, as the same result was not found in the non-offenders group. Furthermore, the Dark Triad personality trait predicted higher BAS scores in both groups and BAS predicted higher perceived effectiveness of traffic penalties, meaning that the mediation process was significant in both groups. The overall results suggests that BAS mediates the relationship between the Dark Triad personality trait and the perceived effectiveness of traffic penalties.

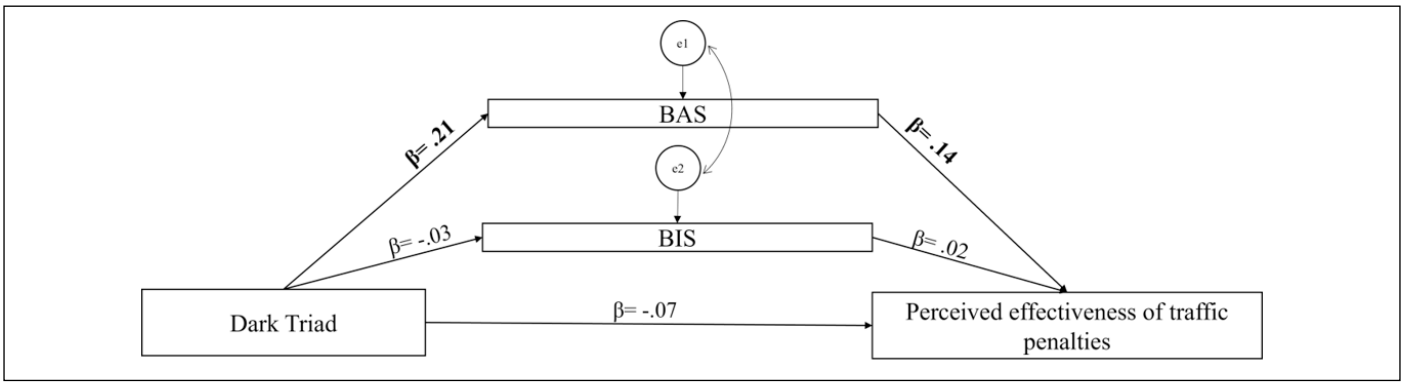

Figure 1. Mediation analysis results for non-offenders.
***Note*: Bold scores represent statistically significant results.**

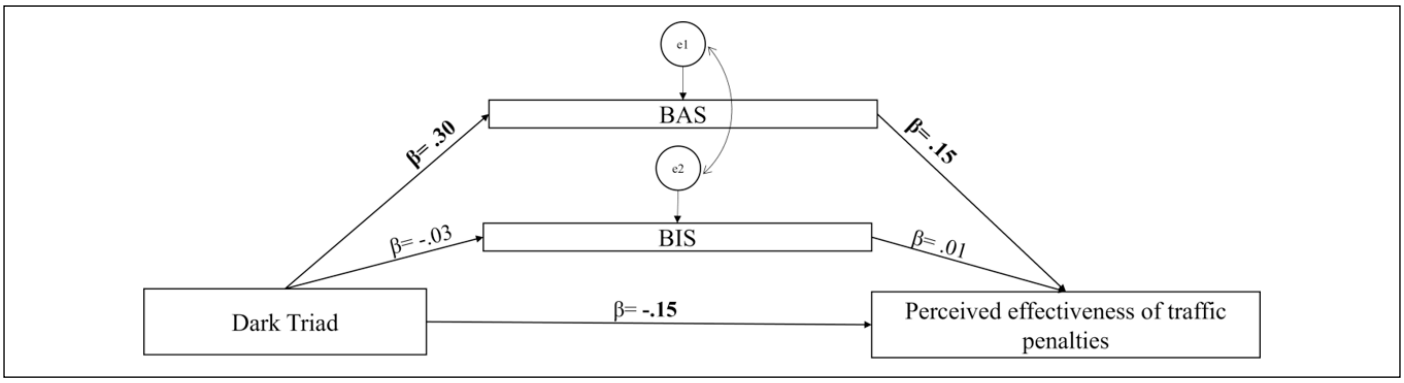

Figure 2. Mediation analysis results for offenders.
***Note*: Bold scores represent statistically significant results.**

Hypothesis 3 was only partially confirmed, since BIS did not mediate the relationship. The path between the Dark Triad personality trait and the perceived effectiveness of traffic penalties in the non-offenders group was only indirect (.03; 95% CI [.01; .06]) and positive. However, the path between the Dark Triad personality trait and the perceived effectiveness of traffic penalties in the offenders group was both direct (-.14; 95% CI [-.20; -.07]) and indirect (.07; 95% CI [.01; .13]), but inconsistent mediation was found (total effect -.10; 95% CI [-.16; -.03]). Inconsistent mediation refers to a mediation model in which one mediated effect has a different sign to the other effect (O'Rourke & MacKinnon, 2018). In this case, the direct effect between the Dark Triad personality trait and the perceived effectiveness of traffic penalties was negative while the indirect effect was positive. Finally, BIS did not mediate the relationship between the Dark Triad personality trait and the perceived effectiveness of traffic penalties.

5. DISCUSSION

The main aim of this study was to analyze the relationship the Dark Triad personality trait has with the perceived effectiveness of traffic penalties. Furthermore, mediation analyses were performed to test whether behavioral inhibition and behavioral activation mediate the relationship between the Dark Triad personality trait and the perceived effectiveness of traffic penalties separately for traffic offenders and non-offenders.

The present study showed that the Dark Triad personality trait was negatively related to the perceived effectiveness of traffic penalties, which confirmed the first hypothesis. It has been suggested that people with higher levels of the Dark Triad personality trait lack of empathy, concern for others` safety, have reduced motivation for justice, and do not respond to potential punishments (Douglass et al., 2023; Glenn & Raine, 2009). However, the relationship found here between the Dark Triad personality trait and the perceived effectiveness of traffic penalties was weak. This may be because the Dark Triad personality trait has a larger influence on how people behave, rather than on how people think, judge and evaluate situations (Moore et al., 2020). In addition, since the "dark" personality is highly manipulative (Walker, Double, Birney & MacCann, 2022; Włodarska et al., 2021) and aims to create a good impression, they tend to "adjust" their thoughts and attitudes to suit the audience. According to Doerfler et al. (2021), the Dark Triad personality trait is related to a weaker and more uncertain sense of self which may result in vague and less self-aware attitudes and perceptions. Studies have found that the Dark Triad personality trait has mostly weak and negative relationships with attitudes toward prosocial behavior (e.g., Pitiruț et al., 2022; Atitsogbe et al., 2020). Furthermore, participants were asked to respond to the provided statements from a general perspective – assessing the effectiveness of traffic penalties for all people and not just for themselves as a driver. It can be assumed that answering from a general perspective decreased the personal relevance of the situations and diminished the expression of the "dark" personality. Future research should use the personal perspective, which should enrich our understanding of attitudes towards safety enforcement.

There were no significant sex differences in the perceived effectiveness of traffic penalties, which is similar to previous findings (e.g., Castellà & Pérez, 2004; Truelove et al., 2022). The absence of gender differences are likely because the safety enforcements measured in this study did not include gender–specific situations and/or measures. Unexpectedly, men did not report higher levels of the Dark Triad personality trait, although previous studies have often found men to score more highly than women (e.g., Jonason et al., 2009). However, not all studies have found men to be higher in the "dark" personality than women, with several even finding the opposite (e.g., Jonason et al., 2020; Luo et al., 2022). Jonason et al. (2020) explains the lack of gender differences in the "dark" personality as being due to societal changes and higher gender equality in the countries studied. Finally, the BIS and BAS were compared between men and women, with women scoring higher on both. Although previous studies have reported that women score higher on BIS (Ma-Kellams & Wu, 2020), the results for BAS have been inconsistent (Jorm et al., 1998; Jung et al., 2022; Li et al., 2014; van der Linden, Taris, Beckers, & Kindt, 2007; Wright et al., 2009). Perhaps the inconsistent gender differences indicate that the relationship is culture or country specific.

The present study found that traffic non-offenders had higher BIS scores than offenders. Higher levels of BIS indicate that an individual will behave less riskily, will follow rules, and avoid punishments (Castellà & Pérez 2004), which leads to a lack of traffic penalties. There were no other differences found between traffic offenders and non-offenders. The results of the present study differ from previous studies which found that traffic offenders scored higher in the BAS (Castellà & Pérez 2004) and the Dark Triad personality trait (Rogier et al., 2021). Moreover, the perceived effectiveness of traffic penalties did not differ between offender and non-offender groups. The hypothesis that offenders would perceive traffic penalties to be ineffective was intuitive, since no previous studies had addressed this issue. However, it is not clear how participants made a decision when evaluating the effectiveness of traffic penalties. The general effectiveness of traffic enforcement for road safety was assessed, so participants' previous experience of traffic offences may not influence this judgment. Furthermore, this group of traffic offenders were not homogenous, ranging from those who had one penalty in the last year to those who had had their driving license suspended at some point due to committing a serious offence. It could be suggested that those who had one penalty over the last year may be more similar to non-offenders. Moreover, participants were not asked if they had violated traffic rules, only if they had been punished for any type of traffic offence. Thus, it is possible that participants in the non-offender group had also violated traffic rules, but they had not been caught by the police.

The relationship between the Dark Triad personality trait and the perceived effectiveness of traffic penalties was tested in both groups (i.e., traffic offenders and non-offenders). The analysis showed that BIS did not mediate the relationship between the Dark Triad personality trait and the perceived effectiveness of traffic penalties in either group. In contrast, BAS was found to mediate this relationship, which is an interesting finding. Perhaps those high in the Dark Triad personality trait have the tendency to be manipulative, seek to be praised, attempt to create a good impression about themselves, and are sensitive to reward (Jonason et al., 2009; Walker et al., 2022; Włodarska et al., 2021). Therefore, people higher in the Dark Triad personality trait and with a high sensitivity to potential rewards (high BAS) might be keen to meet researchers` expectations that traffic penalties are in fact effective. A second explanation for this relationship is that people high in the Dark Triad personality trait are cynical, lack remorse, or concern with morality, and feel motivated to harm others (Jonason & Webster, 2012; Jonason et al., 2009), meaning that they might positively evaluate any kind of punishment for others.

The research has several limitations, such as the use of self-reported instruments and having a cross-sectional study design. In addition, we did not control for social desirability bias, which might be particularly important here since those with the "dark" personality are inclined to use manipula-

tion to get what they want and are more inclined to tell the researchers what they think they want to hear, rather than what they actually believe (Walker et al., 2022; Włodarska et al., 2021). Furthermore, as the individual Dark Triad traits (narcissism, Machiavellianism, and psychopathy) have slightly different relationships with BIS and BAS, future research should repeat same analyses undertaken in the present study, but using the three traits separately (Neria et al., 2016). In addition, the use of a convenience sampling approach might have resulted in self-selection bias. As already stated above, the two groups of drivers (offenders and non-offenders) were not homogeneous in terms of traffic offences and the experience of punishment. Thus, future analyses should consider a more diverse analysis of the effect of receiving and avoiding punishment for traffic offences. Future research should investigate whether traffic penalties (e.g., a monetary fine) actually change drivers' behavior. In addition, future research should also test this cause and effect relationship while statistically controlling for the Dark Triad and BIS/BAS.

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