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Associations of the Light Triad with Driving Style and Driving Anger Expression

PINAR BIÇAKSIZ[a], BURCU TEKEŞ[b]

a. Hacettepe University, Department of Psychology, 06800, Ankara, Turkey
b. Başkent University, Department of Psychology, 06790, Ankara, Turkey

ABSTRACT: Previous research on personality in the driving context mostly focused on the negative and maladaptive personality traits. The present study investigated the links between the Light Triad traits with driving style and driving anger expression. The Light Triad framework emphasizes the positive side of the personality and it consists of humanism, faith in humanity, and Kantianism. A total of 376 active drivers (50.3 % women) aged between 18 and 70 completed the online questionnaire including the Light Triad Scale (Kaufman et al., 2019), Driver Behavior Questionnaire (DBQ; Reason et al., 1990), and Driving Anger Expression Inventory (DAX, Deffenbacher et al., 2002). Ordinary violations, aggressive violations, and positive driver behaviors subscales of the DBQ were used to measure driving style, and the DAX was used to measure the aggressive and adaptive/constructive forms of driving anger expression. Hierarchical multiple regression analyses were conducted to examine the associations of the Light Triad traits with each driving style and driving anger expression dimension after controlling for age, gender, and total mileage. The findings generally supported the expected associations. That is, some traits of the Light Triad yielded negative associations with aberrant driver behaviors and aggressive forms of driving anger. On the other hand, the opposite pattern was found in the analyses with positive driver behaviors and adaptive/constructive expression of driving anger. The findings are discussed in the light of relevant literature.

KEYWORDS: Light Triad; Driving Style; Driving Anger Expression

1. INTRODUCTION

Road traffic crashes are the first leading cause of death among those in 5-29 age group (WHO, 2018), and estimated to become the fifth leading cause of global death among all age groups by 2030 (WHO, 2008). These figures indicate the significance of road traffic crashes as a pressing public health matter, and the need for models and research pertaining to the causes of this issue. As Elander et al. (1993) notes, the models attempting to explain road traffic crashes without stable traits can explain only less than 10 % of the variance in crashes. Therefore, the role of personality in driving has long been investigated. One of the basic premises of studying the links between personality traits and driving style is to improve road safety by determining the drivers who might benefit from specific interventions that target risky behaviors in the driving context.

The human factor in road safety is examined in two broad categories, namely *driving performance* and *driving style* (Näätänen & Summala, 1976; Reason et al., 1990). Driving performance is also called *driving skills* (Evans, 1991), and it entails the information processing and motor skills in the driving context (Elander et al., 1993). Driving style, on the other hand, involves the behaviors that the driver chooses to display while driving (Evans, 1996), such as speed choice, or traffic rule violations. After the process of learning how to drive is complete, driving style is a much stronger predictor of crash involvement than driving skills (Evans, 1996; Lajunen, 1997). Driving style, also called driver behavior (Evans, 1991), is related to drivers' attitudes, motivation, and habits; and therefore, influenced by personality (Elander et al., 1993). In the current study, a new framework of personality, namely the Light Triad, will be examined in the driving context. There is a body of research of the Dark Triad traits in traffic psychology literature, while that of the Light Triad, to the authors' knowledge, is lacking. Therefore, the present study aims to contribute to the literature investigating personality in the driving context by examining the associations of this newly developed personality framework with driving outcomes.

In addition to driving style, driving anger expression is examined in the current study as another diving outcome variable. Angry and aggressive drivers pose significant risks for both themselves and other road users sharing the same traffic environment with them (Deffenbacher, 2016). Aggressive expression of driving anger is found to be associated with variables that increase the risk of crash involvement such as losing concentration while driving, loss of vehicular control, and close calls (Sullman et al., 2013); and self-reported risky behaviors while driving, such as speeding 20+ miles an hour over the speed limit and running a red light (Deffenbacher et al., 2002). These findings indicate that aggressive driving is an important threat to road safety. The majority of research investigating the antecedents of driving aggression studied demographic variables, and personality by using the Big Five model (Burtăverde et al., 2016). In the present study, the Light Triad traits are examined as predictors of driving anger expression in addition to driving style.

The Light Triad traits proposed by Kaufman et al. (2019) are theoretically opposed to The Dark Triad traits, a relatively new personality framework widely examined in applied psychology research. The Dark Triad framework consists of three related personality traits, namely narcissism, subclinical psychopathy, and Machiavellianism (Paulhus & Williams, 2002). Narcissism entails extreme levels of self-focus and effort to attract attention, low levels of empathy, and abusive tendencies in interpersonal relationships (Jakobwitz & Egan, 2006). The defining features of psychopathy are low levels of empathy and anxiety, combined with high levels of impulsivity and sensation seeking (Paulhus & Williams, 2002). Machiavellianism can be defined as being manipulative and having

a strategic and callous orientation (Jones & Paulhus, 2014). These three traits involve a "socially malevolent character" with self-promotion and aggressive tendencies to varying degrees (Paulhus & Williams, 2002, p. 557). Due to their common antisocial nature, The Dark Triad traits predict general risk-taking behavior (Malesza & Ostaszewski, 2016); as well as risky or aggressive behaviors in the driving context (Ball et al., 2018; Endriulaitienė et al., 2018; Münstermann et al., 2022; Sümer et al., 2019).

On the other hand, the Light Triad framework pointed the positive side of the personality. The Light Triad framework consists of humanism, faith in humanity, and Kantianism. In their definition, humanism involves valuing every single individual's worth and dignity; faith in humanity entails believing that humans are essentially good; and Kantianism refers to treating people not as a means to an end, but always an end to themselves. In this sense, this facet serves as a contrast to the Machiavellianism facet of the Dark Triad. This label was chosen for this construct because this facet is based on Immanuel Kant's categorical imperative (Kaufman et al., 2019).

Kaufman et al. (2019) proposed the Light Triad framework as an attempt to integrate the positive side of personality with the dark side of it, since both reside in human nature, but have been studied separately. These researchers also developed the Light Triad Scale. The item content of this scale was generated by contrasting the common core of the Dark Triad traits. That is, the items of the Light Triad reflect the opposite interpersonal orientation of the Dark Triad, but not simply the reverse-coded versions. In other words, the items were constructed by trying to answer the following question: "...what would an everyday loving and beneficent orientation toward others look like that is in direct contrast to the everyday antagonistic orientation of those scoring high on dark traits?" (Kaufman et al., 2019, p. 467).

Although the links between personality constructs and driver behaviors have widely been investigated, the study of Light Triad in the driving context is missing. The aim of the current study is to examine the associations of the Light Triad with driving anger expression and driving style as an attempt to contribute to addressing this missing link in the literature. In the scale development study mentioned above (Kaufman et al., 2019), the Light Triad total score was negatively correlated with both proactive and reactive aggression. Therefore, a similar pattern in the driving context is expected. More specifically, negative associations of the Light Triad facets with aggressive expression of driving anger; and positive associations of the Light Triad facets with adaptive/constructive expression of driving anger are expected. In addition, the Light Triad facets are expected to be negatively related to aggressive violations, since this driver behavior dimension involves an interpersonal aggressive component. Finally, a positive relationship between the Light Triad and positive driver behaviors is expected, because positive driver behaviors involve a motive to care for other drivers sharing the immediate traffic environment.

Examining the role of personality on driver-related outcomes is not a new area of study. Sensation seeking (Zhang et al., 2019), impulsivity (Bıçaksız & Özkan, 2016), normlessness (Steinbakk et al., 2019), locus of control (Totkova, 2020) and many other personality variables were applied in traffic settings and significant relationships have been reported (Bowen et al., 2020). However, the effect of positive psychological constructs on driver behaviors is relatively new. New perspectives on preventive health are reflected in the science of positive psychology by targeting a higher well-being, happiness and the optimal version of self. Thus, there is a growing literature on positive constructs and how to improve them. Therefore, it is important to understand these constructs, and their nomothetic network in order to utilize these variables to contribute to safe driving and eventually a safer traffic system.

2. METHOD

2.1 Participants and Procedure

Convenience sampling with snowball technique was used in the present study. After the approval of Başkent University (Ankara, Turkey) Ethical Committee was obtained, the online survey link along with the eligibility criteria were posted on social media accounts of people who volunteered to help distribute the survey. In addition, these volunteers sent the survey link and the eligibility criteria as text messages to their contact lists. The eligibility criteria were to hold a valid driver's license and driving at least twice a week. Initially, 515 individuals filled out the online questionnaire, but the responses of 113 of them were excluded due to not meeting the eligibility criteria. Then, among the remaining 402 participants, responses of 26 of them were also excluded from the final data because of not completing all of the scales in the questionnaire. Therefore, the final sample of this study consisted of 376 participants (50.3 % women) aged between 18 and 70, with a mean age of 35.43 (SD = 13.12). The participants reported that they have been driving for an average of 14.56 years (SD = 11.86) with an average mileage of 673012.01 km (SD = 7910853.88).

2.2 Instruments

2.2.1 Demographic and Driver Information Form.

In this section of the online survey, age, gender, number of years having a driver license and total mileage information were gathered.

2.2.2 Light Triad Scale.

The 12-item Light Triad Scale was developed by Kaufman et al. (2019), and adapted to Turkish by Tekeş and Bıçaksız (2021). The scale involves three subscales consisting of four items each; namely humanism, faith in humanity and Kantianism. The items require responding on a 5-point Likert scale (1=strongly disagree; 5= strongly agree) and higher scores on each subscale indicate higher levels of the given trait. Cronbach's Alpha coefficients in the present study were .58 for humanism subscale, .64 for faith in humanity subscale, and .49 for Kantianism subscale.

2.2.3 Driver Behavior Questionnaire Short Version (Mini DBQ).

The short version of the DBQ was developed by Martinussen et al. (2013) based on the original DBQ (Reason et al., 1990). The Turkish validation of the DBQ was conducted by Sümer and Özkan (2002) with a professional driver sample and Lajunen and Özkan (2004) in a non-professional driver sample. The 9-item Mini DBQ consists of three subscales, namely lapses, errors, and ordinary violations, each including three items. In the current study, only 3-item ordinary violations subscale was used along with the three items measuring aggressive violations from the original DBQ (Lajunen et al., 1998). The scale items require responding on a 6-point frequency scale (0= never; 5= always) and higher scores indicate higher frequency of the given behavior. The Cronbach's Alpha coefficients in the current study were .60 for ordinary violations, and .70 for aggressive violations.

2.2.4 Positive Driver Behavior Questionnaire (+DBQ).

The 14-item positive driver behaviors scale was developed by Özkan and Lajunen (2005) in order to measure intentional driver behaviors to take care of other road users and the im-

mediate traffic environment. Positive DBQ has a unidimensional structure and is frequently used as an addition to the DBQ. The items of the scale require responding on a 6-point frequency scale (0= never; 5= always) consistent with the DBQ. The Cronbach's Alpha coefficient for the scale was found to be .83 in the present study.

2.2.5 Driving Anger Expression Scale (DAX).

Deffenbacher and colleagues (2002) developed this scale to measure the degree to which individuals express their anger while driving in four different ways. The Turkish adaptation study of the original scale was conducted by Eşiyok, Yasak and Korkusuz (2007). The scale consists of four subscales corresponding to four different ways of expressing driving anger. The scale items involve responding on a 4-point frequency scale (1= almost never; 4=almost always) and higher scores indicate higher frequency of the given behavior. The Cronbach's Alpha internal consistency values in the present study were .86 for verbally aggressive expression subscale, .71 for personal physical aggressive expression subscale, .80 for use of vehicle to express anger subscale, and .91 for adaptive/constructive expression subscale.

2.3 Statistical Analysis

Statistical Package for Social Sciences (SPSS; IBM Inc.) software were used to carry out all of the analyses in the current study. First, the study variables were computed by taking the mean of the scores on items included in the subscale used to measure the variable at hand (see Section 2.2. Instruments). Responses to the three demographic questions (age, gender, and total mileage) were used as scores on these variables. Then, the data were examined in terms of the assumptions of multivariate analysis (i.e., normality of variables, linear relationships between variables, and absence of multicollinearity) prior to analyses.

Hierarchical multiple regression analyses were carried out to examine the associations of the Light Triad factors with driver behaviors and driving anger expression. A total of seven different regression models were tested: by using each of the three driving style variables (i.e., ordinary violations, aggressive violations, and positive driver behaviors), and each of the four driving anger expression variables (i.e., verbal aggressive expression, personal physical aggressive expression, use of vehicle to express anger, and adaptive/constructive expression) as the dependent variable (DV). In each of these seven hierarchical regression analyses, demographic variables (i.e., age, gender, and total mileage) were entered in the first step as control variables; the three Light Triad variables were entered in the second step to examine their strength of association with the corresponding DV in the analysis after controlling for the variance accounted for by the demographic variables.

3. RESULTS

3.1. Descriptives

The descriptive statistics of the study variables are presented in Table 1 and the bivariate correlations are presented in Table 2.

3.2. Hierarchical Regression Analyses: Predicting Driving Style

A series of hierarchical multiple regression analyses were carried out to examine the variance in driving style accounted for by the Light Triad after controlling for age, gender, and total mileage. The findings of these three separate analyses are presented in Table 3.

In the first analysis, ordinary violations subscale score was used as the dependent variable (DV) and the Light Triad traits were entered as the predictors in the second step after controlling for age, gender and total mileage in the first step. The Light Triad traits entered in the second step did not make a significant contribution to the amount of variance explained in ordinary violations. Second, the analyses were conducted by using aggressive violations subscale score as the DV. Again, the Light Triad traits entered in the second step did not make a significant improvement in the explained variance, but Kantianism yielded a significant negative association with aggressive violations (β = -.12, p = .038). Third, positive driver behaviors subscale score was entered as the DV. The Light Triad traits entered in the second step increased the amount of explained variance significantly (R^2_{change} = .09, p < .001). Humanism (β = .24, p < .001) and Kantianism (β = .12, p = .029) were found to be significantly positively related to positive driver behaviors.

3.3. Hierarchical Regression Analyses: Predicting Driving Anger Expression

A series of hierarchical multiple regression analyses were carried out to examine the variance in each of the driving anger expression dimensions accounted for by the Light Triad after controlling for age, gender, and total mileage. The findings of these four separate analyses are presented in Table 4.

The first analysis was conducted by entering the verbal aggressive expression subscale score as the DV. The Light Triad traits explained a significant amount of variance (R^2_{change} = .03, p = .018) and faith in humanity was negatively related to verbal aggressive expression (β = -.17, p = .003). In the following two separate analyses with personal physical aggressive expression subscale and use of vehicle to express anger subscale scores as the DVs, the Light Triad traits entered in the second step did not explain a significant amount variance. In the final analysis with adaptive/constructive expression subscale score as the DV, the Light Triad traits made a significant contribution to the explained variance (R^2_{change} = .10, p < .001). Humanism (β = .20, p = .001) and

	Mean	Median	Mode	SD	Minimum	Maximum	Scale Range
Humanism	3.72	3.75	3.75	0.62	1.50	5.00	1 to 5
Faith in humanity	3.41	3.50	3.25	0.71	1.25	5.00	1 to 5
Kantianism	3.74	3.75	4.00	0.67	1.50	5.00	1 to 5
Ordinary violations	1.98	1.67	1.00	0.85	1.00	5.33	1 to 6
Aggressive violations	2.08	2.00	2.00	0.86	1.00	6.00	1 to 6
Positive driver behaviors	4.67	4.79	4.79	0.72	1.00	5.93	1 to 6
Verbal aggressive expression	2.16	2.13	1.75	0.59	1.00	4.00	1 to 4
Personal physical aggressive expression	1.44	1.40	1.30	0.30	1.00	3.80	1 to 4
Use of vehicle to express anger	1.37	1.27	1.18	0.32	1.00	3.82	1 to 4
Adaptive/constructive expression	2.79	2.87	2.93	0.60	1.00	3.93	1 to 4

Table 1. Descriptive statistics of the study variables.

Kantianism (β = .21, p < .001) yielded significant positive associations with adaptive/constructive expression.

4. DISCUSSION

In the present study, the predicting role of the Light Triad traits on driving style and driving anger expression was examined after controlling for age, gender and total mileage.

First, none of the Light Triad traits yielded significant associations with ordinary violations dimension of driving style, while Kantianism yielded a significant negative association with aggressive violations. Kantianism is related to valuing others in a moral way, without any concern of self-interest (Kaufman et al. 2019). Therefore, this finding can be explained by the negative association of empathy and other-oriented prosocial behaviors with aggressive behaviors (Eisenberg

		1	2	3	4	5	6	8	9	10	11	12	13
1	Age	1											
2	Gender	.175**	1										
3	Total mileage	.119*	-.038	1									
4	Humanism	.070	-.113*	-.011	1								
5	Faith in humanity	.088	-.125*	-.008	.368**	1							
6	Kantianism	.175**	-.133*	.047	.396**	.297**	1						
7	Ordinary violations	-.156**	.261**	.022	-.099	-.083	-.172**	1					
8	Aggressive violations	-.128*	.128*	-.021	-.054	-.065	-.156**	.510**	1				
9	Positive driver behaviors	.145**	-.006	.029	.287**	.102*	.228**	-.072	-.117*	1			
10	Verbal aggressive expression	-.046	.045	.026	-.034	-.170**	-.080	.300**	.591**	-.023	1		
11	Personal physical aggressive expression	.063	.145**	.002	.016	-.036	-.005	.399**	.660**	-.033	.700**	1	
12	Use of vehicle to express anger	-.019	.208**	-.036	-.066	-.033	-.088	.576**	.602**	-.157**	.454**	.608**	1
13	Adaptive/constructive expression	.055	-.161**	-.008	.286**	.126*	.301**	-.322**	-.323**	.384**	-.250**	-.229**	-.298**

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).
Note. Gender was coded as 1=women, 2=men.

Table 2. Correlations between the study variables.

	DV: Ordinary Violations				DV: Aggressive Violations				DV: Positive Driver Behaviors			
	R^2	ΔR^2	*Beta*	*p*	R^2	ΔR^2	*Beta*	*p*	R^2	ΔR^2	*Beta*	*p*
Step 1: Control Variables	.113	.113		.000	.040	.040		.002	.022	.022		.046
Age			-.215	.000			-.156	.004			.149	.006
Gender			.301	.000			.155	.003			-.031	.556
Total Mileage			.059	.243			.003	.954			.010	.855
Step 2: Light Triad	.124	.010		.249	.053	.013		.189	.111	.089		.000
Faith in Humanity			.005	.924			-.007	.897			-.032	.560
Humanism			-.016	.776			.021	.720			.244	.000
Kantianism			-.098	.080			-.121	.038			.124	.029

Table 3. Results of the hierarchical regression analyses predicting driving style.

	DV: Verbal Aggressive Expression				DV: Personal Physical Aggressive Expression				DV: Use of Vehicle to Express Anger				DV: Adaptive/Constructive Expression			
	R^2	ΔR^2	*Beta*	*p*	R^2	ΔR^2	*Beta*	*p*	R^2	ΔR^2	*Beta*	*p*	R^2	ΔR^2	*Beta*	*p*
Step 1: Control Variables	.006	.006		.527	.022	.022		.044	.047	.047		.001	.034	.034		.006
Age			-.060	.270			.038	.475			-.055	.303			.089	.094
Gender			.057	.289			.138	.010			.217	.000			-.178	.001
Total Mileage			.035	.512			.003	.962			-.022	.680			-.026	.625
Step 2: Light Triad	.034	.028		.018	.025	.002		.857	.050	.003		.745	.138	.104		.000
Faith in Humanity			-.169	.003			-.038	.508			.021	.707			-.027	.623
Humanism			.051	.393			.043	.472			-.029	.617			.196	.001
Kantianism			-.041	.492			.001	.986			-.046	.434			.211	.000

Table 4. Results of the hierarchical regression analyses predicting driving anger expression.

et al., 2010). In addition, we believe that this difference in the patterns of associations with ordinary and aggressive violations might be explained by the nature of the ordinary violations. Ordinary violations can be exemplified as close-following, speeding or risky overtaking. These behaviors can be considered as 'instrumental', since they have practical concerns such as a desire to save time, with no aggressive component. On the other hand, aggressive violations are related to the violation of generally accepted social norms and involve interpersonal aggression with an affective component (Guého et al., 2014).

Second, humanism and Kantianism were found to be significantly positively related to positive driver behaviors. As stated in the Introduction section, humanism involves valuing every single individual's worth and dignity; whereas Kantianism refers to treating people not as a means to an end, but always an end to themselves. Present relationships are consistent with the expectations, since positive driver behaviors involve caring for other road users and the traffic environment, and a kindness component (Özkan & Lajunen, 2005). However, the association between faith in humanity and positive driver behaviors was not significant. It can be asserted that a belief that humans are essentially good (i.e. faith in humanity) might be too general for the driving context and therefore might not be manifested in behaviors displayed in traffic per se.

Third, faith in humanity (i.e. believing that humans are essentially good) was negatively associated with verbal aggressive expression. Based on the limited number of research in the literature faith in humanity is positively related to agreeableness (i.e. traits like warmth, courtesy, and cooperativeness [Goldberg, 1992]) emotionality (i.e. traits like being sensitive, anxious, fearless and independent [Ashton et al., 2014]), honesty-humility (i.e. traits like sincerity, fairness, greed avoidance, and modesty [Ashton et al., 2014]), and extraversion (i.e. acting and being extraverted [McCabe & Fleeson, 2012]) and negatively related to disintegration (i.e., a proneness to psychosis [Lazarević et al., 2016]) (Lukic & Zivanovic, 2021). Considering the negative associations between HEXACO (i.e., personality characteristics defined as Honesty-humility, Emotionality, eXtraversion, Agreeableness, Consciousness, Openness to experiences) and aggression, this finding is consistent with the expectations (Knight et al., 2018).

Finally, humanism and Kantianism yielded significant positive associations with adaptive/constructive anger expression of driving anger. This finding is consistent with the previous findings on the positive driver behaviors of the present study. Similarly, it can be stated that these constructs (i.e., humanism and Kantianism) are related to other positive constructs such as HEXACO dimensions mentioned above (Lukić & Živanović, 2021). Additionally, light triad is related to kindness, love, forgiveness, appreciation, and gratitude (Kaufman et al., 2019). All in all, it can be concluded that it is consistent with the expectations to find a link between adaptive/constructive expression of driving anger and humanism and Kantianism, since these constructs points a similar direction related to human nature.

The present study has some limitations involving the design and data collection procedure, such as cross-sectional nature and self-report measurement. Future studies of the associations between these personality traits and driving style might consider utilizing objective driving related data such as police records, or driver behaviors measured on a high-fidelity driving simulator or an instrumented vehicle. Another limitation of the current study involves the low internal consistency coefficients (*Cronbach's Alpha*) of the Light Triad Scale. However, since the number of items is one of the two factors affecting this coefficient (Murphy & Davidshofer, 2005), the very small number of items in each subscale of the Light Triad Scale might explain these findings.

The current study examined the Light Triad personality framework in the driving context. The findings were generally in line with the expectations. These findings, however, should be considered as preliminary, since the current study constitutes the first attempt to investigate this framework in the driving context. Therefore, we hope this study elicits further studies examining the positive side of human personality in the driving context. It should be stated that discussing research examining the impact of personality in the traffic environment is not an easy task. Traffic is an active system and it requires an applied perspective. Nevertheless, traffic psychology has recognized personality as an important factor in driver behavior for a long time (i.e. *since* Tillman & Hobbes, 1949). New perspectives on preventive health are reflected in the science of positive psychology by targeting happiness and optimal functioning of individuals. The aim is to define positive characteristics, understand their nature, and change them in a positive yet balanced way. Positive psychology is a scientific and applied approach to improve well being on macro, group and individual levels (Ackerman, 2018). There is a huge body of literature suggesting that (i) a shift on our perspective's in a positive and balanced way is possible and (ii) this kind of change can actually make a difference in our lives and also in other's lives as well (e.g. Fowler & Christakis, 2008; Layous et al., 2012; Titova and Sheldon, 2022). Tillman and Hobbes (1949) explained this phenomenon almost 75 years ago: "*a man drives how he lives*". Therefore, investigating positive psychological personality constructs and their associations with driver behaviors could contribute to eliciting behavioral change toward safer or risk free driving styles.

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