A comparison of the relationship between individual values and aggressive driving in five countries

Gizem Fındık[a], Bilgesu Kaçan[a,b], Gaye Solmazer[a,c], Özlem Ersan[a],
Yeşim Üzümcüoğlu Zihni[a,d], Derya Azık[a], Türker Özkan[a], Timo Lajunen[e],
Bahar Öz[a], Anton Pashkevich[f], Maria Pashkevich[f], Vassiliki Danelli-Mylona[g],
Dimitra Georgogianni[g], Ema Berisha Krasniqi[h], Muhamed Krasniqi[h],
Evangelos Makris[g], Ksenia Shubenkova[i], and Gentianë Xheladini[h]

[a]Safety Research Unit, Department of Psychology, Middle East Technical University, Ankara,
Turkey; [b]Department of Psychology, Necmettin Erbakan University, Konya, Turkey; [c]Department
of Psychology, İzmir Bakırçay University, İzmir, Turkey; [d]Department of Psychology, TOBB
University of Economics and Technology, Ankara, Turkey; [e]Department of Psychology, Norwegian
University of Science and Technology, Trondheim, Norway; [f]Department of Mechanical and
Industrial Engineering, Tallinn University of Technology, Tallinn, Estonia; [g]R.S.I. Road Safety
Institute 'Panos Mylonas', Athens, Greece; [h]Kosovo Association of Motorization, Kosovo, UK;
[i]Department of Transport Systems Service, Kazan Federal University, Kazan', Russian Federation

ABSTRACT

Values are supposed to transcend specific situations and contexts. A country-independent relationship is expected between individual values and aggressive driving. The purpose of this novel study was to investigate the relationship between individual values and aggressive driving. The data were collected from five countries, namely, Estonia, Greece, Kosovo, Russia, and Turkey. The number of participants was 124 in Estonian, 272 in Greek, 107 in Kosovar, 132 in Russian, and 87 in Turkish samples. Participants filled out a demographic information form, Driver Anger Indicators Scale, and Short-Schwartz's Value Survey. Results of hierarchical regression analyses showed that values are related to aggressive driving (i.e., aggressive warnings, hostile aggression and revenge) of self and not to perceived aggressive behaviours of others. Value types were not related to aggressive driving, whereas higher-order values were. Conservation was negatively associated with aggressive warnings of self in the Greek sample, and self-transcendence was negatively associated with hostile aggression and revenge of self in Turkish as well as Greek samples. Social focus was negatively and personal focus was positively associated with both types of aggressive driving in the Greek sample. Social focus was also negatively associated with hostile aggression and revenge in the Russian sample. Growth anxiety-free was negatively associated with hostile aggression and revenge of self in Russian and Turkish samples. The relationships between values and aggressive driving (of self) were not country-independent for the five countries, even though the lack of significant relationships between values and aggressive driving (of others) were country-independent.

CONTACT Gizem Fındık ✉ fgizem@metu.edu.tr ⊙ Safety Research Unit, Department of Psychology, Middle East Technical University, 06800, Ankara, Turkey.

1. Introduction

1.1. Driving aggression

Driving aggression can be defined as any type of intentional driver behaviour aiming to injure or harm another road user physically or psychologically (Lajunen, Parker, & Stradling, 1998). Previous studies showed that aggressive driving practices pose a serious threat against road safety. For instance, Mesken, Lajunen, and Summala (2002) reported that increased frequency of committing interpersonal (aggressive) violations resulted in increased odds ratio of involvement in passive accidents and obtaining various types of fines (i.e., speeding, parking, and other). Hassan (2016) showed that aggressive violations were the most significant factor explaining at-fault accidents. Similarly, Özkan, Lajunen, Chliaoutakis, Parker, and Summala (2006) reported that each unit increment in the frequency of aggressive violations was associated with a 46% and a 25% increase in accident rates of Finnish and Iranian drivers, respectively. These findings emphasise the potential danger embodied in aggressive driver behaviours in terms of road traffic safety.

Interestingly, Özkan et al. (2010) found that aggressive driving behaviours were related with an increase in accidents exclusively when perceived aggressive driving behaviours of other drivers were high. In a similar vein, Ersan and colleagues (2019) reported that an increase in the perceived aggressive driver behaviours of others moderated the relationship between aggressive driver behaviours of the participants and their aberrant driver behaviours. Lennon and Watson (2015) reported that drivers displayed aggressive driving behaviours more frequently if they believed that other drivers intentionally act aggressively as compared to when their intention was ambiguous. According to Lennon and Watson's results, drivers were angrier and drove more aggressively if their dominant attribution of others' aggressive behaviours was to mistakes as compared to being dangerous and unskilled. Özkan et al. (2006), Özkan et al. (2010), Ersan et al. (2019), and Lennon and Watson (2015) highlight the importance of examining aggressive driving within the context, in other words, in relation to the interaction with drivers who operate in a similar system.

Besides within, a between-context investigation of aggressive driving is fruitful, since the levels of aggressive driving show great variation from country to country. According to Özkan, Lajunen, Parker, Sümer, and Summala (2011), Turkish drivers displayed more aggressive driving than British and Dutch drivers, and these two groups of drivers displayed more aggressive driving than Finnish drivers. Similarly, Warner, Özkan, Lajunen, and Tzamalouka (2011) report that Turkish and Greek drivers commit more aggressive violations than Swedish drivers, who in turn commit more

aggressive violations than Finnish drivers. These findings suggest that the extent of the problem posed by aggressive driving is different across countries. Another study by Stanojević, Sullman, Jovanović, and Stanojević (2018) found that drivers from the north of Kosovo, where traffic enforcement is not undertaken, reported more anger elicited by impeded progress and direct hostility of other drivers, as well as more aggressive driving, compared to drivers from Serbia, where traffic enforcement is undertaken. The region (i.e., Northern Kosovo and Serbia) explained additional variance in aggressive driving after controlling for demographic variables and driving anger, which highlights the level of enforcement, since the two regions bear similar characteristics except for traffic enforcement.

As implied in its definition, driving aggression has a motivational component. Hence, it seems appropriate to discuss these behaviours in relation to the motivational goals that individuals hold, which remain widely unexplored. The current study, therefore, aims to investigate the relationship between the motivational goals of individuals (i.e., individual values) and aggressive driving in samples from five countries differing in their status on aggressive driving and road safety.

1.2. Basic individual values

According to Schwartz and Bilsky (1987), "values are (a) concepts or beliefs, (b) about desirable end states or behaviours, (c) that transcend specific situations, (d) guide selection or evaluation of behaviour and events, and (e) are ordered by relative importance." An earlier version of the theory by Schwartz (1992) suggests that there are ten distinct individual value types, namely, self-direction, stimulation, hedonism, achievement, power, security, conformity, tradition, benevolence, and universalism. Table 1 presents the defining motivational goals of these ten value types. In a more recent and refined conceptualisation of Schwartz's individual values (Schwartz et al., 2012), the value types are depicted around a circular motivational continuum based on the level of compatibility and conflict between them (see Figure 1). Moreover, values are grouped on three different higher-order structures based on two dimensions: one that contrasts values prioritising the interests of the self with values prioritising the interests of other beings and another that contrasts values encouraging people to pursue their interests at the expense of uncertainty with values encouraging people to maintain the status quo to preserve stability.

The first higher-order structure is composed of four values, namely, self-transcendence (ST; i.e., transcending interests of the self for the benefit of others), openness to change (OC; i.e., being receptive to new ideas, actions, experiences, and so on), self-enhancement (SE; i.e., following the interests

Table 1. The ten value types and the corresponding defining motivational goals.

Value type	Defining motivational goal
Self-direction	Thinking and acting autonomously
Stimulation	Experiencing thrill, innovation, and challenge
Hedonism	Seeking pleasurable activities for the self
Achievement	Attaining personal success through competence in relation to social standards
Power	Gaining social status/prestige and supremacy over various resources
Security	Having safe, harmonious, and stable societies, relationships, and selves
Conformity	Constraining tendencies potentially harming for others or violating social expectations
Tradition	Showing respect/being committed to the customs introduced by one's culture
Benevolence	Preserving and maintaining the interests of significant others
Universalism	Showing appreciation and tolerance to and safeguarding the welfare of all beings
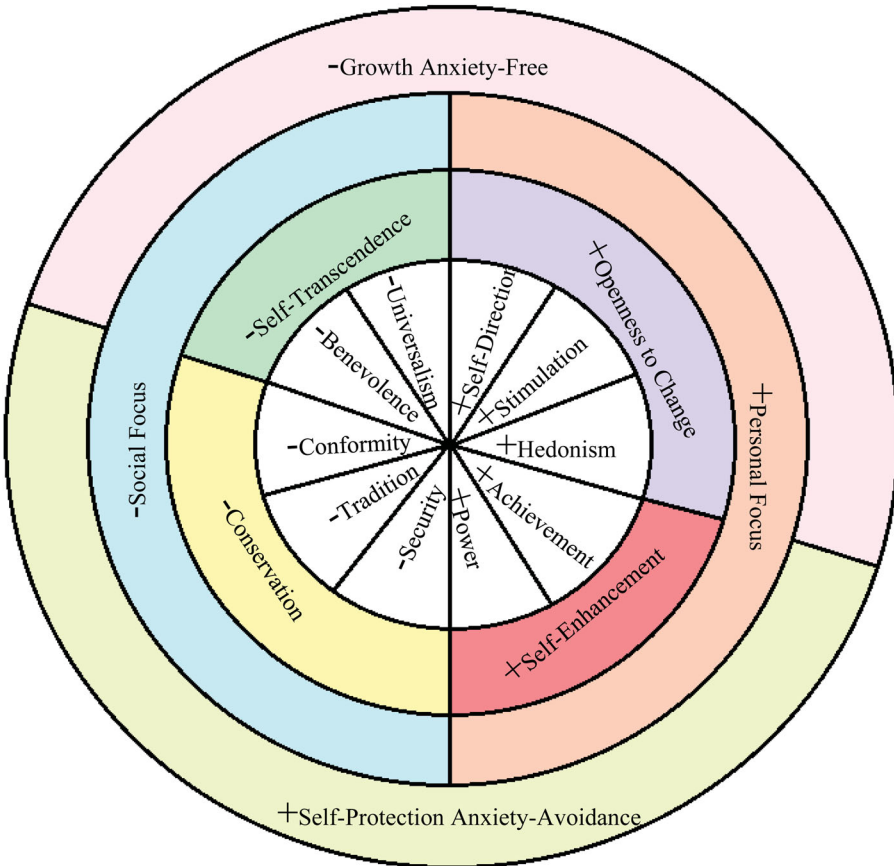
Figure 1. Alignment of the value types around the motivational continuum (Adapted from Schwartz et al., 2012) and the direction of the hypothesised relationships.

of the self), and conservation (C; i.e., restricting the self and avoiding new experiences). The second higher-order structure is composed of social focus (SF; i.e., consequences for other individuals are prioritised over consequences for self) and personal focus (PF; i.e., consequences for self are prioritised over consequences for others). The third higher-order structure is

composed of growth anxiety-free (GAF; i.e., aimed at self-expansion) and self-protection anxiety-avoidance (SPAA; i.e., aimed at self-preservation).

1.3. Individual values and driving context

Not many studies have examined values in a driving context. Kaçan et al. (2019) found that, when clustered based on traffic climate (i.e., external affective demands, functionality, and internal requirements) and individual values (i.e., ST, OC, SE, and C), groups of drivers displayed differences in terms of their aberrant and positive driver behaviours. According to their findings, Russian and Turkish clusters of drivers who perceived the traffic environment as having low internal requirements reported an increased frequency of aberrant and decreased frequency of positive driver behaviours. Kaçan and colleagues point to a possible interaction between traffic climate and values to explain higher aberrant and lower positive driver behaviours. Another study by Reŋge, Austers, and Muzikante (2012) found that SE is positively and C and ST are negatively related to traffic violations, which is in turn positively associated with number of accidents. However, there is no study investigating the relationship between individual values and aggressive driving cross-culturally.

1.4. Aim of this study and expected findings

It should be noted that there are a number of studies in the literature examining the relationship between values on one hand and driver behaviours or fatality rates on the other at the national level (Gaygısız, 2009; 2010; Solmazer, Üzümcüoğlu, & Özkan, 2016; Üzümcüoğlu, Özkan, & Lajunen, 2018); yet, there is a lack of interest in literature in terms of this relationship at the individual level. The current study aims to investigate and compare the nature of the hypothesised relationships between basic individual values and aggressive driving across samples from five countries. The relationship will be examined with the ten value types as well as the three higher-order structures of values. In doing so, we attempt to understand whether the relationship, if any, between individual-level values and aggressive driving is country-independent. The relationship will be investigated for the frequency of both self-reported aggressive driving behaviours of the respondents themselves and their perception of others' aggressive driving behaviours.

We hypothesise that individual values are associated with aggressive driving. The directions of the hypothesised relationships are graphically represented with a (+) sign for positive and (−) sign for negative associations in Figure 1. The hypothesised relationships listed above are expected to be

Table 2. Characteristics of the samples for Estonia, Greece, Kosovo, Russia, and Turkey.

	Age			Annual mileage (kilometres)			Accidents		
	Mean	Standard deviation	Range	Mean	Standard deviation	Range	Mean	Standard deviation	Range
Estonia	47.18	13.65	24-76	14475	10935	15-70000	0.50	0.81	0-4
Greece	42.22	10.23	18-72	21517	50442	150-770000	0.63	0.82	0-3
Kosovo	36.05	11.65	18-72	27379	36357	100-300000	0.82	1.44	0-10
Russia	22.49	6.05	17-50	21543	38245	0-300000	0.67	1.21	0-7
Turkey	27.03	8.16	20-64	7413	8130	10-35000	0.96	1.07	0-4

observed in the same direction in samples from five selected countries (i.e., Estonia, Greece, Kosovo, Russia, and Turkey). We expect the hypothesised relationships to be country-independent, since the value types can be said to exist universally as motivational goals the individual holds, though their relative importance can change from person to person (Schwartz, 1992).

2. Methods

2.1. Selected countries

Although the extent of the road safety issues fluctuates from region to region (Al-Madani, 2019), a country-independent relationship is expected between individual values and aggressive driving. To test this hypothesis, data were collected from five countries varying in their status of road traffic safety, which were Estonia, Greece, Kosovo, Russia, and Turkey. According to the World Health Organization's (2018) report, estimated road traffic fatality rate per 100,000 population in 2016 was 6.1 for Estonia, 9.2 for Greece, 18 for Russia, and 12.3 for Turkey. For Kosovo, Ramadani et al. (2017) reported that the average annual fatality rate per 100,000 population between 2010–2015 was 7.4. Percentage of deaths by road user category is also different in the five countries. According to the World Health Organization's (2018) report, the highest percentage of deaths occur among pedestrians (31%) in Estonia, riders of motorised two- and three-wheelers (32%) in Greece, drivers of four-wheeled cars and light vehicles (32%) in Russia, and other road users (33%) in Turkey. In Kosovo, the highest percentage of deaths occurred among drivers—as compared to passengers and pedestrians—between 2010 and 2015, with the exception of the year 2013, in which the highest percentage of deaths occurred among passengers (Ramadani et al., 2017). As these numbers suggest, the extent and content of road traffic safety problems differ across the five selected countries.

2.2. Participants and procedure

The data were collected from five countries, namely, Estonia, Greece, Kosovo, Russia, and Turkey, in five languages (Estonian, Greek, Albanian,

Russian, and Turkish) as part of a larger research project. The number of participants was 124 (59 females, 65 males) in Estonian, 272 (107 females, 165 males) in Greek, 107 (25 females, 82 males) in Kosovar, 132 (21 females, 111 males) in Russian, and 87 (36 females, 51 males) in Turkish samples. Details regarding participant characteristics can be seen in Table 2. Sizes of the five samples and the characteristics shown in Table 2 suggest that the five study samples are not equivalent. Russian and Turkish samples are comparably younger than the other three samples. Özkan et al. (2010) report that age and aggressive driving are negatively associated in all four samples (i.e., British, Dutch, Finnish, and Turkish) in their study. Because age is a critical factor associated with aggressive driving, differences in the characteristics of the five samples in the current study may have influenced the results. Data and results about the countries are presented in alphabetical order.

The ethical approval for the current study was obtained from the Human Subjects Ethics Committee of Middle East Technical University. Following the ethical approval, data collection started via an online survey platform (www.qualtrics.com). Five different survey links were prepared in five languages and distributed through contacts in corresponding countries. Potential participants were reached through social media, e-mail groups, and so on. All the participants were first presented with an informed consent form, and only those who were willing to participate in the study were able to see the rest of the survey.

2.3. Measures

2.3.1. Demographic information form
Participants were asked several demographic questions in order to gather background information. These questions were about age, sex, annual mileage (kilometres), area of residency, and accident involvement in the last three years.

2.3.2. Driver Anger Indicators Scale (DAIS)
In order to assess the frequency of aggressive behaviours of drivers, DAIS was used. DAIS was developed by T. Lajunen and D. Parker in English and first used by Rämet (2003) in Finnish. It was validated and its norm data were collected for the Turkish sample by Lajunen and Özkan (2004). DAIS was translated from English to Estonian, Greek, Albanian, and Russian for this study. DAIS is composed of 13 items rated on a 5-point Likert-type scale (1 = never, 5 = nearly all the time). In this study, each participant answered all 13 items twice: once indicating how frequently they thought other drivers engaged in the behaviours mentioned in the items (i.e.,
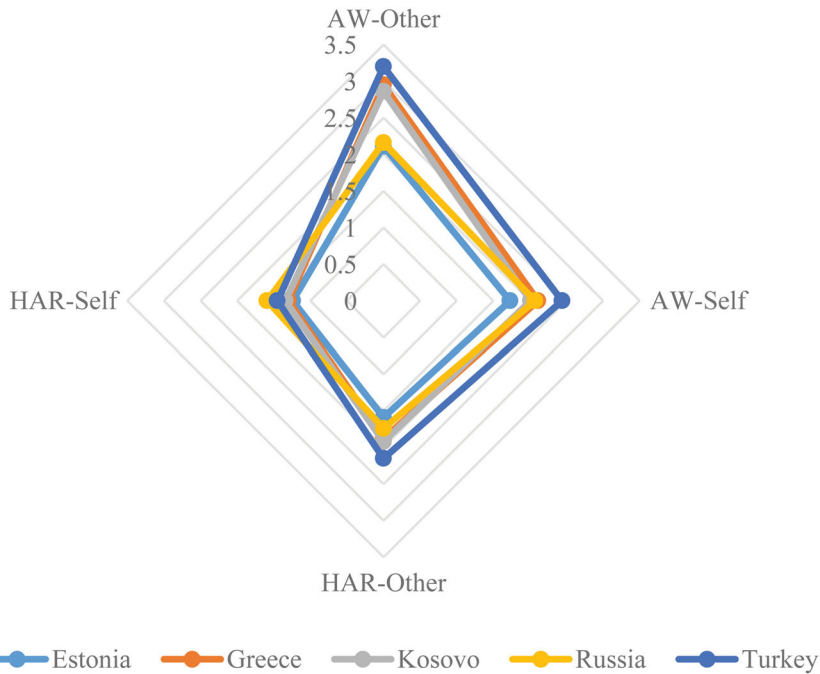
Figure 2. Mean subscale scores for DAIS.

aggressive driving of others) and once again indicating how frequently they did these behaviours themselves (i.e., aggressive driving of self).

The two-factor solution of DAIS was used by Özkan et al. (2010) in a previous study. Items in the first factor represented aggressive behaviours aimed at warning other drivers (e.g., sounding horn), whereas items in the second factor represented hostile actions of drivers (e.g., physically attacked). The first and the second factors were labelled as "aggressive warnings" (AW) and "hostile aggression and revenge" (HAR), respectively.

A series of reliability analyses were run for the two subscales of DAIS in all five samples in order to examine internal consistency of the scale. Cronbach's alpha values of AW for behaviours of others were .73, .85, .73, .84, and .89 for Estonia, Greece, Kosovo, Russia, and Turkey, respectively. Cronbach's alpha values of AW for behaviours of self were .51, .75, .75, .83, and .69 for Estonia, Greece, Kosovo, Russia, and Turkey, respectively. On the other hand, Cronbach's alpha values of HAR for behaviours of others were .58 for Estonia, .83 for Greece, .81 for Kosovo, .92 for Russia, and .91 for Turkey. Cronbach's alpha values of HAR for behaviours of self were .31 for Estonia, .84 for Greece, .84 for Kosovo, .93 for Russia, and .88 for Turkey. Mean subscale scores for each country are depicted in Figure 2. It seems from Figure 2 that the countries have similar mean scores of HAR, which is a more severe form of aggressive driving, and less similar mean scores of AW, which is a milder form of aggressive driving. Also, the
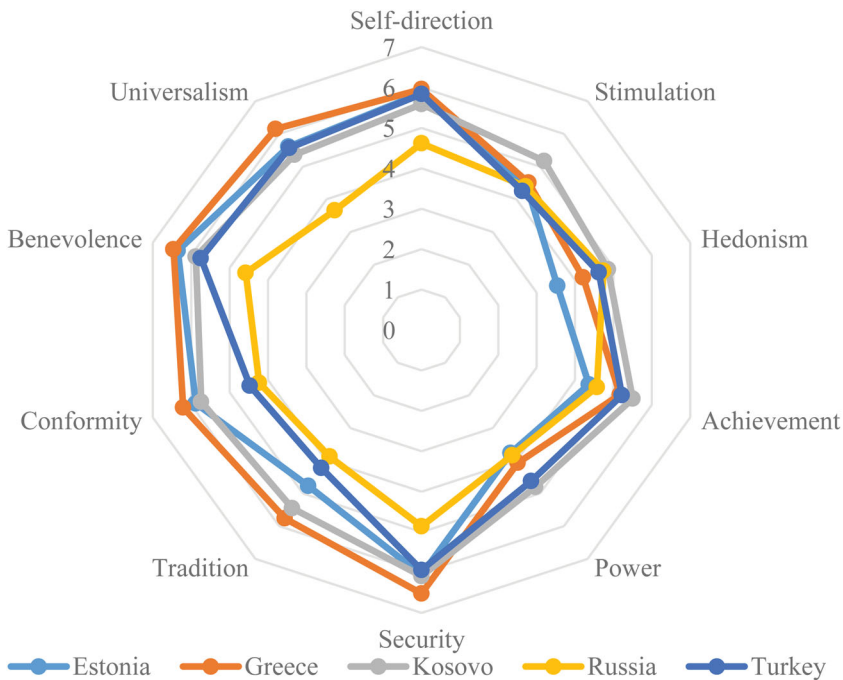
Figure 3. Mean scores for individual values.

mean scores seem to be lower for the evaluation of the self as compared to the evaluation of other drivers.

2.3.3. Short-Schwartz's Value Survey (SSVS)

In order to measure the level of importance of basic individual values, SSVS was used. Schwartz's Value Survey (SVS) was originally developed by Shalom Schwartz in 1992. This measurement tool evaluates the importance of ten basic individual values (i.e., universalism, benevolence, conformity, tradition, security, power, achievement, hedonism, stimulation, and self-direction) represented by 57 items. Later, Lindeman and Verkasalo (2005) developed SSVS, which is a shorter version of SVS. SSVS measures ten basic individual values with ten items rated on an eight-point Likert-type scale (0 = opposed to my principles, 7 = of supreme importance). Basic individual values were translated to the relevant languages in previous studies utilising SVS (Schwartz, 1992; 1994; Schwartz et al., 2012; Schwartz & Bardi, 1997) with the exception of Albanian. Hence, SSVS was translated into Albanian for this study. Mean scores of the ten value types are depicted in Figure 3 for each country. It seems that the variation in the values on the left-hand side of Figure 3 (i.e., SF) is higher across the five countries as compared to the values on the right-hand side of it (i.e., PF).

2.4. Statistical analyses

In the current study, all statistical analyses were conducted using the Statistical Package for the Social Sciences v. 24 (SPSS). Pearson correlation coefficients were computed in order to examine the relationships between the study variables, that is, basic individual values and aggressive driving behaviours. A series of hierarchical regression analyses was conducted in order to understand the relationships between basic individual values and aggressive behaviours of drivers. In these hierarchical regression analyses, independent variables were demographic variables (i.e., age, sex, mileage), value types, first higher-order structure of values (i.e., ST, OC, SE, C), second higher-order structure of values (i.e., SF, PF), and third higher-order structure of values (i.e., GAF, SPAA). The four dependent variables were AW and HAR of both others and self.

An a priori power analysis using G*Power 3.1.9.2. suggested that given a medium effect size (i.e., 0.15), an alpha level of .05, and power level of .95, the recommended sample size would be 173 for value types, 129 for the first, and 107 for the second and third higher-order structures in regression analyses. Considering the sizes of the samples (i.e., 124 for Estonian, 272 for Greek, 107 for Kosovar, 132 for Russian, and 87 for Turkish samples), some of the regression analyses seem to be underpowered, especially for value types and in Turkey.

3. Results

3.1. The relationships between the study variables

The relationships between the predictor and outcome variables of the current study were examined based on bivariate Pearson correlation coefficients. Overall, results of the correlation analyses suggest that values seemed to be related to HAR more strongly than AW (see Appendix A).

3.2. Basic individual values and aggressive behaviours of others and self

More detailed examinations of the relationships between the study variables were conducted through a set of hierarchical regression analyses. Results of the regression analyses are described below and summarised in Appendices B through G, Table 3, and Figure 4.

3.2.1. Individual values and AW of others
Results of the first set of regression analyses, in which the outcome variable was the AW of others, showed that the model 1 (including age, sex, and mileage) did not explain a significant amount of variance in the AW of

others in any of the countries. Similarly, models 2a (including universalism, benevolence, conformity, tradition, security, power, achievement, hedonism, stimulation, and self-direction), 2b (including ST, OC, SE, and C), 2c (including SF and PF), and 2d (including GAF and SPAA) also did not explain a significant amount of the variance in the data. In other words, none of the study variables had a significant relationship with AW of others.

3.2.2. Individual values and AW of self

Results of the second set of analyses indicated that the model 1 (including age, sex, and mileage) explained a significant amount of the variability in AW of self in the Greek sample ($F(3, 251) = 5.43$, $p < .01$, $Adj. R^2 = .05$), but not in other samples. To be precise, age was negatively ($\beta = -.19$, $p < .01$) and sex was positively ($\beta = .17$, $p < .01$) related to aggressive warnings of self. Model 2a (including universalism, benevolence, conformity, tradition, security, power, achievement, hedonism, stimulation, and self-direction; $F(13, 241) = 3.09$, $p < .01$, $Adj. R^2 = .10$) and model 2b (including ST, OC, SE, and C; $F(7, 247) = 5.41$, $p < .01$, $Adj. R^2 = .11$) explained a significant proportion of the variance in the dependent variable in Greek sample. None of the step 2a variables were significant; whereas C ($\beta = -.16$, $p < .05$) of the step 2b was negatively associated with AW of self. Models 2c (including SF and PF) and 2d (including GAF and SPAA) also explained significant amounts of the variability in Greek data ($F(5, 249) = 7.62$, $p < .01$, $Adj. R^2 = .12$; $F(5, 249) = 3.52$, $p < .01$, $Adj. R^2 = .05$, for models 2c and 2d, respectively). Of step 2c variables, SF was negatively and PF was positively associated with aggressive warnings of self in the Greek sample ($\beta = -.24$, $p < .01$ for SF; $\beta = .19$, $p < .01$ for PF). None of the step 2d variables were significant for Greece. See Appendices B, C, and D for details.

3.2.3. Individual values and HAR of others

Results of the third set of hierarchical regression analyses indicated that model 1 (including age, sex, and mileage) explained a significant amount of the variability in HAR of others in the Estonian sample ($F(3, 106) = 2.86$, $p < .05$, $Adj. R^2 = .05$). Annual mileage was the only significant step 1 variable, and it was positively associated with HAR of others ($\beta = .27$, $p < .01$). On the other hand, models 2b (including ST, OC, SE, and C; $F(7, 73) = 2.19$, $p < .05$, $Adj. R^2 = .09$), 2c (including SF and PF; $F(5, 75) = 2.94$, $p < .05$, $Adj. R^2 = .11$), and 2d (including GAF and SPAA; $F(5, 75) = 2.87$, $p < .05$, $Adj. R^2 = .11$) explained a significant amount of the variability in the dependent variable only in the Turkish sample. However, none of

the variables in steps 2b, 2c, or 2d were significantly associated with HAR of others.

3.2.4. Individual values and HAR of self

According to the results of the fourth set of regression analyses, model 1 (including age, sex, and mileage) did not explain a significant proportion of the variability in HAR of self. Model 2a (including universalism, benevolence, conformity, tradition, security, power, achievement, hedonism, stimulation, and self-direction) was significant for Greek ($F(13, 241) = 2.92$, $p < .01$, $Adj. R^2 = .06$), Russian ($F(13, 109) = 3.81$, $p < .01$, $Adj. R^2 = .23$), and Turkish ($F(13, 67) = 2.13$, $p < .05$, $Adj. R^2 = .16$) samples; however, none of the step 2a variables were significant in any of these samples. On the other hand, model 2b (including ST, OC, SE, and C) explained a significant amount of variance in Greek ($F(7, 247) = 3.50$, $p < .01$, $Adj. R^2 = .06$), Kosovar ($F(7, 86) = 2.35$, $p < .05$, $Adj. R^2 = .09$), Russian ($F(7, 115) = 5.71$, $p < .01$, $Adj. R^2 = .21$), and Turkish ($F(7, 73) = 3.49$, $p < .01$, $Adj. R^2 = .18$) samples. ST was negatively associated with HAR of self for Greece ($\beta = -.17$, $p < .05$) and Turkey ($\beta = -.47$, $p < .01$), whereas none of the step 2b variables were significant in the Kosovar and Russian samples. Model 2c (including SF and PF) explained a significant amount of the variability in the dependent variable in Greek ($F(5, 249) = 4.64$, $p < .01$, $Adj. R^2 = .07$), Kosovar ($F(5, 88) = 2.92$, $p < .05$, $Adj. R^2 = .09$), and Russian ($F(5, 117) = 7.21$, $p < .01$, $Adj. R^2 = .20$) samples. Of the 2c variables, SF was significantly and negatively associated with the outcome variable for both Greece ($\beta = -.22$, $p < .01$) and Russia ($\beta = -.44$, $p < .01$), and PF was significantly and positively associated with the outcome variable for Greece ($\beta = .18$, $p < .01$). None of the 2c variables were significant for Kosovo. Finally, model 2d (including GAF and SPAA) explained a significant amount of the variance in hostile aggression and revenge of self in Kosovo ($F(5, 88) = 2.93$, $p < .05$, $Adj. R^2 = .09$), Russia ($F(5, 117) = 7.61$, $p < .01$, $Adj. R^2 = .21$), and Turkey ($F(5, 75) = 3.64$, $p < .01$, $Adj. R^2 = .14$). Of the 2d variables, GAF was negatively associated with the outcome variable for both Russia ($\beta = -.57$, $p < .01$) and Turkey ($\beta = -.53$, $p < .01$), whereas none of the 2d variables were significant for Kosovo. See Appendices E, F, and G for details.

3.2.5. Summary of the results across countries

Overall, results of the hierarchical regression analyses suggest that values are related to different types of aggressive behaviours of self, while they are not related to perceived aggressive behaviours of others. Value types were not related to aggressive driving, whereas higher-order values were. The

Table 3. Summary table for the hierarchical regression analyses.

	First-order values				Second-order values		Third-order values	
	ST	OC	SE	C	SF	PF	GAF	SPAA
AW-Others	NS	NS	NS	NS	NS	NS	NS	NS
AW-Self	NS	NS	NS	GR(−)	GR(−)	GR(+)	NS	NS
HAR-Others	NS	NS	NS	NS	NS	NS	NS	NS
HAR-Self	GR(−)	NS	NS	NS	GR(−)	GR(+)	RU(−)	NS
	TR(−)				RU(−)		TR(−)	

Note. AW = aggressive warnings, HAR = hostile aggression and revenge, ST = self-transcendence, OC = openness to change, SE = self-enhancement, C = conservation, SF = social focus, PF = personal focus, GAF = growth anxiety-free, SPAA = self-protection anxiety-avoidance, GR = Greece, RU = Russia, TR = Turkey, NS = non-significant. A (+) indicates a positive coefficient and a (−) indicates a negative coefficient.

Aggressive warnings - Self   Hostile aggression and revenge - Self
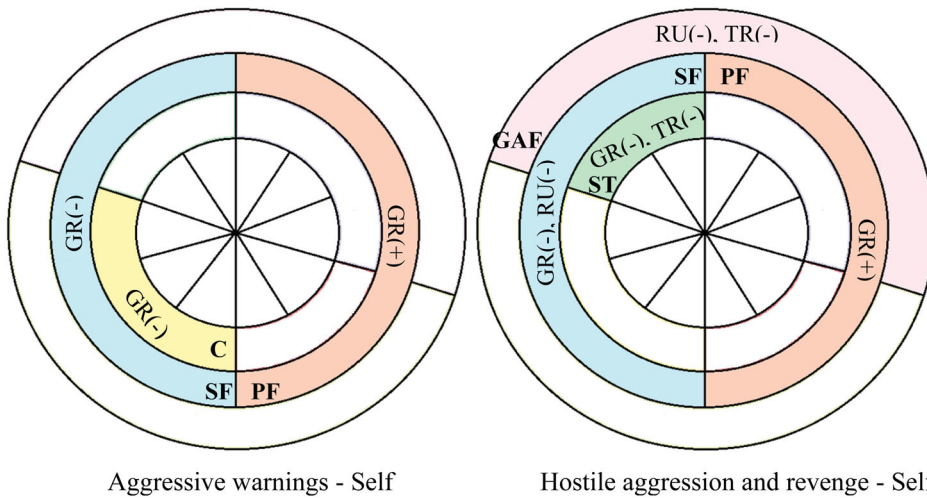
Figure 4. Summary of results of the hierarchical regression analyses.
Note. C = conservation, ST = self-transcendence, SF = social focus, PF = personal focus, GAF = growth anxiety-free, GR = Greece, RU = Russia, TR = Turkey. A (+) indicates a positive coefficient and a (-) indicates a negative coefficient.

relationships were not entirely consistent across the samples from the five countries. Effect sizes of the significant models varied between .06 and .21, which means a small to medium amount of variance explained in aggressive driving by individual values. See Table 3 and Figure 4 for the summary of the results of the hierarchical regression analyses.

4. Discussion

The current study sought to investigate the role of individual values in explaining aggressive driving. According to the literature, status of road traffic safety (Al-Madani, 2019; Ramadani et al., 2017; World Health Organization [WHO], 2018) and frequency of aggressive driving (Özkan

et al., 2010; 2011) vary across different regions and countries, which was also evident in our samples from the five selected countries (see Figure 2). Whether and how different levels of aggressive driving are associated with individual values was mainly unexplored in the literature. For this reason, the relationship between individual values and aggressive driving was examined across samples from five selected countries. Our hypotheses were partially supported by the findings, which are discussed in more detail below.

4.1. Summary of the findings

The results showed that individual values explained aggressive driving behaviours of self, but not those of others. This indicates that perceived frequency of aggressive driving behaviours of others do not reflect the values adopted by the individuals themselves. This finding may be explained with the ceiling effect. To be specific, when the mean aggressive driving scores were examined, it is found that "other" mean scores of both AW and HAR were higher than "self" mean scores in all five samples (see Figure 2). These differences were significant for four samples, but not for the Russian sample. On the other hand, the reason for this ceiling effect may come from self-related biases. Previous studies show that drivers display various self-related biases: actor-observer effect (Stewart, 2005), self-enhancement bias (Fındık, Uslu, Öz, Lajunen, & Özkan, 2016), optimism bias (DeJoy, 1989), and so on. It is possible that the participants in our sample employed one or more of these biases and cognitive shortcuts (Hoorens, 1993) in explaining others' aggressive driving, resulting in a lack of relationship. It was noteworthy, however, that the lack of significant relationship between values and aggressive driving of others was country-independent.

All significant relationships were in the hypothesised directions, yet not all hypotheses were confirmed by the findings. For instance, none of the value types (i.e., universalism, benevolence, conformity, tradition, security, power, achievement, hedonism, stimulation, and self-direction) was significantly associated with aggressive driving according to the regression analyses. Schwartz (1992) states that the value types placed close to each other on the circular structure are compatible with each other, whereas those placed at the opposite poles are in conflict. This indicates that some amount of relationship between neighbouring value types is expected. In line with this point, additional analyses suggested potential multicollinearity problems related to our data. In order to overcome this problem and reach "greater universal heuristic and predictive power," Schwartz et al. (2012) refined the original model and presented the higher-order structures. The significant associations we found with the higher-order structure, and not

with the value types, encourages the use of the refined model suggested by Schwartz et al. (2012).

Among the first-order values, C was negatively associated with AW of self in the Greek sample, and ST was negatively associated with HAR of self in Turkish as well as Greek samples. In line with these, SF was negatively associated with both types of aggressive driving behaviours of self in the Greek sample. SF was also negatively associated with HAR of self in the Russian sample. PF, on the other hand, was positively associated with both types of aggressive driving behaviours in the Greek sample. Finally, GAF was negatively associated with HAR of self in both Russian and Turkish samples. The variance explained in aggressive driving by higher-order individual values were small to moderate, which emphasises the complexity of such behaviours.

To summarise, individual values were found to be associated with aggressive driving of self, but not other drivers. Consistently higher aggressive driving scores reported for other drivers as compared to self in all samples and the lack of relationship with individual values imply that evaluations of other drivers' behaviours may be governed by other more universal factors such as cognitive biases. Potentially due to greater statistical power, value types were not related to aggressive driving, whereas higher-order values were. SF was negatively and PF was positively associated with both types of aggressive driving, yet these associations were not common to all five countries. Put another way, the main country-independent finding in this study was the lack of relationship between individual values and aggressive driving of others, not the one between individual values and aggressive driving of self.

4.2. Linking the current study with the previous literature

Overall, our results are in line with previous findings linking individual values with aberrant behaviours such as hacking activities (Madarie, 2017), unethical behaviour (Ivaniš & Pavlović, 2017), and social deviance (Demirutku, 2006) as well as traffic violations (Reņge et al., 2012). It seems that the second-order structure contrasting ST–self-enhancement dimension—that is, SF versus PF—is especially relevant to such behaviours.<AQ: Please confirm/correct "It seems that the second-order structure contrasting ST–self-enhancement dimension—that is, SF versus PF—is especially relevant to such behaviours"> Indeed, conceptualisation of SF (i.e., concern with others) and PF (i.e., concern with self) seems particularly relevant to engaging in aberrant behaviours, in our case, aggressive driving. Lawton, Parker, Manstead, and Stradling (1997) argued that aggressive driver behaviours were intentional behaviours having a strong affective component,

which is a personal concern. Additionally, Kaçan et al. (2019) also discussed that higher levels of C and ST, which come together to form SF values, might be responsible for lower aberrant behaviours and higher positive behaviours among Russian and Turkish drivers. It is noteworthy that besides increased personal concern, decreased social concern is also associated with aggressive driving. This finding supports the notion that values placed at the opposite poles of the structure contrast with each other (Schwartz et al., 2012), especially for volitional behaviour (Skimina, Cieciuch, Schwartz, Davidov, & Algesheimer, 2018). However, this was not valid for GAF versus SPAA values, which might indicate that instead of being opposite poles of a single continuum, these two concepts might be somewhat distinct dimensions. Finally, the results suggest that the relationship between individual values and aggressive driving is stronger for more severe forms of aggression (i.e., HAR) than for milder forms of aggression (i.e., AW). It is possible that milder forms of aggressive driving behaviours have an instrumental function in traffic; that is, drivers might be displaying such behaviours in order to communicate with others and to regulate traffic rather than to cause harm. More severe forms of aggressive driving behaviours, on the other hand, might be displayed due to more personal reasons, hence, relating more to motivational goals.

Basic individual values and their relation to different types of aberrant behaviours are examined in the previous literature (Ivaniš & Pavlović, 2017; Madarie, 2017). Additionally, the relationship between values and traffic-related outcomes such as aberrant driving and fatality rates were also investigated, yet at the national level. This study is the first to investigate the relationship between values and aggressive driving at the individual level. Despite being an individual-level variable, importance of values seemed to vary from country to country across the five selected countries (see Figure 3). Although our results indicated some amount of parallelism between the relationships examined across these five countries, especially in terms of the correlation results, there were also differences, which was contrary to our expectation. These differences do not allow us to claim country independence of the relationship between individual values and aggressive driving.

Although the specific relationships between values and aggressive driving were not country-independent for the five countries, it was noteworthy that the directions of the relationships were consistent when the same models were significant in multiple samples. Country-specific relationships might be a reflection of the differences in characteristics of traffic system in these countries. Indeed, profiles of traffic systems differ in terms of many aspects across the four countries available (i.e., Estonia, Greece, Russia, and Turkey) in the WHO (2018) report. Furthermore, Warner et al. (2011) reported that the frequencies of the aggressive driving behaviours vary across cultures. In our

study, differences in aggressive driving across the five selected countries were also visible in Figure 2. As Gaygısız (2010) discussed, influence of (cultural) values on driver behaviour is high when a traffic system is not well governed and low when a traffic system is well governed. This finding can explain why significant relationships were obtained, of the five selected countries, with those with higher fatality rates per 100,000 population (i.e., Greece, Russia, and Turkey) and not with those with lower fatality rates per 100,000 population (i.e., Estonia and Kosovo). In a similar vein, the relationship between (cultural) values and driver behaviour (Üzümcüoğlu et al., 2018) and fatality rates (Solmazer et al., 2016) are mediated by law enforcement. Taken together, the degree of relationship between values and aggressive driver behaviours allowed by the quality of governance, enforcement, and other related factors might have played a role in the differences between samples in the current study.

Taken together, our results are in line with previous studies that link individual values with a variety of aberrant behaviours (Ivaniš & Pavlović, 2017; Madarie, 2017) and aberrant driver behaviours (Renge et al., 2012), as well as those that link national level values with traffic safety outcome measures (Solmazer et al., 2016; Üzümcüoğlu et al., 2018). It is also noteworthy that our hypotheses were differentially confirmed in samples from higher fatality rate countries, which supports the notion that the influence of values on traffic safety outcomes is alleviated by better governance (Gaygısız, 2010).

4.3. Limitations

This study has several limitations, which might be another factor explaining some of the discrepancies in the findings across the five samples. To begin with, sample characteristics were not equivalent across the five countries. A larger sample size would be more informative, especially for Kosovar and Turkish data. Similarly, participant characteristics also varied across the five samples. Specifically, age, which is a critical variable associated with aggressive driving, was considerably lower in the Russian and Turkish samples. This limitation might have contributed to the inconsistent findings obtained in the current study. Also, psychometric properties of the instruments used in this study were not examined previously in all countries. Therefore, internal consistency scores of some instruments were lower in some countries as compared to others. This is in line with the previous finding that the spectrum of different aggressive behaviours varies from one country to another (Özkan et al., 2010).

4.4. Contributions and implications

This study contributes to both value literature and traffic safety literature by forming a link between these fields. Tao and Au (2014) claim that

values causally influence behaviour and this influence is strengthened when individuals are primed with values. Schuster, Pinkowski, and Fischer (2019) revealed that although value orientations of individuals are at least moderately stable in adulthood, value orientations can be changed with interventions. Considering the relationship between values and aggressive driving, the threat that aggressive driving poses against traffic safety, and the possibility to change value orientations, some critical implications arise. For instance, especially in those countries with higher fatality rates, individuals can be primed with values promoting SF in the traffic setting. This can be done through public service broadcasting and roadside advertising. Additionally, the emphasis on PF values can be decreased in traffic-related advertisements, broadcasts, and so on. A value intervention can be placed in both licencing and reinstatement processes, as well as in earlier formal education, in a way to promote concern for other road users. Taking consistent lack of relationship between values and aggressive driving of others, unfavourable assessment of other drivers as compared to self, and the importance of drivers' evaluations of other road users' behaviour into consideration, necessity of conducting further studies regarding attributions about aggressive driving emerges. If individuals negatively evaluate others' behaviours regardless of their own values, changing their explanations of such behaviours would require different interventions.

Acknowledgements

Funding

References

Al-Madani, H. M. N. (2019). Analysis of past and future continental crash mortality rates employing long-term data. *Journal of Transportation Safety & Security*, *11*(5), 464–490. doi:10.1080/19439962.2018.1428256

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

Demirutku, K. (2006, September). *Değerler, sosyalleşme ve sosyal sapma.* Paper presented at the 14. Ulusal Psikoloji Kongresi, Hacettepe Üniversitesi, Ankara.

Ersan, Ö., Üzümcüoğlu, Y., Azık, D., Fındık, G., Kaçan, B., Solmazer, G., … Xheladini, G. (2019). The relationship between self and other in aggressive driving and driver behaviors across countries. *Transportation Research Part F: Traffic Psychology and Behaviour*, *66*, 122–138. doi:10.1016/j.trf.2019.08.020

Fındık, G., Uslu, İ., Öz, B., Lajunen, T., & Özkan, T. (2016). Sürücü davranışları, becerileri ve kaza değerlendirmesinde atıf yanlılıkları ve stilleri. *Sürdürülebilir Ulaşım İçin Yol Trafik Güvenliği Ulusal Kongresi (ROTRASA) Bildiri Kitabı*. Retrieved from http://rotrasa.org/s/2267/i/rotrasa_bildiri_kitab%C4%B1_1.8.16.pdf.

Gaygısız, E. (2009). Economic and cultural correlates of road-traffic accident fatality rates in OECD countries. *Perceptual and Motor Skills*, *109*, 531–545. doi:10.2466/PMS.109.2.531-545

Gaygısız, E. (2010). Cultural values and governance quality as correlates of road traffic fatalities: A nation level analysis. *Accident Analysis & Prevention*, *42*(6), 1894–1901. doi:10.1016/j.aap.2010.05.010

Hassan, H. M. (2016). Investigation of the self-reported aberrant driving behavior of young male Saudi drivers: A survey-based study. *Journal of Transportation Safety & Security*, *8*(2), 113–128. doi:10.1080/19439962.2015.1017782

Hoorens, V. (1993). Self-enhancement and superiority biases in social comparison. *European Review of Social Psychology*, *4*(1), 113–139. doi:10.1080/14792779343000040

Ivaniš, M., & Pavlović, N. (2017). Universal values and etical behaviour of hotel managers in Croatia. *International Journal for Quality Research*, *11*(3), 677–690. doi:10.18421/IJQR11.03-12

Kaçan, B., Fındık, G., Üzümcüoğlu, Y., Azık, D., Solmazer, G., Ersan, Ö., … Xheladini, G. (2019). Driver profiles based on values and traffic safety climate and their relationships between driver behaviours. *Transportation Research Part F: Traffic Psychology and Behaviour*, *64*, 246–259. doi:10.1016/j.trf.2019.05.010

Lajunen, T., & Özkan, T. (2004). Culture, safety culture, and traffic safety in Turkey and in Europe. The Turkish Driver Behaviour Questionnaire (T-DBQ): Validity and norms (Report no: SBB-3023). Ankara: The Scientific and Technical Research Council of Turkey (TÜBİTAK).

Lajunen, T., Parker, D., & Stradling, S. G. (1998). Dimensions of driving anger, aggressive nad highway code violations and their mediation by safety orientation in UK drivers. *Transportation Research Part F: Traffic Psychology and Behaviour*, *1*(2), 107–121. doi:10.1016/S1369-8478(98)00009-6

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

Lennon, A. J., & Watson, B. C. (2015). A matter of style? Driver attributional 'style' in accounting for the driving of others as protective or as predisposing drivers towards retaliatory aggressive driving. *Transportation Research Part F: Traffic Psychology and Behaviour*, *30*, 163–172. doi:10.1016/j.trf.2015.03.001

Lindeman, M., & Verkasalo, M. (2005). Measuring values with the Short Schwartz's Value Survey. *Journal of Personality Assessment*, *85*(2), 170–178. doi:10.1207/s15327752jpa8502_09

Madarie, R. (2017). Hackers' motivations: Testing Schwartz's theory of motivational types of values in a sample of hackers. *International Journal of Cyber Criminology*, *11*(1), 78–97. doi:10.5281/zenodo.495773

Mesken, J., Lajunen, T., & Summala, H. (2002). Interpersonal violations, speeding violations and their relation to accident involvement in Finland. *Ergonomics*, *45*(7), 469–483. doi:10.1080/00140130210129682

Özkan, T., Lajunen, T., Chliaoutakis, J. E., Parker, D., & Summala, H. (2006). Cross-cultural differences in driving behaviours: A comparison of six countries. *Transportation Research Part F: Traffic Psychology and Behaviour*, *9*(3), 227–242. doi:10.1016/j.trf.2006.01.002

Özkan, T., Lajunen, T., Parker, D., Sümer, N., & Summala, H. (2010). Symmetric relationship between self and others in aggressive driving across gender and countries. *Traffic Injury Prevention*, *11*(3), 228–239. doi:10.1080/15389581003788864

Özkan, T., Lajunen, T., Parker, D., Sümer, N., & Summala, H. (2011). Aggressive driving among British, Dutch, Finnish and Turkish drivers. *International Journal of Crashworthiness*, *16*(3), 233–238. doi:10.1080/13588265.2010.536687

Ramadani, N., Zhjeqi, V., Berisha, M., Hoxha, R., Begolli, I., Salihu, D., & Krasniqi, P. (2017). Public health profile of road traffic accidents in Kosovo 2010–2015. *Open Access Macedonian Journal of Medical Sciences*, *5*(7), 1036–1041. doi:10.3889/oamjms.2017.214

Rämet, T. (2003). *Nuorten kuljettajien ajotavat ja -asenteet: Periytyvätkö vanhempien ajotavat? (Young drivers' driving style and attitudes: Do the young drivers 'inherit' the driving style of their parents?), (Unpublished* (master's thesis). University of Helsinki, Finland.

Reņģe, V., Austers, I., & Muzikante, I. (2012). Combining social axioms with basic individual values and self-reported driving behavior in predicting traffic accidents. *Baltic Journal of Psychology*, *13*(1), 72–86.

Schuster, C., Pinkowski, L., & Fischer, D. (2019). Intra-individual value change in adulthood: A systematic literature review of longitudinal studies assessing Schwartz's value orientations. *Zeitschrift Für Psychologie*, *227*(1), 42–52. doi:10.1027/2151-2604/a000355

Schwartz, S. H. (1992). Universals in the content and structure of values: Theory and empirical tests in 20 countries. In M. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 25, pp. 1–65). New York: Academic Press.

Schwartz, S. H. (1994). Beyond individualism-collectivism: New cultural dimensions of values. In U. Kim, H. C. Triandis, C. Kagitcibasi, S.-C. Choi, & G. Yoon (Eds.), *Individualism and collectivism: Theory, method, and application*. Newbury Park, CA: Sage.

Schwartz, S. H., & Bardi, A. (1997). Influences of adaptation to communist rule on value priorities in Eastern Europe. *Political Psychology*, *18*(2), 385–410. doi:10.1111/0162-895X.00062

Schwartz, S. H., & Bilsky, W. (1987). Toward a universal psychological structure of human values. *Journal of Personality and Social Psychology*, *53*(3), 550–562. doi:10.1037/0022-3514.53.3.550

Schwartz, S. H., Cieciuch, J., Vecchione, M., Davidov, E., Fischer, R., Beierlein, C., … Konty, M. (2012). Refining the theory of basic individual values. *Journal of Personality and Social Psychology*, *103*(4), 663–688. doi:10.1037/a0029393

Skimina, E., Cieciuch, J., Schwartz, S. H., Davidov, E., & Algesheimer, R. (2018). Testing the circular structure and importance hierarchy of value states in real-time behaviours. *Journal of Research in Personality*, *74*, 42–49. doi:10.1016/j.jrp.2018.02.001

Solmazer, G., Üzümcüoğlu, Y., & Özkan, T. (2016). The role of traffic law enforcements in the relationship between cultural variables and traffic fatality rates across some countries of the world. *Transportation Research Part F: Traffic Psychology and Behaviour*, *38*, 137–150. doi:10.1016/j.trf.2016.01.001

Stanojević, P., Sullman, M. J. M., Jovanović, D., & Stanojević, D. (2018). The impact of police presence on angry and aggressive driving. *Accident, Analysis and Prevention*, *110*, 93–100. doi:10.1016/j.aap.2017.11.003

Stewart, A. E. (2005). Attributions of responsibility for motor vehicle crashes. *Accident, Analysis and Prevention*, *37*(4), 681–688. doi:10.1016/j.aap.2005.03.010

Tao, L., & Au, W. (2014). Values, self and other-regarding behaviour in the dictator game. *Rationality and Society*, *26*(1), 46–72. doi:10.1177/104346311351299

Üzümcüoğlu, Y., Özkan, T., & Lajunen, T. (2018). The relationships between cultural variables, law enforcements and driver behaviours across 37 nations. *Transportation Research Part F: Traffic Psychology and Behaviour*, *58*, 743–753. doi:10.1016/j.trf.2018.07.009

Warner, H. W., Özkan, T., Lajunen, T., & Tzamalouka, G. (2011). Cross-cultural comparison of drivers' tendency to commit different aberrant driving behaviours. *Transportation Research Part F: Traffic Psychology and Behaviour*, *14*(5), 390–399. doi:10.1016/j.trf.2011.04.006

World Health Organization (WHO). (2018). *Global status report on road safety 2018*. Retrieved from https://apps.who.int/iris/bitstream/handle/10665/276462/9789241565684-eng.pdf?ua=1.

Appendices

Appendix A. Pearson correlation coefficients between predictor and outcome variables in the study.

	AW-Others					AW-Self					HAR-Others					HAR-Self				
	ES	GR	KO	RU	TR	ES	GR	KO	RU	TR	ES	GR	KO	RU	TR	ES	GR	KO	RU	TR
Age	.12	-.09	-.11	-.01	-.19	.11	-.15*	.05	-.04	-.11	.11	-.09	-.24*	-.10	-.30**	.00	-.10	.03	-.15	-.08
Sex	-.03	-.02	-.04	.14	.00	-.05	.16**	.10	.14	.06	.01	-.02	-.10	.09	.00	.16	.09	.06	.03	.05
KM	-.06	.03	.01	-.03	-.08	-.05	-.03	.02	-.06	.18	.26**	.02	.08	-.05	-.15	.19	-.02	.08	.02	-.04
ACC	.29**	.05	-.07	.06	.02	.12	.09	-.07	.05	.05	-.01	.04	.07	-.02	.02	.14	.23**	.00	-.04	.00
UNI	.09	.03	.14	.03	.03	-.14	-.26**	.07	-.15	.08	-.05	.08	-.10	-.16	-.26*	-.07	-.33**	-.31**	-.45**	-.42**
BEN	.05	.02	.14	.09	.00	.07	-.30**	.08	-.16	.04	-.08	.01	-.18	-.16	-.31**	-.10	-.42**	-.31**	-.45**	-.45**
CON	.09	.02	.14	.02	-.19	.05	-.30**	.14	-.16	-.04	-.03	.04	-.19*	-.17	-.26*	-.25**	-.36**	-.26**	-.46**	-.21
TRA	.15	-.06	.17	-.08	-.19	-.10	-.26**	.12	-.20*	-.06	-.08	-.06	-.11	-.11	-.20	-.15	-.27**	-.25*	-.28**	-.05
SEC	.01	.08	.10	.09	-.02	.05	-.21**	.05	-.14	-.01	.03	.06	-.18*	-.33**	-.11	-.11	-.32*	-.34**	-.39**	-.43**
POW	.02	-.01	-.01	.13	-.29**	-.12	.06	-.10	-.11	-.18	-.07	.04	-.13	-.08	-.26*	-.10	.01	-.24**	-.19*	-.05
ACH	.05	.09	.04	.13	-.13	-.11	.05	-.04	-.09	.03	-.04	.08	-.08	-.13	-.22*	.01	-.06	-.32**	-.34**	-.19
HED	-.03	.01	.12	.06	-.21	-.06	.15*	.00	-.12	-.03	.01	.02	-.05	-.20*	-.28**	.02	.04	-.22*	-.38**	-.26*
STI	-.10	.03	.07	.15	-.14	-.12	.10	-.01	-.09	.00	-.02	.06	.02	-.15	-.15	.03	.01	-.18	-.38**	-.18
SEL	.00	.09	.14	.12	.02	-.03	-.04	.06	-.11	.05	.09	.03	-.05	-.17	-.28**	-.02	-.22*	-.28**	-.41**	-.40**
ST	.09	.03	.14	.07	.02	-.07	-.31**	.08	-.16	.06	-.07	.06	-.14	-.17	-.32**	-.09	-.42**	-.33**	-.48**	-.48**
OC	-.06	.04	.12	.12	-.15	-.09	.10	.02	-.11	.00	.03	-.04	-.03	-.18*	-.29**	.02	-.05	-.25**	-.42**	-.34**
SE	.04	.05	.02	.14	-.23*	-.13	.06	-.08	-.11	-.08	.07	-.12	-.12	-.26*	-.06	-.02	-.31**	-.29**	-.13	-.10
C	.11	.00	.15	.01	-.17	-.02	-.29**	.11	-.19*	-.05	-.04	.00	-.17	-.17	-.32**	-.20*	-.35**	-.30**	-.43**	-.27*
SF	.12	.02	.15	.04	-.10	-.05	-.33**	.10	-.19*	.00	-.06	.03	-.16	-.18*	-.35**	-.19*	-.42**	-.33**	-.47**	-.40**
PF	-.02	.05	.09	.13	-.21*	-.13	.10	-.02	-.12	-.04	-.01	.06	-.07	-.17	-.32**	-.02	-.05	-.29**	-.39**	-.28**
GAF	-.01	.05	.14	.10	-.09	-.10	-.04	.04	-.14	.03	-.01	.06	-.08	-.19*	-.34**	-.02	-.22*	-.30**	-.47**	-.46**
SPAA	.10	.03	.10	.06	-.22*	-.08	-.15*	.04	-.17*	-.07	-.06	.04	-.16	-.16	-.32**	-.17	-.24*	-.33**	-.40**	-.23*

Note. AW = aggressive warnings, HAR = hostile aggression and revenge, ES = Estonia, GR = Greece, KO = Kosovo, RU = Russia, TR = Turkey, KM = mileage, ACC = accidents, UNI = universalism, BEN = benevolence, CON = conformity, TRA = tradition, SEC = security, POW = power, ACH = achievement, HED = hedonism, STI = stimulation, SEL = self-direction, ST = self-transcendence, OC = openness to change, SE = self-enhancement, C = conservation, SF = social focus, PF = personal focus, GAF = growth anxiety-free, SPAA = self-protection anxiety-avoidance. *p < .05, **p < .01. <TQ: Hyphens preceding numbers in Appendix A should be changed to minus symbols (−)>

Appendix B. Relationship between higher-order values I and aggressive warnings of self.

	Beta					Adjusted R^2					F value				
						ES	GR	KO	RU	TR	ES	GR	KO	RU	TR
Step 1. Demographic variables						-.01	.05	-.03	.03	.03	.63	**5.43****	.07	2.40	1.70
	ES	GR	KO	RU	TR										
Age	.10	**-.19****	-.02	.06	-.18										
Sex	-.09	**.17****	.04	.24*	.03										
Mileage	-.04	-.07	.02	-.06	.22										
Step 2b. Higher-order values I						-.03	.11	-.01	.03	-.02	.54	**5.41****	.90	1.62	.73
	ES	GR	KO	RU	TR										
ST	-.09	-.12	.00	.07	.06										
OC	-.01	.12	-.08	-.10	.01										
SE	-.08	.10	-.33	.12	-.05										
C	-.01	**-.16***	.40	-.22	.01										

Note. ES = Estonia, GR = Greece, KO = Kosovo, RU = Russia, TR = Turkey, ST = self-transcendence, OC = openness to change, SE = self-enhancement, C = conservation. *p < .05, **p < .01. <TQ: Hyphens preceding numbers in Appendix B should be changed to minus symbols (−)>

Appendix C. Relationship between higher-order values II and aggressive warnings of self.

	Beta					Adjusted R^2					F value				
						ES	GR	KO	RU	TR	ES	GR	KO	RU	TR
Step 1. Demographic variables						-.01	.05	-.03	.03	.03	.63	**5.43****	.07	2.40	1.70
	ES	GR	KO	RU	TR										
Age	.10	**-.19****	-.02	.06	-.18										
Sex	-.09	**.17****	.04	.24*	.03										
Mileage	-.04	-.07	.02	-.06	.22										
Step 2c. Higher-order values II						-.01	.12	.00	.04	.00	.69	**7.62****	.98	2.09	1.02
	ES	GR	KO	RU	TR										
SF	-.09	**-.24****	.41*	-.18	.05										
PF	-.07	**.19****	-.38	.03	-.03										

Note. ES = Estonia, GR = Greece, KO = Kosovo, RU = Russia, TR = Turkey, SF = social focus, PF = personal focus. *p < .05, **p < .01. <TQ: Hyphens preceding numbers in Appendix C should be changed to minus symbols (−)>

Appendix D. Relationship between higher-order values III and aggressive warnings of self.

	Beta					Adjusted R^2					F value				
						ES	GR	KO	RU	TR	ES	GR	KO	RU	TR
Step 1. Demographic variables						-.01	.05	-.03	.03	.03	.63	**5.43****	.07	2.40	1.70
	ES	GR	KO	RU	TR										
Age	.10	**-.19****	-.02	.06	-.18										
Sex	-.09	**.17****	.04	.24*	.03										
Mileage	-.04	-.07	.02	-.06	.22										
Step 2d. Higher-order values III						-.02	.05	-.05	.04	.00	.69	3.52**	.08	1.98	1.02
	ES	GR	KO	RU	TR										
GAF	-.06	.07	.07	-.05	.06										
SPAA	-.09	-.07	-.02	-.10	-.04										

Note. ES = Estonia, GR = Greece, KO = Kosovo, RU = Russia, TR = Turkey, GAF = growth anxiety-free, SPAA = self-protection anxiety-avoidance. *p < .05, **p < .01. <TQ: Hyphens preceding numbers in Appendix D should be changed to minus symbols (−)>

Appendix E. Relationship between higher-order values I and hostile aggression and revenge of self.

Beta					Adjusted R^2					F value				
					ES	GR	KO	RU	TR	ES	GR	KO	RU	TR
Step 1. Demographic variables					.02	.01	-.03	.00	-.03	1.87	1.99	.22	1.16	.33
	ES	GR	KO	RU	TR									
Age	-.08	-.13*	.02	-.09	-.09									
Sex	.12	.09	.02	.12	.07									
Mileage	.17	-.04	.08	.01	-.03									
Step 2b. Higher-order values I					.03	.06	.09	.21	.18	1.40	**3.50****	2.35*	5.71**	**3.49****
	ES	GR	KO	RU	TR									
ST	.03	**-.17***	-.30	-.30	**-.47****									
OC	.00	.10	.13	-.26	-.18									
SE	.04	.11	-.22	.14	.23									
C	-.22	-.09	-.04	-.06	-.01									

Note. ES = Estonia, GR = Greece, KO = Kosovo, RU = Russia, TR = Turkey, ST = self-transcendence, OC = openness to change, SE = self-enhancement, C = conservation. *$p < .05$, **$p < .01$. <TQ: Hyphens preceding numbers in Appendix E should be changed to minus symbols (−)>

Appendix F. Relationship between higher-order values II and hostile aggression and revenge of self.

Beta					Adjusted R^2					F value				
					ES	GR	KO	RU	TR	ES	GR	KO	RU	TR
Step 1. Demographic variables					.02	.01	-.03	.00	-.03	1.87	1.99	.22	1.16	.33
	ES	GR	KO	RU	TR									
Age	-.08	-.13*	.02	-.09	-.09									
Sex	.12	.09	.02	.12	.07									
Mileage	.17	-.04	.08	.01	-.03									
Step 2c. Higher-order values II					.03	.07	.09	.20	.07	1.75	**4.64****	2.92*	**7.21****	2.25
	ES	GR	KO	RU	TR									
SF	-.18	**-.22****	-.30	**-.44****	-.36*									
PF	.03	**.18****	-.09	-.04	.00									

Note. ES = Estonia, GR = Greece, KO = Kosovo, RU = Russia, TR = Turkey, SF = social focus, PF = personal focus. *$p < .05$, **$p < .01$. <TQ: Hyphens preceding numbers in Appendix F should be changed to minus symbols (−)>

Appendix G. Relationship between higher-order values III and hostile aggression and revenge of self.

Beta					Adjusted R^2					F value				
					ES	GR	KO	RU	TR	ES	GR	KO	RU	TR
Step 1. Demographic variables					.02	.01	-.03	.00	-.03	1.87	1.99	.22	1.16	.33
	ES	GR	KO	RU	TR									
Age	.08	.13*	.02	-.09	-.09									
Sex	.12	.09	.02	.12	.07									
Mileage	.17	-.04	.08	.01	-.03									
Step 2d. Higher-order values III					.03	.00	.09	.21	.14	1.64	1.22	2.93*	**7.61****	**3.64****
	ES	GR	KO	RU	TR									
GAF	.03	.03	-.08	**-.57****	**-.53****									
SPAA	-.16	-.02	-.31	.11	.16									

Note. ES = Estonia, GR = Greece, KO = Kosovo, RU = Russia, TR = Turkey, GAF = growth anxiety-free, SPAA = self-protection anxiety-avoidance. *$p < .05$, **$p < .01$.<TQ: Hyphens preceding numbers in Appendix G should be changed to minus symbols (−)>