

Cross-cultural differences in pedestrian behaviors in relation to values: A comparison of five countries

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ABSTRACT

Keywords:

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This study compared pedestrian behaviors in five countries (Estonia, Greece, Kosovo, Russia, and Turkey) and investigated the relationships between these behaviors and values in each country. The study participants were 131 pedestrians for Estonia, 249 for Greece, 112 for Kosovo, 176 for Russia, and 145 for Turkey. The principal component analyses revealed that the four-factor structure of the Pedestrian Behavior Scale (PBS) was highly consistent across the five countries. ANCOVA results revealed significant differences between countries on the PBS items and scale scores. Specifically, Greek and Turkish participants reported transgressive pedestrian behaviors more frequently than Estonian, Kosovar, and Russian pedestrians while Kosovar participants reported transgressive pedestrian behaviors less frequently than Estonian pedestrians. In addition, Turkish and Russian pedestrians reported lapses and aggressive behaviors more frequently than Estonian, Greek, and Kosovar pedestrians. Finally, Turkish and Estonian pedestrians reported positive behaviors more frequently than Kosovar pedestrians. Unexpectedly, the regression analyses showed that values have varying effects on pedestrian behavior in the five countries. That is, context or country may determine the effect of values on pedestrian behaviors. The results are discussed in relation to the previous literature.

1. Introduction

Road traffic injuries, which are responsible for the deaths of 1.35 million people every year worldwide (World Health Organization [WHO], 2018), vary in fatality rates between countries. For example, the estimated fatality rates per 100,000 population are 6.1 for Estonia, 9.2 for Greece, 18 for Russia, 7.4¹ for Kosovo, and 12.3 for Turkey (Ramadani et al., 2017; WHO, 2018). Since 23 % of people killed on roads are pedestrians (WHO, 2018), they are one of the road user

groups at greatest risk. As with overall traffic fatality rates, pedestrian death rates differ substantially across countries (WHO, 2018). To illustrate, among all deaths on the roads, the percentage of pedestrian death is 23 % for Turkey, 29 % for Russia, 31 % for Estonia, but only 18 % for Greece (WHO, 2018). In Kosovo, this percentage ranged from 28.2 % to 37.2 % between 2010 and 2015 (Ramadani et al., 2017). The pedestrian fatality rates per 100,000 population for these five countries are 1.89 for Estonia (high-income country), 1.66 for Greece (high-income country), 2.72² for Kosovo (middle-income country), 5.22 for

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¹ The report published by WHO (2018) did not include Kosovo. This statistic, which refers to mean traffic fatality rates in 2010-2015 was taken from Ramadani et al. (2017).

² This rate refers to the pedestrian fatality rate in 2015.

Table 1 Population, Number of Fatalities, Fatality Rates per 100,000 population, Percentage of Pedestrian Fatalities, Pedestrian Fatality Rates per 100,000 population for Estonia, Greece, Kosovo, Russia and Turkey.

Y	EE (H)			GR (H)			KS (M)			RU (M)			TR (M)		
	2016	2013	2016	2016	2013	2016	2015	2014	2013	2012	2011	2010	2016	2013	2016
P	1,312,442	1,287,251	11,183,716	11,127,990	1,771,604	1,804,944	1,820,631	1,793,000	1,739,825	2,207,000	143,964,512	142,833,689	79,512,424	74,932,641	
FN	71 (80)	81 (90)	824 (1026)	865 (1013)	129	127	117	121	157	175	20,308 (25,969)	27,025 (27,025)	7300 (9782)	3685 (6687)	
FR	6.1	7	9.2	9.1	7.3	7.0	6.4	6.7	9.0	7.9	18	18.9	12.3	8.9	
PPF	31 %	29 %	18 %	17 %	37.2 %	30.7 %	28.2 %	34.7 %	28.7 %	34.3 %	29 %	29 %	23 %	26 %	
PFR	1.89	2.03	1.66	1.55	2.72	2.15	1.80	2.32	2.58	2.71	5.22	5.48	2.83	2.31	

Note. EE = Estonia, GR = Greece, KS = Kosovo, RU = Russia, TR = Turkey, Y = Year, P = Population, FN = Fatality Number, FR = Fatality Rates per 100,000 population, PPF = Percentage of Pedestrian Fatalities among all deaths, PFR = Pedestrian Fatality Rate per 100,000 population, H = High-income country, M = Middle-income country, Country classification by income level was taken from World Bank (2019). Data for 2016 and 2013 are from WHO (2018) and WHO (2015) respectively for four countries (Estonia, Greece, Russia, and Turkey). All data for Kosovo came from Ramadani et al. (2017). As in Eid and Abu-Zidan (2015), PFR = FR * PPF. Countries are alphabetically ordered. Values in parenthesis represent estimated fatality numbers.

Russia (middle-income country), and 2.83 for Turkey (middle-income country) (see Table 1). Table 1 provides important background statistics for these five countries, including population and income level. In Russia, pedestrians are the road user group at greatest risk, with a pedestrian fatality rate higher than many European countries in 2012 (Fattakhov, 2016). Greece experienced one the steepest declines in Europe for pedestrian fatalities between 1991 and 2012 (Fattakhov, 2016). Estonia's pedestrian fatality rate is lower than for the other four countries, although the proportion of pedestrian deaths among all road fatalities is higher than the other countries (WHO, 2018). After driver related factors, pedestrian related factors are the second most frequent cause of traffic accidents resulting in death or injury, with a percentage of 8.44 % in Turkey (Turkish Statistical Institute, 2018). The Road Safety Strategy and Action Plan for Kosovo (2012) reported that the high number of pedestrian fatalities was one of Kosovo's main road safety problems. Although the countries for the present study were chosen based on the availability of data, it can be assumed that each has a different level of pedestrian safety and traffic culture, which should be reflected in pedestrian behaviors. Hence, understanding the factors behind these differences may provide insights into how roads can be made a safer environment for pedestrians.

The proximal factors associated with road accidents are vehicle-related factors, traffic environment, and human factors. These in turn are all affected by a country's socio-ecological factors at different levels (Özkan and Lajunen, 2011). However, in most cases, human factors, which include both pedestrian and driver-related factors, are associated with traffic accidents involving pedestrians (e.g. Mako and Szakonyi, 2016).

1.1. Pedestrian behaviors as a human factor in pedestrian fatalities

As already outlined, pedestrians are among the road user groups who are most likely to be physically injured (Deb et al., 2017; WHO, 2018). Despite being extremely vulnerable in traffic, pedestrians engage in risky and inattentive behaviors that significantly increase their risk of being involved in accidents (e.g. Mako and Szakonyi, 2016; Zhuang and Wu, 2011). To illustrate, in Hungary, pedestrians' risky behaviors cause 44 % of all pedestrian-related accidents occurring on pedestrian crossings (Mako and Szakonyi, 2016). Hence, investigating differences in pedestrian behaviors is an important prerequisite for making the traffic environment safer for road users.

While there are various measurement methods (e.g. observation, simulation) and scales for pedestrian behaviors (e.g. Ojo et al., 2019; Elliott and Baughan, 2004; Granić, 2008; Holland and Hill, 2010), many studies use the Pedestrian Behavior Scale (PBS) developed by Granić et al. (2013). This is based on the framework of driver behavior classification (e.g. Lawton et al., 1997; Reason et al., 1990; Özkan and Lajunen, 2005). Although PBS was intended to include five different behavior types (errors, violations, lapses, positive behaviors, and aggressive behaviors), the original study's factor analysis revealed four factors, namely transgressions, aggressive behaviors, lapses, and positive behaviors (Granić et al., 2013). There were also some slight differences between the classifications of pedestrian and driver behaviors. Transgressions included offences defined as the intentional failure to comply with legal rules. However, this factor also included error items that are considered as unintentional behaviors in the driver behavior classification. Specifically, the error component is viewed as decision-making errors that put pedestrians at risk while excluding non-compliance with pedestrian-related rules. Other factors (lapses, and positive and aggressive behaviors) were congruent with the driver behavior classification. Lapses are unintentional pedestrian behaviors due to inattention. Positive behaviors are pedestrian behaviors facilitating interaction with other road users while aggressive behaviors are aggressive pedestrian behaviors in interacting with other road users (Granić et al., 2013). This scale has been translated into various languages and different versions (e.g. Antić et al., 2016; Deb et al., 2017;

Demir, 2017; McIlroy et al., 2019; Qu et al., 2016) have been used in different countries (e.g. Turkey, the USA, Serbia, Bangladesh, China, Kenya, Thailand, the United Kingdom, and Vietnam). Some studies support the original four factor structure (e.g. Demir, 2017; Qu et al., 2016) while others do not (e.g. Deb et al., 2017; McIlroy et al., 2019).

Regarding the relationship between safety outcomes and pedestrian behaviors, different types of pedestrian behaviors are linked to different safety outcomes. To illustrate, Deb et al. (2017) revealed that self-reported violation scores are related to previous involvement in an accident as a pedestrian while both self-reported violations and errors are related to injuries caused by accidents. Injury severity was related to self-reported lapses and aggressive behaviors in the USA (Deb et al., 2017). McIlroy et al. (2019) found that lapses and aggressive behaviors are related to previous involvement in an accident by any road user. Yıldırım (2007) reported a positive correlation between near accident involvement for pedestrians and self-reported aggressive pedestrian behaviors in Turkey. Thus, except for positive behaviors, all pedestrian behaviors seem relevant for safety outcomes, so they can be considered risky pedestrian behaviors.

In research on pedestrian behaviors, the most frequently studied variables are demographic variables like age and gender. Studies show that male and younger pedestrians are more likely to engage in risky behaviors (e.g. Antić et al., 2016; Deb et al., 2017; Moyano-Diaz, 2002; Granić et al., 2013; Rosenbloom et al., 2004; Papadimitriou et al., 2013). Different pedestrian behavior dimensions also vary by gender and age (e.g. Antić et al., 2016; Deb et al., 2017; Granić et al., 2013; McIlroy et al., 2019; Moyano-Diaz, 2002), indicating the important influence of gender and age on pedestrian behaviors. Accordingly, these two variables are used as control variables in all analyses in the present study.

1.2. Regional differences in pedestrian behaviors

It is well known that there are regional differences in pedestrian behaviors. An observational study in Israel by Rosenbloom et al. (2004) compared pedestrians in ultra-orthodox and secular areas in terms of five behaviors ("running a red-light, crossing where there is no crosswalk, walking along the road, failing to check for traffic prior to crossing, and taking a child's hand when crossing", p. 395). The frequency of violations was higher for pedestrians in the ultra-orthodox than secular area. Another study revealed that Iranian pedestrians have higher transgression scores than Pakistani pedestrians while Pakistani pedestrians have higher scores for both attention violations and aggressive behaviors than Iranians (Nordfjærn and Zavareh, 2016). Recently, McIlroy et al. (2019) compared pedestrians in six countries (Bangladesh, China, Kenya, Thailand, the UK, and Vietnam) in terms of violations, lapses, and aggression, as measured by PBS sub-scales, finding a significant main effect of country. That is, these countries differ substantially in terms of pedestrian behaviors.

The available literature suggests that the countries studied differ in terms of pedestrian behaviors. To illustrate, Papadimitriou et al. (2013) compared pedestrian attitudes and behaviors in 19 European countries. Cluster analyses showed that pedestrians fell into three groups (pedestrians with "positive behavior and attitudes", pedestrians with "negative behavior and attitudes", and pedestrians with "positive behavior but mixed attitudes", p. 114). Greece had the high percentage of pedestrians with "negative behavior and attitudes" (38.9 %) while Estonia had an average percentage of pedestrians with "negative behavior and attitudes" (31.5 %). Another study by Papadimitriou et al. (2012) showed that 25 % of Estonian pedestrians reported occasionally or more frequently ignoring pedestrian red lights whereas 44 % did so in Greece. Furthermore, whereas 41 % of Estonian pedestrians reported occasionally or more frequently crossing at places other than pedestrian crossings, the violation rate was 76 % in Greece (Papadimitriou et al., 2012). In Turkey, about 30 % of participants reported occasionally or more frequently violating pedestrian traffic rules, with around 70 %

rarely or less frequently engaging in lapse behaviors. About 40 % of participants reported never displaying aggressive pedestrian behaviors while around 60 % reported that they frequently display positive pedestrian behaviors (Demir, 2017).

Pedestrian fatality rates (see Table 1) suggest that Estonia (high-income) and Greece (high-income) have safer fatality records than Kosovo (middle-income), Russia (middle-income), and Turkey (middle income). Consistent with this, Eid and Abu-Zidan (2015) found that gross national income as an economic indicator was related to pedestrian death rates in 2007. However, cross-cultural studies (Papadimitriou et al., 2012; 2013) comparing European Countries on pedestrian behaviors indicate that pedestrians in Estonia display safer behaviors than those in Greece. That is, risky pedestrian behaviors may contribute less to pedestrian deaths in Estonia than in Greece since driver and infrastructural factors are also related to pedestrian deaths (Özkan and Lajunen, 2011). Based on this, we expected that pedestrians in Greece, Kosovo, Russia, and Turkey would have higher scores on transgressions, lapses, and aggressive behaviors (risky pedestrian behaviors) than those in Estonia. We had no expectations about positive pedestrian behaviors, which previous studies show are unrelated to safety outcomes. This suggests the following hypothesis.

Hypothesis 1. Pedestrians in Greece, Kosovo, Russia, and Turkey have higher scores on risky pedestrian behaviors (transgressions, lapses, and aggressive behaviors) than those in Estonia.

1.3. Possible reasons for differences in pedestrian behaviors

It seems plausible that the reasons behind the differences between countries in the pedestrian behaviors that may contribute to pedestrian fatalities can be related to traffic culture since pedestrians are embedded in the traffic culture of each country (Nordfjærn et al., 2014; Özkan and Lajunen, 2011). Just as for driver behaviors, traffic culture shapes its member's pedestrian behaviors through many factors, including formal and informal rules (Özkan et al., 2006). Traffic safety culture refers to "the assembly of underlying assumptions, beliefs, values and attitudes shared by members of a community, which interact with a community's structures and systems to influence road safety related behaviours" (Edwards et al., 2014, p. 296). Similarly, Özkan and Lajunen (2011) define this concept as "the sum of all external factors (ecocultural sociopolitical, national, group, organizational, and individual factors) and practices (e.g., education, enforcement, engineering, economy, and exposure) for the main goals of mobility and safety to cope with internal factors (road users, roads, and engineering) of traffic." (p. 187). Although traffic culture is a very broad concept encompassing all factors within the traffic system, cultural components, which refer to societal norms and value systems shared by all members, are at the center of traffic culture (Özkan and Lajunen, 2011, 2015). In other words, cultural components (e.g. norms, beliefs, and values) substantially form and maintain traffic culture (Özkan and Lajunen, 2011; 2015). Similarly, Edwards et al. (2014) suggest that traffic culture includes both cultural (e.g. shared values, attitudes, and norms) and contextual factors (e.g. traffic system). Given that previous research discusses that traffic culture functions at different levels (Edwards et al., 2014; Özkan and Lajunen, 2011; 2015), the present study uses the multilevel framework proposed by Özkan and Lajunen (2011, 2015). This framework includes four different levels (micro "individual level factors", meso "group/community level factors", macro "national level factors", and magna "ecocultural sociopolitical level factors").

Various studies have determined the relationships between driver behaviors and the cultural component of traffic culture at the micro level (e.g. Kaçan et al., 2019), meso level (e.g. Öz et al., 2013, 2014), macro level (Üzümcüoğlu and Özkan, 2019), and magna level (e.g. Üzümcüoğlu et al., 2018). Regarding pedestrian behaviors, some studies have investigated the effect of cultural factors. Nordfjærn and Şimşekoğlu (2013) highlighted the importance of cultural variables (i.e.

vertical and horizontal collectivism) in pedestrian behaviors in Turkey. Specifically, risky pedestrian behaviors were negatively associated with vertical collectivism but positively with horizontal collectivism. Nordfjærn and Zavareh (2016) studied how cultural factors affect risky pedestrian behavior in Iran and Pakistan. In both cases, vertical individualism was negatively related to attitudes toward safety, which in turn affected pedestrian behaviors. In Iran, but not Pakistan, vertical collectivism was related to attitudes toward safety. In addition, several studies have examined the relationship between the cultural component of traffic culture at the macro level (traffic climate) and pedestrian behaviors (e.g. Xu et al., 2018). However, no studies have investigated the relationship between pedestrian behaviors and values as the cultural component of traffic culture at the micro level.³ Hence, the present study considers values as a micro level aspect of traffic culture to explain differences in pedestrian behaviors between counties.

1.4. The relationships between pedestrian behaviors and values as a micro level aspect of traffic culture

Due to the lack of traffic-specific value measurements, the present study used the theory of basic human values proposed by Schwartz (1992) as a framework for testing the effects of values on pedestrian behaviors across countries. In this theory, values are defined as “desirable, trans-situational goals, varying in importance, that serve as guiding principles in people’s lives” (Schwartz et al., 2001; p. 521). According to Schwartz (1992), individuals’ attitudes, decision-making, and behaviors across different context are affected by their values since values guide them. The theory includes 10 basic values characterized by their underlying motivation: security, conformity, tradition, benevolence, universalism, self-direction, stimulation, hedonism, achievement, and power (Schwartz, 1994a; Schwartz et al., 2001; see Table 2 for definitions).

The theory of basic human values depicts the structure of the association among basic values in a circular motivational continuum, depending on conflict or congruence among these values (Schwartz, 1994a, 2012; Schwartz et al., 2012; see Fig. 1). In this circular structure, some values are compatible while others are not, and may even conflict (Schwartz, 2012). Values that are proximal in this circle have analogue motivations while values remote from each other have conflicting motivations (Schwartz, 2009, 2012). The content and inter-relationship between these values is cross-culturally supported (e.g. Schwartz, 1992, 2012; Schwartz et al., 2001; Schwartz and Rubel, 2005; Schwartz and Sagiv, 1995). As shown in Fig. 1, the basic values are grouped into two higher-order value dimensions: openness to change versus conservation, and self-enhancement versus self-transcendence (Schwartz et al., 2012). Openness to change, which includes self-direction, stimulation, and hedonism, highlights a willingness to do what is new (Schwartz et al., 2012). In contrast, conservation, which includes security, conformity, and tradition, puts importance on hierarchy, reluctance to change, self-restriction, and maintenance of the existing situation (Schwartz, 2012). Self-enhancement, which includes power, achievement, and hedonism, is characterized by a willingness to prioritize one’s own needs, to accomplish, and control (Schwartz, 2009, 2012). In contrast, self-transcendence, which includes universalism and benevolence, highlights caring about other people by going beyond one’s own needs (Schwartz, 2012; Schwartz et al., 2012).

This theory of values has been used as a framework for examining the effects of values on a wide range of social phenomena, such as out-group communication (Sagiv and Schwartz, 1995) and well-being (Sorthex and Schwartz, 2017). Other studies have explored the effects of these values on risky behaviors. Goodwin et al. (2002) documented the associations between values and risky sexual behaviors. Their

results highlighted the predictive role of openness to change, self-enhancement, and hedonism in risky sexual behavior. Studies on prosocial behaviors have shown the beneficial effects of self-transcendence values and the negative effects of openness to change values (e.g. Daniel et al., 2015). Regarding aggression, Knafo et al. (2008) showed the beneficial effect of universalism and conformity on self-reported violence behavior in contrast to the negative effect of power. Similarly, Benish-Weisman et al. (2017) argue that self-transcendence is negatively related to aggression whereas self-enhancement is positively related to it. They also claimed that conservation is negatively related to aggression while openness to change is positively but weakly related to it.

While the effects of values on risky, aggressive, and prosocial behaviors has been documented, the literature is mainly mute about the effects of individual values in the traffic context. However, there is empirical evidence showing the effects of national-level values, which parallel the effects of individual level values (e.g. Fischer and Poortinga, 2012; Schwartz, 1994b) on traffic outcomes across countries (e.g. Gaygısız, 2010; Özkan and Lajunen, 2007; Solmazer et al., 2016). Schwartz, 1994b suggests that the autonomy versus embeddedness dimension of national-level values is analogous to openness to change versus conservation. He also suggests that mastery and hierarchy dimensions of national-level values are analogous to self-enhancement while harmony and egalitarianism are analogous to self-transcendence. Özkan and Lajunen (2007) reported that, beyond the economy, traffic fatality rates are negatively associated with embeddedness but positively associated with egalitarianism. Gaygısız (2010), found that embeddedness, hierarchy, and mastery were positively related to traffic fatality rates whereas intellectual autonomy and egalitarianism were negatively related. Solmazer et al. (2016) showed that these rates were positively related to embeddedness and hierarchy but negatively to intellectual autonomy, egalitarianism, and harmony. Finally, another aggregated study including 37 nations by Üzümcüoğlu and Özkan (2019) reported that non-speed violations were positively related to both embeddedness and egalitarianism in a driver behavior context. Taken together, despite the inconsistent patterns of associations across studies, national-level values affect road safety at aggregated level.

Only a few studies have investigated the effect of individual values in a traffic context. For instance, Yıldırım (2007) revealed that one factor of conservatism (conservation of values) measured by a scale was negatively related to aggressive pedestrian behaviors while it was significantly related to positive driver behaviors in Turkey. Kaçan et al. (2019) recently revealed that self-transcendence values were negatively correlated with errors (Greece, Russia, and Turkey) and violations (Greece, Estonia, Russia and Turkey) but positively correlated with positive driver behaviors (Russia and Turkey). Conservation was negatively correlated with errors (Greece, Russia, Kosovo, Turkey) and violations (Greece, Estonia, Russia) but positively correlated with positive behaviors (Russia, Kosovo, and Turkey). Openness to change was related to errors (a negative relationship for Russia and Turkey), violation (Russia), and positive behaviors (a positive relationship for Russia and Turkey but a negative relationship for Greece). Self-enhancement was negatively related to errors (Russia and Kosovo) and positively correlated with positive behaviors (Russia and Turkey). As previously mentioned, studies on aggression, prosocial behavior, and risky behavior – albeit in non-traffic contexts – consistently indicate that conservation and self-transcendence are both protective factors against risky pedestrian behaviors and promoting factors for positive behaviors while the opposite is true for self-enhancement and openness to change. Given these findings, self-transcendence versus self-enhancement and conservation versus openness to change may result in lower risky pedestrian behaviors and higher positive behaviors. Hence, the following is hypothesized.

Hypothesis 2. Self-transcendence and conservation are related to less frequent risky pedestrian behaviors but more frequent positive behaviors while self-enhancement and openness to change are related

³ At this point, it is important to note that one study investigated the effect of conservatism on pedestrian behaviors.

Table 2
Ten Basic Values and Defining Goals (Schwartz, 1994a, p.22).

Values	Defining goals
Self-direction	“independent thought and action choosing, creating, exploring”
Stimulation	“excitement, novelty, and challenge in life”
Hedonism	“pleasure and sensuous gratification for oneself.”
Achievement	“personal success through demonstrating competence according to social standards”
Power	“social status and prestige, control or dominance over people and resources”
Security	“safety, harmony, and stability of society, of relationships, and of self”
Conformity	“restraint of actions, inclinations, and impulses likely to upset or harm others and violate social expectations or norms”
Tradition	“respect, commitment, and acceptance of the customs and ideas that one's culture or religion provides”
Benevolence	“preserving and enhancing the welfare of those with whom one is in frequent personal contact (the ‘in-group’)”
Universalism	“understanding, appreciation, tolerance, and protection for the welfare of <i>all</i> people and for nature”

Note. The definitions in column 2 are directly taken from Schwartz, 1994a, p. 22).

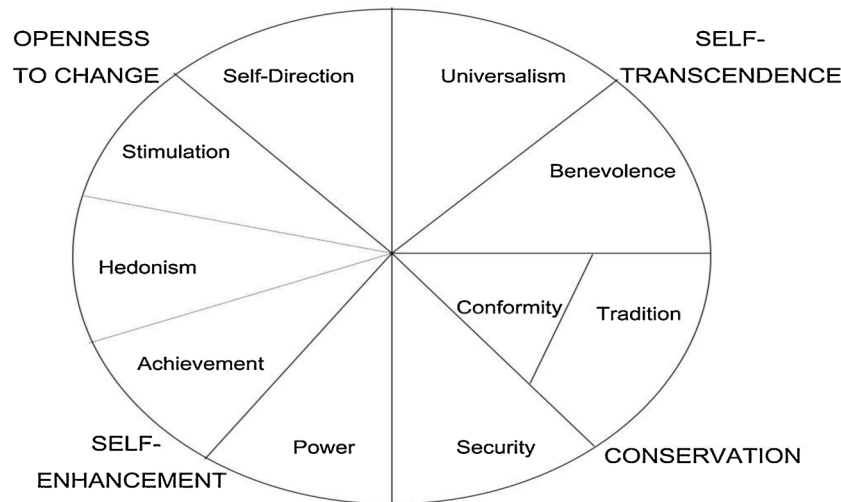


Fig. 1. Values in a Circular Motivational Continuum. Note. This figure is directly taken from Schwartz and Rubel (2005, p.1011).

to more frequent risky pedestrian behaviors but less frequent positive behaviors.

Social context determines whether values affects pedestrian behaviors. As Shinar (1998) notes regarding aggressive driving, the behavioral manifestation of such behaviors depends on cultural norms and enforcement. If a country's cultural norms and enforcement levels allow people to show these behaviors, then they display them. Similarly, Roccas and Sagiv (2010) claim that the effect of values on behavior depends on situation strength (the degree to which the social context gives clear cues about appropriate behavior). When the social context is weak, it allows people to display their values; hence the relationship between values and behaviors becomes stronger. Conversely, a strong social context prevents people displaying their values; hence the relationship between values and behaviors becomes weaker. Supporting this, Knafo et al. (2008) found that the same values (power, universalism, and conformity) affected self-reported violent behavior in two different contexts (two different schools) in an adolescent sample. However, these relationships were stronger for schools with higher levels of violence (but only for power and universalism). When we extend these findings to the traffic environment, the effects of values can be stronger in countries in which the social context allows individuals to display risky pedestrian behaviors than in countries in which the social context prevents it. Consistent with hypothesis 1, Greece, Kosovo, Russia, and Turkey can be considered countries with higher levels of risky pedestrian behaviors while Estonia can be considered as having lower levels of risky pedestrian behaviors. Accordingly, the following is hypothesized.

Hypothesis 3. The effect of values on pedestrian behaviors is stronger for Kosovo, Russia, Greece, and Turkey than Estonia.

2. Method

2.1. Participants and procedure

The data was obtained from a large-scale survey of road user behaviors and traffic culture (as a part of **Traffic Safety Cultures** and the **Safe Systems Approach – Towards a Cultural Change Research and Innovation Agenda for Road Safety [TraSaCu]** Project). The study was approved by the Human Research Ethic Committee at Middle East Technical University. The questionnaire battery was distributed in all participating countries via the internet using Qualtrics (an online software solution). The participants were 813 pedestrians from five different countries (Estonia, Greece, Kosovo, Russia, and Turkey). Of the participants, 131 (16.1 %) were Estonian, 249 (30.6 %) were Greek, 112 (13.8 %) were Kosovar, 176 (21.6 %) were Russian, and 145 (16.8 %) were Turkish. There were 326 women (40.1 %) and 487 men (59.9 %). Ages ranged between 17 and 76 with a mean of 35.09 years ($SD = 13.87$). The demographic characteristics for the whole sample and each country are presented in Table 3.

2.2. Measures

2.2.1. Demographic information form

This asked for the participant's age and gender.

2.2.2. Short-Schwartz's value scale

The Short-Schwartz's Value Scale, developed by Lindeman and Verkasalo (2005) from the original version (Schwartz, 1992), was used to measure 10 values. This version of the scale consists of the names of 10 values presented with their value items. Participants were asked to

Table 3
Participants' Demographic Characteristics by Country.

Variables	Total	EE	GR	KS	RU	TR
N (%)	813 (100 %)	131 (16.1 %)	249 (30.6 %)	112 (13.8 %)	176 (21.6 %)	145 (16.8 %)
Women	326 (40.1 %)	65 (49.8 %)	107 (43 %)	28 (25 %)	46 (26.1 %)	80 (55.2 %)
Men	487 (59.9 %)	66 (50.4 %)	142 (57 %)	84 (75 %)	130 (73.9 %)	65 (44.8 %)
Age						
Mean	35.09	47.68	41.91	36.86	21.79	26.59
SD	13.87	13.64	10.37	12.11	5.29	8.24
Min-Max	17-76	24-76	18-72	18-72	17-50	19-64

Note. EE = Estonia, GR = Greece, KS = Kosovo, RU = Russia, TR = Turkey; countries are alphabetically ordered.

evaluate the importance of each value (for example power; that is, social power, authority, wealth) on an 8-point Likert-type scale ranging from 0 (opposed to my principles) to 7 (of supreme importance).

Higher-order values were created based on the circular motivational continuum of values by Schwartz et al. (2012). Openness to change was created by hedonism, stimulation, and self-direction scores whereas conservation was created by conformity, tradition, and security scores. Self-enhancement was created by power and achievement scores⁴ while self-transcendence was created by universalism and benevolence scores.

2.2.3. Pedestrian behavior scale (PBS)

Pedestrian behaviors were assessed using 15 selected items from the PBS developed by Granié et al. (2013). The original scale, which was conceptually based on the Driver Behavior Questionnaire (Reason et al., 1990), Aggressive Driver Behaviors Scale (Lawton et al., 1997), and Positive Driver Behaviors Scale (Özkan and Lajunen, 2005), consists of 32 items. Granié et al. (2013) found that this scale has four sub-dimensions, namely transgressions with 15 items (e.g. "I cross the street even though the pedestrian light is red"), lapses with seven items (e.g. "I forget to look before crossing because I am thinking about something else"), aggressive behaviors with five items (e.g. "I get angry with another user and insult him"), and positive behaviors with five items (e.g. "I let a car go by, even if I have the right-of-way, if there is no other vehicle behind it"). The short version of this scale with 20 items designed by Granié et al. (2013) also supported the four-factor structure. In this study, a total of 15 marked items borrowed from this short version were used. This 15-item scale included four dimensions: transgression with five items, lapses with four items, aggressive behaviors with three items, and positive behaviors with three items. Participants were asked to rate each item on a seven-point Likert-type scale ranging from 1 = Never to 7 = Always. The Cronbach alpha coefficients for the four dimensions are shown in Table 4.

3. Results

3.1. Factor structure of PBS

A series of principle component analyses with Varimax rotation were separately conducted on the 15-item PBS for each country. Consistent with the original structure of the scale, four samples (Estonia, Greece, Kosovo, and Turkey) revealed an initial four-factor structure with eigenvalues over one whereas the Russian sample revealed an initial three-factor structure. As the four-factor structure, which is congruent with the scale's original structure (Granié et al.,

⁴ Self-enhancement also includes hedonism. In other words, hedonism is conceptualized under both self-enhancement and openness to change. In this study, in calculating higher order values, hedonism was only used for openness to change.

2013), was found in the other four countries, the Russian data were forced into the four-factor structure.

The four factors explained from 66.19 %–75.36 % of the total variance for the five countries. In three samples (Estonia, Greece, and Turkey), all items loaded under their expected respective factors without any cross-loading. However, in the Kosovar sample, item 4 ("I cross even though the light is still green for vehicles.") pertaining to transgression in the original scale, loaded on aggressive behaviors. This item was therefore omitted from the scale for all countries. In the Russian sample, item 13 ("I let a car go by, even if I have the right-of-way, if there is no other vehicle behind it.") loaded both onto aggressive behaviors and positive behaviors. However, as expected, this item had a higher factor loading on positive behaviors than on aggressive behaviors. Hence, the item was not dropped. The remaining 14 items (all items except for item 4), which had similar structures in all five countries, were used in the further analyses. Taken together, the results supported the four-factor structure of the PBS in the five countries, implying that the scale's four-factor structure (transgressions, lapses, aggressive behaviors, and positive behaviors) is valid for these five countries.

3.2. Descriptive statistics

Correlations among the study variables (age, gender, values, and four dimensions of the PBS) are presented in Table 5 (Estonia and Kosovo), Table 6 (Kosovo and Russia), and Table 7 (Turkey). Generally, there were inconsistent patterns for the associations of pedestrian behaviors with demographic and value variables in the five countries (see Tables 5–7 for detailed information). Descriptive statistics for the higher order values are presented in Table 8.

3.3. Comparison of countries on PBS items and sub-scale scores

A series of Analysis of Covariance (ANCOVA) were conducted to test Hypothesis 1. These analyses revealed significant differences between the countries on the PBS items and sub-scale scores after controlling for the effects of age and gender (see Table 9).

Hypothesis 1 predicted that pedestrians in Greece, Kosovo, Russia, and Turkey have higher scores for risky pedestrian behaviors (transgressions, lapses, and aggressive behaviors) than those in Estonia. The results demonstrated that Turkish and Greek pedestrians had higher scores for transgressions than Estonian, Kosovar, and Russian pedestrians. In addition, Estonian pedestrians had higher scores for transgressions than Kosovar pedestrians. However, Russian pedestrians did not significantly differ from Estonian and Kosovar pedestrians in terms of transgression scores. Greek pedestrians reported the pedestrian behavior described in item 2 ("I cross outside the pedestrian crossing even if there is one less than 50 m away") most frequently.

Turkish and Russian pedestrians had higher scores for lapses and aggressive behaviors than Estonian, Greek, and Kosovar pedestrians. Consistent with this, Turkish and Russian pedestrians reported all items of lapses and aggressive behaviors more frequently than other countries except for the behaviors described in item 6 ("I forget to look before crossing because I am thinking about something else"), item 9 ("I realize that I have crossed several streets and intersections without paying attention to traffic"), item 11 ("I get angry with another user (pedestrian, driver, cyclist, etc.) and I yell at him/her"), and item 12 ("I get angry with another user (pedestrian, driver, cyclist, etc.) and I make a hand gesture"). The results showed that Turkish and Estonian pedestrians had higher scores for positive behaviors than Kosovar pedestrians.

Hypothesis 1 was thus partially supported since Turkish and Russian pedestrians generally had higher scores for risky pedestrian behavior than Estonian pedestrians (except for transgression scores in Russia). Consistent with the hypothesis, Greek pedestrians had higher scores for transgressions than Estonian pedestrians. Unexpectedly, however,

Table 4
Four-Factor Solution of the PBS in Five Countries (EE, GR, KS, RU, TR).

Items	Transgressions					Lapses					Aggressive Behaviors					Positive Behaviors				
	EE	GR	KS	RU	TR	EE	GR	KS	RU	TR	EE	GR	KS	RU	TR	EE	GR	KS	RU	TR
1. I cross diagonally to save time.	.63	.69	.69	.81	.63															
2. I cross outside the pedestrian crossing even if there is one less than 50 m away.	.82	.84	.80	.83	.77															
3. I cross the street even though the pedestrian light is red.	.85	.86	.75	.80	.84															
4. I cross even though the light is still green for vehicles.	.82	.83		.68	.77															
5. I cross the street between parked cars.	.68	.74	.67	.69	.78															
6. I forget to look before crossing because I am thinking about something else.						.82	.85	.88	.83	.89										
7. I forget to look before crossing because I want to join someone on the sidewalk on the other side.						.85	.89	.77	.82	.85										
8. I cross without looking because I am talking with someone.						.87	.89	.85	.79	.90										
9. I realize that I have crossed several streets and intersections without paying attention to traffic.						.70	.78	.79	.72	.75				.51						
10. I get angry with another road user and insult him/her.											.85	.83	.86	.79	.83					
11. I get angry with another user (pedestrian, driver, cyclist, etc.) and I yell at him/her.											.88	.90	.93	.81	.91					
12. I get angry with another user (pedestrian, driver, cyclist, etc.) and I make a hand gesture.											.74	.81	.88	.79	.84					
13. I let a car go by, even if I have the right-of-way, if there is no other vehicle behind it.														.42		.85	.54	.71	.64	.62
14. When I am accompanied by other pedestrians, I walk in single file on narrow sidewalks so as not to bother the pedestrians I meet.																.88	.73	.83	.85	.80
15. I stop to let the pedestrians I meet pass by.																.74	.87	.88	.83	.84
Eigenvalues:	3.02	3.23	2.50	3.39	3.05	2.79	3.19	2.89	3.29	3.15	2.18	2.36	2.87	2.77	2.38	1.94	1.61	2.08	1.86	1.76
Explained Variance %:	2.11	22.16	16.63	22.57	2.33	18.60	21.27	19.28	21.93	2.99	14.52	15.74	19.10	18.49	15.84	12.96	1.75	13.85	12.37	11.73
Cronbach's Alpha:	.78	.82	.75	.85	.79	.83	.91	.86	.93	.90	.78	.86	.90	.91	.86	.68	.53	.76	.69	.63

Note. A value of .40 was used as a cut-off point for factor loadings. EE = Estonia, GR = Greece, KS = Kosovo, RU = Russia, TR = Turkey; countries are alphabetically ordered.

Table 5
Correlations among Study Variables for Estonian and Greek samples.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Age	-																			
2. Gender	.20*	-.05	.06	.05	.10	.15*	.08	-.02	-.08	-.24**	-.18**	-.03	.07	-.20**	-.05	.13*	-.18**	-.08	-.07	.14*
3. Universalism	-.02	-.26**	-	-.18**	-.06	-.08	-.10	-.03	-.15*	-.01	-.05	-.19**	-.23**	-.09	-.10	-.09	-.02	-.07	.11	-.04
4. Benevolence	-.21	-.29**	.56**	.52**	.39**	.26**	.39**	.07	.10	.00	.10	.33**	.91**	.16*	.09	.38**	-.03	-.14*	-.11	.11
5. Conformity	.02	-.17	.37**	.50**	.61**	.45**	.58**	.07	.17**	.08	.12	.33**	.83**	.21**	.13*	.60**	.02	-.15*	-.11	.27**
6. Tradition	.25**	-.01	.25**	.20*	.47**	-.	.62**	.10	.20**	-.01	.07	.24**	.56**	.11	.27**	.92**	-.11	-.21**	-.11	.22**
7. Security	.03	-.25**	.23**	.33**	.60**	.36**	-.	.26**	.33**	.03	.13*	.32**	.54**	.18**	.33**	.86**	-.01	-.20**	-.15*	.25**
8. Power	.05	-.02	.16	.06	.34**	.47**	.29**	-.	.60**	.43**	.35**	.17**	.08	.41**	.91**	.20**	.09	.05	.00	.00
9. Achievement	-.06	-.04	.10	.03	.16	.15	.16	.60**	-.	.43**	.38**	.28**	.15*	.47**	.88**	.29**	.09	.07	-.04	.04
10. Hedonism	-.08	-.09	.10	.14	.07	-.03	.06	.31**	.26**	-.	.59**	.24**	.04	.82**	.48**	.00	.19**	.09	.05	-.09
11. Stimulation	-.13	-.04	.13	.20*	.04	-.01	-.01	.12	.25**	.47**	-.	.45**	.13*	.87**	.40**	.08	.17**	.04	-.01	.00
12. SD	-.02	-.12	.29**	.37**	.22*	-.03	.19*	.02	.18*	.32**	.54**	-.	.38**	.66**	.24**	.25**	.15*	-.08	-.09	.14*
13. ST	-.10	-.30**	.94**	.81**	.47**	.26**	.30**	.14	.08	.12	.17*	.36**	-.	.20**	.12	.54**	-.01	-.17**	-.13*	.20**
14. OC	-.11	-.11	.20*	.28**	.13	-.03	.09	.21*	.29**	.80**	.84**	.72**	.26**	-.	.49**	.12	.22**	.03	-.02	.01
15. SE	.00	-.03	.15	.05	.29**	.36**	.26**	.91**	.88**	.32**	.20*	.11	.12	.28**	-.	.27**	.10	.07	-.02	.02
16. C	.15	-.16	.34**	.40**	.81**	.82**	.78**	.47**	.20*	.03	.01	.13	.41**	.06	.38**	-.	-.12	-.19**	-.12	.22**
17. TRG	-.16	.19*	-.05	.01	-.16	-.11	-.12	-.17	-.19*	.05	.03	-.08	-.03	.01	-.20*	-.16	-.	.31**	.16*	-.03
18. LA	-.01	.13	-.12	-.17*	-.22*	-.09	-.10	.10	.06	.16	-.03	-.15	-.16	.01	.09	-.16	.25**	-.	.45**	-.02
19. AGB	.25**	.05	-.05	-.01	.03	.15	.04	.06	-.08	-.03	-.11	-.15	-.04	-.11	-.01	.10	.15	.22*	-.	.04
20. PB	-.12	-.07	.05	.07	-.02	-.17*	.00	-.03	.16	.04	.05	.15	.06	.09	.07	-.10	.04	-.10	.05	-.

Note. SD = Self-Direction, ST = Self-transcendence, OC = Openness to change, SE = Self-enhancement, C = Conservation, TRG = Transgressions, LA = Lapses, AGB = Aggressive Behaviors, PB = Positive Behaviors; the results presented in right-hand side of this table (i.e. bold numbers) show the correlations pertaining to the Greek sample; the results presented in left-hand side of this table show the correlations pertaining to the Estonian sample; countries are alphabetically ordered; $p < .05$; ** $p < .01$; *** $p < .001$.

Table 6
Correlations among Study Variables for Kosovo and Russian Samples.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Age	–	–.19*	.16*	.12	.09	.16*	.14	.16*	.11	.10	.12	.15	.15*	.13	.15	.15*	–.06	–.13	–.16*	.20**
2. Gender	.23*	–	–.14	–.14	–.08	–.23**	–.12	–.03	–.01	–.06	–.02	.02	–.15	–.03	–.02	–.16*	.01	.02	.14	–.13
3. Universalism	.07	–.21*	–	.78**	.63**	.50**	.67**	.24**	.44**	.64**	.53**	.63**	.95**	.65**	.38**	.69**	–.11	–.41**	–.45**	.32**
4. Benevolence	.00	–.15	.79**	–	.75**	.59**	.79**	.36**	.60**	.76**	.68**	.74**	.94**	.79**	.53**	.81**	–.02	–.36**	–.39**	.27**
5. Conformity	.01	–.16	.64**	.79**	–	.61**	.64**	.39**	.52**	.65**	.55**	.68**	.73**	.68**	.50**	.87**	–.14	–.38**	–.39**	.27**
6. Tradition	.03	–.12	.63**	.73**	.84**	–	.64**	.42**	.44**	.54**	.54**	.53**	.57**	.58**	.47**	.87**	–.11	–.15*	–.20**	.15*
7. Security	.00	–.18	.80**	.85**	.76**	.77**	–	.45**	.68**	.76**	.69**	.76**	.77**	.80**	.62**	.87**	.00	–.30**	–.30**	.35**
8. Power	.02	–.15	.42**	.43**	.52**	.57**	.52**	–	.66**	.48**	.43**	.50**	.31**	.51**	.91**	.48**	.14	.01	.07	.23**
9. Achievement	–.11	–.29**	.61**	.64**	.63**	.61**	.68**	.65**	–	.70**	.73**	.75**	.55**	.79**	.92**	.63**	.04	–.23**	–.15*	.24**
10. Hedonism	–.16	–.32**	.54**	.50**	.54**	.56**	.55**	.61**	.67**	–	.74**	.78**	.74**	.91**	.65**	.75**	–.04	–.30**	–.29**	.31**
11. Stimulation	–.10	–.32**	.69**	.68**	.59**	.64**	.69**	.53**	.70**	.70**	–	.81**	.63**	.92**	.64**	.68**	–.01	–.23**	–.24**	.35**
12. SD	–.05	–.23*	.81**	.82**	.71**	.73**	.80**	.44**	.69**	.65**	.84**	–	.72**	.94**	.69**	.75**	–.03	–.32**	–.33**	.36**
13. ST	.04	–.19*	.96**	.94**	.75**	.71**	.87**	.45**	.66**	.55**	.72**	.86**	–	.76**	.48**	.79**	–.08	–.41**	–.45**	.32**
14. OC	–.12	–.32**	.74**	.73**	.68**	.71**	.75**	.59**	.76**	.87**	.93**	.91**	.78**	–	.72**	.79**	–.03	–.31**	–.31**	.36**
15. SE	–.05	–.24*	.56**	.58**	.63**	.65**	.66**	.92**	.90**	.70**	.67**	.61**	.60**	.74**	–	.61**	.10	–.12	–.05	.26**
16. C	.02	–.16	.74**	.85**	.94**	.94**	.90**	.58**	.69**	.59**	.69**	.80**	.83**	.76**	.69**	–	–.09	–.32**	–.34**	.29**
17. TRG	–.08	.06	.17	.20*	.13	.05	.20*	–.09	.04	.07	–.01	.06	.20*	.04	–.03	.13	–	.53**	.48**	.19*
18. LA	–.08	.03	–.14	–.11	–.13	–.18	–.10	–.10	–.09	–.13	–.25**	–.26**	–.13	–.24*	–.10	–.15	.39**	–	.72**	–.03
19. AGB	.20*	.20*	–.18	–.17	–.17	–.17	–.24**	–.18	–.23*	–.17	–.25**	–.25**	–.19*	–.24**	–.22*	–.21*	.32**	.26**	–	.11
20. PB	.10	–.07	.42**	.43**	.40**	.33**	.39**	.18	.26**	.19	.34**	.44**	.45**	.35**	.24*	.40**	.14	–.05	–.05	–

Note. SD = Self-Direction, ST = Self-transcendence, OC = Openness to change, SE = Self-enhancement, C = Conservation, TRG = Transgressions, LA = Lapses, AGB = Aggressive Behaviors, PB = Positive Behaviors; the results pertaining to the Russian sample are presented in the lower half of this table (i.e. bold numbers); the results pertaining to the Kosovo sample are presented in the upper half of this table; countries are alphabetically ordered; $p < .05$; ** $p < .01$; *** $p < .001$.

Table 7
Correlations among Study Variables for Turkish sample.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
1. Age	—																			
2. Gender	.09	—																		
3. Universalism	.04	-.22**	—																	
4. Benevolence	.09	-.01	.65**	—																
5. Conformity	.29**	-.05	.31**	.51**	—															
6. Tradition	.27**	-.04	.19*	.33**	.56**	—														
7. Security	.15	-.12	.58**	.75**	.50**	.32**	—													
8. Power	.19*	.05	.01	.28**	.51**	.36**	.31**	—												
9. Achievement	.06	.05	.30**	.50**	.38**	.36**	.51**	.58**	—											
10. Hedonism	.13	.00	.17*	.21*	.14	.13	.18*	.30**	.30**	—										
11. Stimulation	.14	.18*	.12	.28**	.21*	.20*	.15	.28**	.33**	.54**	—									
12. SD	.07	-.08	.63**	.69**	.35**	.30**	.57**	.19*	.48**	.26**	.73**	—								
13. ST	.07	-.13	.92**	.90**	.45**	.29**	.73**	.16	.43**	.20*	.21**	.45**	—							
14. OC	.15	.05	.35**	.46**	.28**	.26**	.35**	.34**	.46**	.83**	.83**	.62**	.45**	—						
15. SE	.14	.06	.16*	.43**	.51**	.40**	.46**	.90**	.88**	.33**	.34**	.37**	.32**	.44**	—					
16. C	.31**	-.08	.43**	.64**	.87**	.80**	.72**	.50**	.51**	.19*	.23**	.49**	.59**	.37**	.57**	—				
17. TRG	-.21*	.07	.04	.01	-.07	-.10	-.05	-.05	-.07	.09	.11	.02	.03	.10	-.09	-.07	—			
18. LA	-.14	-.03	-.37**	-.39**	-.19*	-.21*	-.32**	-.05	-.20*	-.23**	-.05	-.30**	-.42**	-.24**	-.14	-.29**	.32**	—		
19. AGB	-.08	-.03	-.26**	-.35**	-.14	-.11	-.21*	-.01	-.10	-.01	-.06	-.29**	-.33**	-.12	-.06	-.18*	-.21*	.40**	—	
20. PB	.04	.02	.16*	.19*	.17*	.21*	.24**	.00	.01	-.09	.01	.21*	.19*	.03	.01	.25**	-.05	-.11	-.07	—

Note. SD = Self-Direction, ST = Self-transcendence, OC = Openness to change, SE = Self-enhancement, C = Conservation, TRG = Transgressions, LA = Lapses, AGB = Aggressive Behaviors, PB = Positive Behaviors; * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 8
Descriptive Statistics of Higher-order Values for Five Countries.

Variables	EE	GR	KS	RU	TR
<i>Self-Transcendence</i>					
Mean	6.00	6.33	5.72	4.44	5.90
SD	.86	.87	1.74	2.23	1.33
Min-Max	3.50-7.00	.00-7.00	.00-7.00	.00-7.00	.50-7.00
<i>Openness to Change</i>					
Mean	4.59	4.88	5.23	4.80	4.91
SD	1.18	1.18	1.77	1.98	1.23
Min-Max	.67-7.00	.00-7.00	.00-7.00	.00-7.00	.00-7.00
<i>Self-Enhancement</i>					
Mean	4.11	4.58	5.19	4.28	4.72
SD	1.13	1.37	1.78	1.81	1.54
Min-Max	1.00-7.00	.00-7.00	.00-7.00	.00-7.00	.00-7.00
<i>Conservation</i>					
Mean	5.60	6.09	5.81	4.52	4.94
SD	.93	1.05	1.72	1.92	1.32
Min-Max	3.00-7.00	.00-7.00	.00-7.00	.00-7.00	.00-7.00

Note. EE = Estonia; GR = Greece; KS = Kosovo; RU = Russia; TR = Turkey.

Kosovar pedestrians reported safer pedestrian behavior than expected by the traffic fatality rate in Kosovo.

3.4. Hierarchical regression analyses

A series of regression analyses were conducted to examine the effects of self-transcendence, openness to change, self-enhancement, and conservation values on each PBS dimension (transgressions, lapses, aggressive behaviors, and positive behaviors) after controlling for age and gender for each of the five countries, separately.

3.4.1. The effects of control variables on PBS

In all the regression analyses, age and gender were entered into the model in the first step as control variables. The contributions of model 1, including the control variables (age and gender) for the four PBS scales in all the regression analyses, are reported here to avoid repetition. The results for transgression revealed that age and gender in model 1 were significant in only Estonia, Greece, and Turkey, explaining from 3 % to 8 % of the variance. Age was negatively related to transgression scores in every country except for Kosovo and Russia, whereas being male was only related to transgressions in Estonia. Regarding lapses, the variance explained by age and gender in model 1 was insignificant in all five countries. Neither control variable (age and gender) was significantly related to lapses in any country. The results for aggressive behaviors showed that the variance in this DV explained by age and gender in model 1 was significant in only Estonia, Kosovo, and Russia, ranging from 4 % to 7 %. Age was positively related to aggressive behaviors in only Estonia; gender was unrelated to this dimension in any country. Finally, regarding positive behaviors, age and gender in model 1 were only significant in Russia, explaining 5 % of the variance in the DV. Age was positively related to positive behaviors in only Greece and Russia; gender was unrelated to this dimension in all countries.

Taken as whole, age and gender were related to different dimensions of the PBS in each country. Specifically, being male was only related to higher transgression scores in Estonia. Despite the lack of association between gender and pedestrian behaviors in the four countries, this finding is consistent with the previous literature, which revealed that being male is related to more risky pedestrian behaviors (e.g. Moyano-Diaz, 2002; Rosenbloom et al., 2004; Papadimitriou et al., 2013). In addition, age was negatively related to transgressions in Estonia, Greece, and Turkey, whereas it was positively associated with aggressive behaviors in Estonia. Finally, age was positively related to positive behaviors in Greece and Russia. These effects of age on pedestrian behaviors are partially supported by previous studies showing a positive association between risky behaviors and being younger (e.g.

Table 9
Means of PBS Items After Controlling for the Effects of Age and Gender, and ANCOVA Results (F) in the Five Countries.

Items	EE	GR	KS	RU	TR	F(4806)	Eta ²
Transgression (except for item 4)	2.65 ^a	3.14 ^b	2.18 ^c	2.42 ^{ac}	3.26 ^b	23.68***	.11
1. I cross diagonally to save time.	3.02 ^{bcd}	3.06 ^d	2.39 ^a	2.47 ^{ab}	3.57 ^c	14.98***	.07
2. I cross outside the pedestrian crossing even if there is one less than 50 m away.	2.69 ^{ab}	3.24 ^c	2.20 ^a	2.32 ^a	2.89 ^b	13.71***	.06
3. I cross the street even though the pedestrian light is red.	2.22 ^a	2.76 ^b	1.44 ^c	2.17 ^a	2.76 ^b	21.88***	.10
4. I cross even though the light is still green for vehicles.	2.05 ^a	2.39 ^{ab}	1.42 ^c	2.09 ^a	2.60 ^b	14.45***	.07
5. I cross the street between parked cars.	2.68 ^a	3.49 ^b	2.69 ^a	2.74 ^a	3.81 ^b	19.90***	.09
Lapses	1.29 ^a	1.41 ^a	1.40 ^a	1.83 ^b	1.86 ^b	8.23***	.04
6. I forget to look before crossing because I am thinking about something else.	1.33 ^a	1.43 ^a	1.50 ^{ab}	1.82 ^{bc}	1.92 ^c	6.14***	.03
7. I forget to look before crossing because I want to join someone on the sidewalk on the other side.	1.23 ^a	1.31 ^a	1.34 ^a	1.71 ^b	1.76 ^b	6.35***	.03
8. I cross without looking because I am talking with someone.	1.33 ^a	1.38 ^a	1.34 ^a	1.82 ^b	1.91 ^b	8.18***	.04
9. I realize that I have crossed several streets and intersections without paying attention to traffic.	1.26 ^a	1.52 ^{ac}	1.41 ^a	1.96 ^{bc}	1.87 ^c	6.57***	.03
Aggressive Behaviors	1.26 ^a	1.55 ^a	1.45 ^a	2.11 ^b	1.97 ^b	11.25***	.05
10. I get angry with another road user and insult him/her.	1.26 ^a	1.52 ^a	1.42 ^a	2.26 ^b	2.09 ^b	13.44***	.06
11. I get angry with another user (pedestrian, driver, cyclist, etc.) and I yell at him/her.	1.15 ^a	1.67 ^b	1.45 ^{ab}	2.05 ^c	1.93 ^{bc}	10.01***	.05
12. I get angry with another user (pedestrian, driver, cyclist, etc.) and I make a hand gesture.	1.36 ^a	1.45 ^a	1.50 ^{ab}	2.03 ^c	1.90 ^{cb}	6.57***	.03
Positive Behaviors	4.70 ^a	4.44 ^{ab}	4.04 ^b	4.19 ^{ab}	4.56 ^a	4.90**	.02
13. I let a car go by, even if I have the right-of-way, if there is no other vehicle behind it.	4.23 ^a	4.10 ^a	3.32 ^b	3.48 ^b	3.70 ^{ab}	6.11***	.03
14. When I am accompanied by other pedestrians, I walk in single file on narrow sidewalks so as not to bother the pedestrians I meet.	5.21 ^a	4.35 ^b	4.30 ^b	4.68 ^{abc}	5.04 ^{ac}	7.89***	.04
15. I stop to let the pedestrians I meet pass by.	4.65 ^a	4.86 ^a	4.52 ^a	4.41 ^{ab}	4.94 ^{ac}	2.97*	.02

Note. Bonferroni correction was used for pairwise comparisons. Mean values with different superscripts (a–d) within rows were significantly different at $p < .05$. EE = Estonia, GR = Greece, KS = Kosovo, RU = Russia, TR = Turkey; countries are alphabetically ordered. The scale used for all PBS-items was 1 = never to 7 = always.

- * $p < .05$.
- ** $p < .01$.
- *** $p < .001$.

Moyano- Diaz, 2002; Rosenbloom et al., 2004; Papadimitriou et al., 2013).

3.4.2. The effects of self-transcendence, openness to change, self-enhancement, and conservation on PBS

As shown in Table 10, Model 2, which included self-transcendence, openness to change, self-enhancement, and conservation, made no significant contribution to the equation in Estonia, Russia, and Turkey. However, in Greece and Kosovo, model 2 added significant incremental variance in explaining transgressions. Self-transcendence was only positively related to transgressions in Kosovo. Openness to change was only positively related to transgressions in Greece. Interestingly, self-enhancement was negatively associated with transgressions in Estonia but positively in Russia. Finally, conservation was only negatively related to transgressions in Greece.

As presented in Table 11, Model 2, which included self-transcendence, openness to change, self-enhancement, and conservation, added significant incremental variance in explaining lapses, ranging from 6 % to 18 %, in all five countries except Kosovo and Estonia. Self-transcendence was negatively related to lapses in Russia and Turkey. Openness to change was only negatively related to lapses in Kosovo.

Table 10
Model Summary of Hierarchical Regression Analyses Examining the Effects on Transgressions of ST, OC, SE, and C Values after Controlling for Age and Gender for Five Countries.

Variables	EE			GR			KS			RU			TR		
	β	t	R ² Δ	β	t	R ² Δ	β	t	R ² Δ	β	t	R ² Δ	β	t	R ² Δ
Step 1			.08**			.03*			.01			.00			.05*
Age	-.21*	-2.42		-.18**	-2.88		-.10	-1.02		-.06	-.83		-.22**	-2.66	
Gender	.23*	2.62		-.01	-.22		.08	.84		.00	.03		.09	1.05	
Step 2			.04			.05*			.10*			.05			.03
ST	.05	.50		.04	.57		.43*	2.35		.03	.20		.03	.29	
OC	.06	.68		.18*	2.41		-.21	-1.17		-.06	-.40		.18	1.78	
SE	-.20*	-2.06		.04	.59		-.17	-1.18		.28*	2.56		-.11	-1.05	
C	-.04	-.43		-.16*	-2.09		.07	.36		-.23	-1.62		-.04	-.30	

Note. ST = Self-transcendence, OC = Openness to change, SE = Self-enhancement, C = Conservation, EE = Estonia, GR = Greece, KS = Kosovo, RU = Russia, TR = Turkey; countries are alphabetically ordered; * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 11

Model Summary of Hierarchical Regression Analyses Examining the Effects on Lapses of ST, OC, SE, and C Values after Controlling for Age and Gender for Five Countries.

Variables	EE			GR			KS			RU			TR		
	β	t	$R^2 \Delta$	β	t	$R^2 \Delta$	β	t	$R^2 \Delta$	β	t	$R^2 \Delta$	β	t	$R^2 \Delta$
Step 1			.02			.01			.01			.02			.02
Age	-.04	-.39		-.07	-1.13		-.09	-.89		-.13	-1.73		-.14	-1.69	
Gender	.14	1.56		-.06	-1.02		.05	.47		-.01	-1.10		-.02	-1.18	
Step 2			.05			.06**			.08			.17***			.18***
ST	-.08	-.81		-.11	-1.47		.19	1.01		-.36**	-2.90		-.38***	-3.72	
OC	.01	.09		.00	-.01		-.49**	-2.65		-.12	-.83		-.05	-.58	
SE	.16	1.65		.11	1.50		.16	1.08		.17	1.63		.06	.62	
C	-.17	-1.60		-.16*	-2.04		-.04	-.22		-.03	-.23		-.06	-.55	

Note. ST = Self-transcendence, OC = Openness to change, SE = Self-enhancement, C = Conservation, EE = Estonia, GR = Greece, KS = Kosovo, RU = Russia, TR = Turkey; countries are alphabetically ordered; * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 12

Model Summary of Hierarchical Regression Analyses Examining the Effects on Aggressive Behaviors of ST, OC, SE, and C Values after Controlling for Age and Gender for Five Countries.

Variables	EE			GR			KS			RU			TR		
	β	t	$R^2 \Delta$	β	t	$R^2 \Delta$	β	t	$R^2 \Delta$	β	t	$R^2 \Delta$	β	t	$R^2 \Delta$
Step 1			.06*			.02			.07*			.04*			.01
Age	.25**	2.81		-.08	-1.21		.16	1.67		-.13	-1.77		-.08	-.89	
Gender	.00	-.01		.12	1.82		.17	1.76		.11	1.48		-.03	-.30	
Step 2			.01			.01			.04			.22***			.12**
ST	-.03	-.34		-.06	-.74		-.01	-.07		-.40**	-3.30		-.38**	-3.52	
OC	-.08	-.89		-.01	-.08		-.06	-.32		-.19	-1.38		.03	.34	
SE	-.02	-.15		.02	.21		-.09	-.59		.32**	3.27		.06	.61	
C	.09	.89		-.08	-1.01		-.07	-.39		-.05	-.39		.00	-.00	

Note. ST = Self-transcendence, OC = Openness to change, SE = Self-enhancement, C = Conservation, EE = Estonia, GR = Greece, KS = Kosovo, RU = Russia, TR = Turkey; countries are alphabetically ordered; * $p < .05$; ** $p < .01$; *** $p < .001$.

hypothesized that self-transcendence and conservation would be positively related to less frequent risky pedestrian behaviors but more frequent positive behaviors whereas while self-enhancement and openness to change would be positively related to more frequent risky pedestrian behaviors but less frequent positive behaviors. However, the results showed that the effects of values on pedestrian behavior varied by country in that there were both similarities and differences in the relationship between pedestrian behavior and values across counties (see Table 14). Regarding differences across countries, self-enhancement, for example, was negatively related to transgression in Estonia but self-enhancement was positively related to it in Russia. Regarding similarities, as predicted in both Turkey and Russia, self-transcendence was negatively related to lapses and aggressive behaviors. Hypothesis 3 predicted that the effect of values on pedestrian behavior is stronger for Greece, Kosovo, Russia, and Turkey than Estonia. Consistent with this,

the explained variance in pedestrian behaviors by values for Estonia ranged from 0.05 to .01, which was not significant (see Fig. 6). On the other hand, in other countries, values made a significant contribution to explaining the variance in different pedestrian behaviors.

4. Discussion

The first aim of the present study was to compare pedestrian behaviors in five countries (Estonia, Greece, Kosovo, Russia, and Turkey). The second aim was to investigate the relationships between these behaviors and values for Estonian, Greek, Kosovar, Russian, and Turkish pedestrians.

As predicted, there were significant differences between countries in pedestrian behaviors, reflecting differences in safety levels and traffic culture. Consistent with Hypothesis 1 regarding lapses and aggressive

Table 13

Model Summary of Hierarchical Regression Analyses Examining the Effects on Positive Behaviors of ST, OC, SE, and C Values after Controlling for Age and Gender for Five Countries.

Variables	EE			GR			KS			RU			TR		
	β	t	$R^2 \Delta$	β	t	$R^2 \Delta$	β	t	$R^2 \Delta$	β	t	$R^2 \Delta$	β	t	$R^2 \Delta$
Step 1			.02			.02			.02			.05*			.00
Age	-.11	-1.25		.15*	2.34		.12	1.22		.18*	2.39		.04	.48	
Gender	-.05	-.54		-.05	-.71		-.10	-1.02		-.10	-1.32		.02	.20	
Step 2			.03			.05*			.19***			.12***			.10**
ST	.09	.88		.12	1.53		.34 ⁺	1.98		.08	.67		.08	.78	
OC	.03	.33		.00	.02		.06	.35		.35*	2.40		-.04	-.44	
SE	.11	1.15		-.03	-.36		-.11	-.78		-.00	-.01		-.20	-1.89	
C	-.18	-1.65		.15	1.92		.14	.79		-.09	-.64		.35**	2.90	

Note. ST = Self-transcendence, OC = Openness to change, SE = Self-enhancement, C = Conservation, EE = Estonia, GR = Greece, KS = Kosovo, RU = Russia, TR = Turkey; countries are alphabetically ordered; ⁺ $p = .05$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 14

Summary of Hierarchical Regression Analyses Results Examining the Effects on Risky and Positive Behaviors of ST, OC, SE, and C Values after Controlling for Age and Gender for Five Countries.

	EE				GR				KS				RU				TR			
	TRG	LA	AGB	PB	TRG	LA	AGB	PB	TRG	LA	AGB	PB	TRG	LA	AGB	PB	TRG	LA	AGB	PB
ST									+			+		-	-				-	-
OC					+															+
SE	-												+		+					
C					-	-														+

Note. ST = Self-transcendence, OC = Openness to change, SE = Self-enhancement, C = Conservation, EE = Estonia, GR = Greece, KS = Kosovo, RU = Russia, TR = Turkey; countries are alphabetically ordered; TRG = Transgressions, LA = Lapses, AGB = Aggressive Behaviors, PB = Positive Behaviors; - represents negative associations whereas + represents positive associations.

behaviors, countries with higher fatality rates (Russia and Turkey) had more risky pedestrian behaviors than Estonia and Greece with lower fatality rates, except for Kosovo. Regarding transgressions, the results showed that Greek and Turkish participants reported transgressive pedestrian behaviors more frequently than Estonian, Kosovar, and Russian pedestrians while Kosovar participants reported transgressive pedestrian behaviors less frequently than Estonian pedestrians. Individual studies in Turkey, Estonia, and Greece (Demir, 2017; Papadimitriou et al., 2012) support the finding that pedestrians in Turkey and Greece commit more violations than those in Estonia. However, the results for Russia and Kosovo are particularly surprising.

These results suggest that each country may have its own problems related to pedestrians. For example, transgressive pedestrian behaviors may be more problematic for Greece while lapses and aggressive behaviors may be more problematic for Russia. In Turkey, traffic authorities should take all risky pedestrian behaviors into consideration to create a safer pedestrian environment. Interestingly, Kosovar pedestrians showed safer behaviors than predicted, and inconsistently with the country’s poor traffic safety record. This suggests that, rather than pedestrian behaviors, driver-related and infrastructural factors may be responsible for Kosovo’s high pedestrian fatality rates. This argument is consistent with the Road Safety Strategy and Action Plan (2012), which implies that drivers may contribute to pedestrian fatalities. The main problems regarding pedestrians in Kosovo include that pedestrians must walk along roads due to parked cars on sidewalks and drivers are unwilling to stop at pedestrian crossings (Road Safety Strategy and Action Plan for Kosovo, 2012). Consistent with this, the road environment can be considered as a contributing factor in 34 % of all accidents in countries in which infrastructure needs improvement, including Kosovo (Gashi et al., 2016; Jashari, 2011). That is, rather than pedestrian-related factors, infrastructure and driver-related factors should be considered to make the traffic environment safer for pedestrians.

As predicted, in Russia, self-enhancement was positively related to transgressions. However, in Estonia, self-enhancement was negatively related to transgressions, which contradicted our prediction. The

significant positive association between self-transcendence and transgression in Kosovo is in a similar direction. It seems plausible that Estonian and Kosovar pedestrians may intentionally display lower transgressive behaviors due to the self-enhancing motivations that the value expresses, such as avoiding fines or negative attributes. Conversely, Russian pedestrians may exhibit higher transgression behaviors due to self-enhancing motivations, including saving time. Schwartz et al. (2000) found that self-transcendence values were linked to macro worries and self-enhancement values (for achievement to some extent) were linked to micro worries. Another possible explanation for this interesting finding is that people in Estonia and Kosovo may be concerned about traffic safety at the micro level (about themselves and close others), which may reduce transgressive behavior with increasing self-enhancing motivation or decreasing self-transcendence motivation. In contrast, pedestrians in Russia may be concerned about traffic safety at the macro level (about society), which may encourage more frequent transgressive behaviors due to increasing self-enhancing motivation or decreasing self-transcendence motivation.

Our results indicate some similarities between Russia and Turkey, especially in terms of the effects of values on lapses and aggressive behaviors. In both countries, as predicted, self-transcendence was negatively related to both lapses and aggression, which are common risky behaviors in these countries. Similarly, in Russia, self-enhancement was positively related to aggressive behaviors. These findings seem unsurprising since self-transcendence values, including benevolence and universalism, are related to greater emphatic concern and perspective taking (Silfver et al., 2008). Based on these findings, it seems plausible that self-transcendence may decrease aggressive pedestrian behaviors by activating a mindset whereby people interpret a situation that normally triggers aggressive behaviors less aggressively. In contrast to self-transcendence, self-enhancement allows people to reduce their sensitivity to others’ needs and prioritize their own needs (Schwartz, 2009). Hence, in a traffic context in which each road user is equal (Gaygisiz, 2010), people who prioritize their own needs may easily get angry.

As predicted, openness to change in Greece predicted transgression

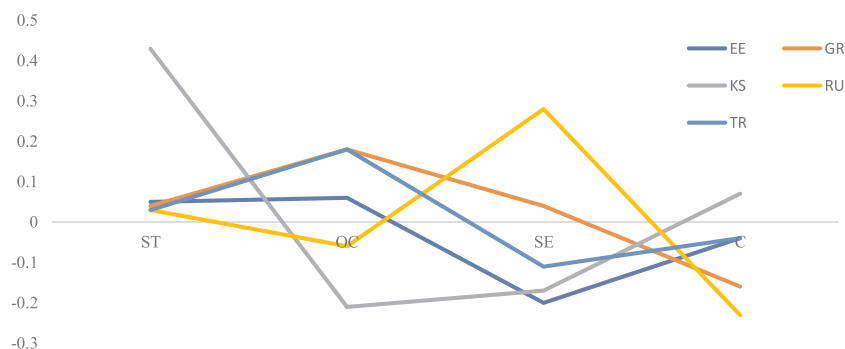


Fig. 2. Beta Coefficients Between Values and Transgression Scores After Controlling for Age and Gender. Note. ST = Self-transcendence, OC = Openness to change, SE = Self-enhancement, C = Conservation, EE = Estonia, GR = Greece, KS = Kosovo, RU = Russia, TR = Turkey.

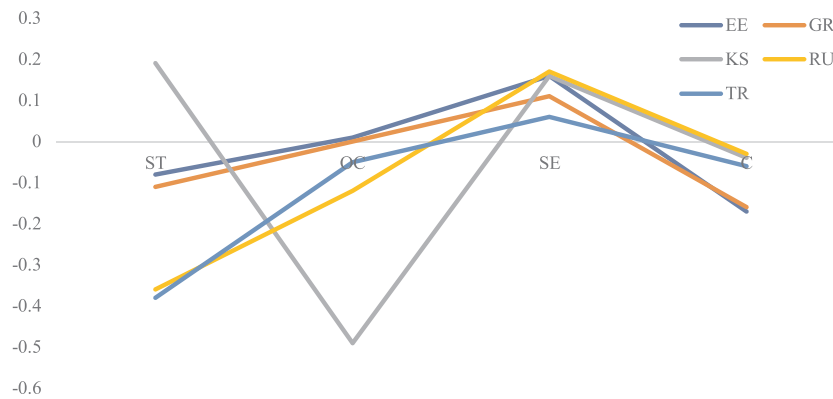


Fig. 3. Beta Coefficients Between Values and Lapse Scores After Controlling for Age and Gender. Note. ST = Self-transcendence, OC = Openness to change, SE = Self-enhancement, C = Conservation, EE = Estonia, GR = Greece, KS = Kosovo, RU = Russia, TR = Turkey.

positively while conservation predicted both transgression and lapses negatively. In contrast, in Kosovo, openness to change was negatively related to lapses. The beneficial effect of conservation in Greece is congruent with Nordfjærn and Şimşekoğlu (2013), who reported beneficial effects of hierarchy on pedestrian safety. This finding is also supported by Yıldırım (2007), who demonstrated a negative association between conservation of values and aggressive behaviors. However, it is important to note that this finding contradicts Rosenbloom et al. (2004), who found that pedestrians in an ultra-orthodox Jewish area committed more violations than those in a secular area. Nevertheless, it seems plausible that conservation may increase pedestrian safety by encouraging compliance with traffic regulations and rules for some countries, such as Greece (Nordfjærn and Şimşekoğlu, 2013).

Finally, the predicted finding that self-transcendence was positively related to positive behaviors in Kosovo is consistent with previous studies revealing the role of self-transcendence (e.g. Daniel et al., 2015; Sosik et al., 2009). Russia and Turkey showed some differences in the effects of values on positive behaviors. In Russia, positive behavior was positively predicted by openness to change whereas in Turkey it was positively predicted by conservation. The effect of conservatism on positive driver behaviors was also documented in Turkey (Yıldırım, 2007). This suggests that people in Turkey but not in Russia relate conservation to positive pedestrian behaviors.

Unexpectedly, the relationship between values and pedestrian behaviors varied across countries. We hypothesized that social context determines whether values influence pedestrian behaviors. However, the results showed that the beneficial or detrimental effects of any value depended on the country concerned, especially for transgressions, lapses, and positive behaviors. One possible explanation for this interesting finding is that although people from different countries rate some values as equally important, they relate these values to different types

of behaviors (e.g. Hanel et al., 2017; Maio, 2010). Roccas and Sagiv (2010) also concluded that although values have similar meaning across countries, the meanings of relevant behaviors, which are affected by the social and psychological functions of this behavior, differ across countries. This may then lead to the different patterns of the association across countries. To illustrate, a cross-cultural study of 31 countries found that although people in all countries equally rated the importance of the equality value, there were significant differences in gender discrimination. More specifically, people in Turkey had the highest scores on gender discrimination despite having similar scores for the value of equality. More interestingly, in Turkey, the relationship between equality and gender discrimination is positive whereas it is negative in the other countries (Hanel et al., 2017). These findings can be extended to the present study. That is, the same values trigger different behaviors in different contexts since people from different countries may have different mental representations about the same values (Hanel et al., 2017) or hold different meanings for risky and positive pedestrian behaviors (Roccas and Sagiv, 2010). These may be affected by the social and psychological functions of displaying these pedestrian behaviors (Roccas and Sagiv, 2010). This causes the relationship between values and pedestrian behaviors to vary across countries.

The impact of values on pedestrian behavior is not equally visible in all countries. As predicted, the explained variance in pedestrian behaviors was lower in Estonia but higher in Turkey and Russia. This result can be explained by the lower pedestrian fatality rates and lower level of risky pedestrian behaviors in Estonia than in Russia and Turkey. This is consistent with the argument that the effect of values on behaviors is stronger in weak than strong situations (Roccas and Sagiv, 2010). Thus, if traffic regulations and the degree of their enforcement does not allow pedestrians to show risky pedestrian behaviors, then these values may

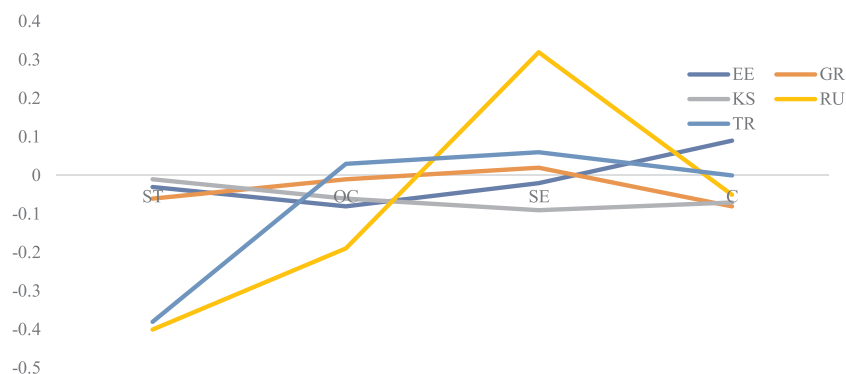


Fig. 4. Beta Coefficients Between Values and Aggressive Behavior Scores After Controlling for Age and Gender. Note. ST = Self-transcendence, OC = Openness to change, SE = Self-enhancement, C = Conservation, EE = Estonia, GR = Greece, KS = Kosovo, RU = Russia, TR = Turkey.

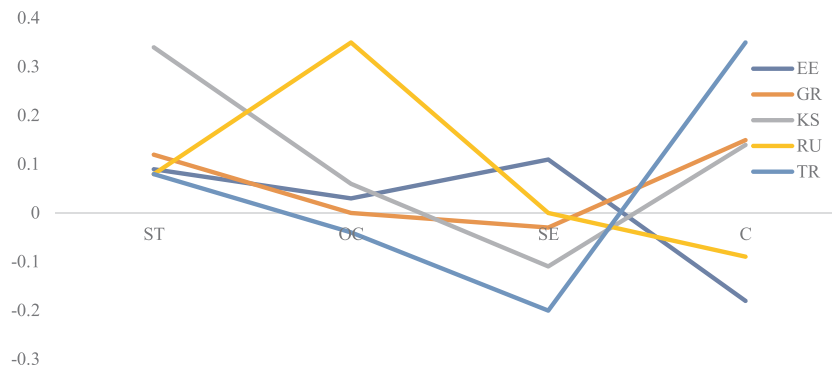


Fig. 5. Beta Coefficients Between Values and Positive Behavior Scores After Controlling for Age and Gender. Note. ST = Self-transcendence, OC = Openness to change, SE = Self-enhancement, C = Conservation, EE = Estonia, GR = Greece, KS = Kosovo, RU = Russia, TR = Turkey.

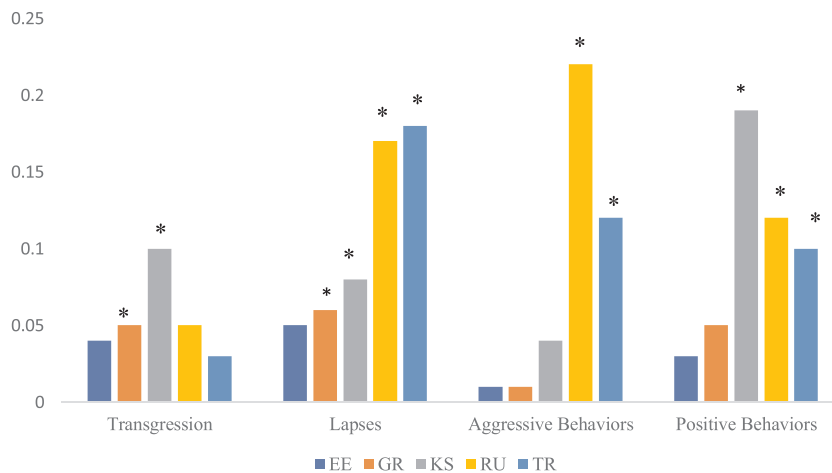


Fig. 6. Explained Variance in Pedestrian Behaviors by Higher-Order Values After Controlling for Age and Gender; * represents significant explained variance. Note. EE = Estonia, GR = Greece, KS = Kosovo, RU = Russia, TR = Turkey.

be unable to affect the pedestrian behaviors that contribute to pedestrian fatalities. That is, enforcement may encourage pedestrians to behave safely regardless of their values.

4.1. Limitations

Although the present study documented differences in pedestrian behaviors across countries in relation to values, some limitations need to be considered. One limitation is that the self-report measures used to assess the study variables may have triggered socially desirable responding. Another limitation is that differences in actual and self-reported pedestrian behaviors and self-reported may not be the same across countries (see Özkan et al., 2006 for a similar discussion). Hence, it is not clear how closely the reported differences across countries in the present study relate to actual differences in pedestrian behaviors. In addition, this study used the values proposed by Schwartz (1992) due to the lack of traffic-specific value dimensions and/or measurements. However, it would be more valid to develop traffic-specific values. Furthermore, this study used the countries which are situated in South-East Europe and the wider area in order to investigate the role of values as a micro level aspect of traffic culture to explain the differences in pedestrian behaviors. Nonetheless, it would be more useful to include the countries from Northern or central Europe where road safety outcomes and performance indicators are substantially better than other countries. The final limitation is that the country sample sizes were small, especially in Kosovo, Estonia, and Turkey. Hence, they may not be representative of pedestrians in these countries.

4.2. Contributions and implications

This study contributes to the literature by showing that each country has its own problems regarding pedestrian behaviors. This implies that traffic authorities should focus on the relevant problems in each country. The results also imply that if traffic regulations and their enforcement prevent the display of risky pedestrian behaviors, then the effects of values on pedestrian behaviors may become invisible.

Finally, the results suggest that efforts to decrease pedestrian fatalities and injuries may focus on values as a micro level aspect of the traffic culture as reflected in pedestrian behaviors. However, the values that should be modified for safer traffic environments are not the same across countries. Thus, closer examination of countries and traffic culture is important since, in each culture, values seem to relate to different types of pedestrian behaviors. Values as a micro level aspect of the traffic culture may receive the necessary attention in safety programs. This could improve the persuasiveness of any message to decrease pedestrians' risky behavior since a message that incorporates the relevant values can be more persuasive. Various modifications can be made that remind or activate related values in the traffic environment to encourage pedestrians to display safer traffic-related behaviors.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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References

- Antić, B., Pešić, D., Milutinović, N., Maslač, M., 2016. Pedestrian behaviours: validation of the Serbian version of the pedestrian behaviour scale. *Transp. Res. Part F Traffic Psychol. Behav.* 41, 170–178.
- Benish-Weisman, M., Daniel, E., Knafo-Noam, A., 2017. The relations between values and aggression: a developmental perspective. In: Roccas, S., Sagiv, L. (Eds.), *Values and Behavior: Taking a Cross-Cultural Perspective*. Springer, New York, pp. 97–114.
- Daniel, E., Bilgin, A.S., Brezina, I., Strohmeier, C.E., Vainre, M., 2015. Values and helping behavior: a study in four cultures. *Int. J. Psychol.* 50 (3), 186–192.
- Deb, S., Strawderman, L., DuBien, J., Smith, B., Carruth, D.W., Garrison, T.M., 2017. Evaluating pedestrian behavior at crosswalks: validation of a pedestrian behavior questionnaire for the US population. *Accid. Anal. Prev.* 106, 191–201.
- Demir, B., 2017. *The Social Psychological Predictors of Pedestrian Behaviors* (Unpublished Doctoral Dissertation). Middle East Technical University, Ankara.
- Edwards, J., Freeman, J., Soole, D., Watson, B., 2014. A framework for conceptualising traffic safety culture. *Transp. Res. Part F Traffic Psychol. Behav.* 26, 293–302.
- Eid, H.O., Abu-Zidan, F.M., 2015. Pedestrian injuries-related deaths: a global evaluation. *World J. Surg.* 39 (3), 776–781.
- Elliott, M.A., Baughan, C.J., 2004. Developing a self-report method for investigating adolescent road user behavior. *Transp. Res. Part F Traffic Psychol. Behav.* 7 (6), 373–393.
- Fattakhov, T., 2016. Road traffic accidents and mortality in Russia: 1956–2014. *Демографическое обозрение, (English Selection)* 3 (5), 135–160. <https://doi.org/10.17323/demreview.v3i5.7314>.
- Fischer, R., Poortinga, Y.H., 2012. Are cultural values the same as the values of individuals? An examination of similarities in personal, social and cultural value structures. *Int. J. Cross-Cultural Manage.* 12 (2) 157–17.
- Gashi, E., Tille, M., Mustafa, G., 2016. Road safety audit from design point of view at the Western Balkan Countries. *J. Eng. Archit.* 4 (2), 193–203.
- Gaygisiz, E., 2010. Cultural values and governance quality as correlates of road traffic fatalities: a nation level analysis. *Accid. Anal. Prev.* 42, 1894–1901.
- Goodwin, R., Realo, A., Kwiatkowska, A., Kozlova, A., Luu, L.A.N., Nizharadz, G., 2002. Values and sexual behaviour in central and eastern Europe. *J. Health Psychol.* 7 (1), 45–56.
- Granić, M.A., 2008. Influence de l'adhésion aux stéréotypes de sexe sur la perception des comportements piétons chez l'adulte [Abstract]. *Recherche Transports Sécurité* 101, 253–264.
- Granić, M.A., Pannetier, M., Guého, L., 2013. Developing a self-reporting method to measure pedestrian behaviors at all ages. *Accid. Anal. Prev.* 50, 830–839.
- Hanel, P.H., Vione, K.C., Hahn, U., Maio, G.R., 2017. Value instantiations: the missing link between values and behavior? In: Roccas, S., Sagiv, L. (Eds.), *Values and Behavior: Taking a Cross-Cultural Perspective*. Springer, New York, pp. 175–190.
- Holland, C., Hill, R., 2010. Gender differences in factors predicting unsafe crossing decisions in adult pedestrians across the lifespan: a simulation study. *Accid. Anal. Prev.* 42 (4), 1097–1106.
- Jashari, V., 2011. Road Infrastructure Development and Investment in Kosovo (Unpublished master's thesis). Rochester Institute of Technology, New York.
- Kaçan, B., Findik, G., Üzümcüoğlu, Y., Azık, D., Solmazer, G., Ersan, Ö., et al., 2019. Driver profiles based on values and traffic safety climate and their relationships with driver behaviors. *Transp. Res. Part F Traffic Psychol. Behav.* 64, 246–259.
- Knafo, A., Daniel, E., Khoury-Kassabri, M., 2008. Values as protective factors against violent behavior in Jewish and Arab high schools in Israel. *Child Dev.* 79 (3), 652–667.
- 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. *J. Appl. Soc. Psychol.* 27, 1258–1276.
- Lindeman, M., Verkasalo, M., 2005. Measuring values with the short Schwartz's value survey. *J. Pers. Assess.* 85 (2), 170–178.
- Maio, G.R., 2010. Mental representations of social values. In: Zanna, M.P. (Ed.), *Advances in Experimental Social Psychology* Vol. 42. Academic Press, San Diego, CA, pp. 1–43.
- Mako, E., Szakonyi, P., 2016. Evaluation of human behaviour at pedestrian crossings. *Transp. Res. Procedia* 14, 2121–2128. <https://doi.org/10.1016/j.trpro.2016.05.227>.
- McIlroy, R.C., Plant, K.L., Jikyong, U., Nam, V.H., Bunyasi, B., Kokwaro, G.O., et al., 2019. Vulnerable road users in low-, middle-, and high-income countries: validation of a Pedestrian Behaviour Questionnaire. *Accid. Anal. Prev.* 131, 80–94.
- Moyano-Diaz, E., 2002. Theory of planned behavior and pedestrians' intentions to violate traffic regulations. *Transp. Res. Part F Traffic Psychol. Behav.* 5, 169–175.
- Nordfjærn, T., Şimşeköglü, Ö., 2013. The role of cultural factors and attitudes for pedestrian behaviour in an urban Turkish sample. *Transp. Res. Part F Traffic Psychol. Behav.* 21, 181–193.
- Nordfjærn, T., Şimşeköglü, Ö., Rundmo, T., 2014. Culture related to road traffic safety: a comparison of eight countries using two conceptualizations of culture. *Accid. Anal. Prev.* 62, 319–328.
- Nordfjærn, T., Zavareh, M.F., 2016. Individualism, collectivism and pedestrian safety: a comparative study of young adults from Iran and Pakistan. *Saf. Sci.* 87, 8–17.
- Ojo, T., Adetona, C.O., Agyemang, W., Afukaar, F.K., 2019. Pedestrian risky behavior and safety at zebra crossings in a Ghanaian metropolitan area. *Traffic Inj. Prev.* 20 (2), 216–219.
- Öz, B., Özkan, T., Lajunen, T., 2013. An investigation of professional drivers: Organizational safety climate, driver behaviours and performance. *Transp. Res. Part F Traffic Psychol. Behav.* 16, 81–91.
- Öz, B., Özkan, T., Lajunen, T., 2014. Trip-focused organizational safety climate: investigating the relationships with errors, violations and positive driver behaviours in professional driving. *Transp. Res. Part F Traffic Psychol. Behav.* 26, 361–369.
- Özkan, T., Lajunen, T., 2005. A new addition to DBQ: positive driver behaviours scale. *Transp. Res. Part F Traffic Psychol. Behav.* 8, 355–368.
- Özkan, T., Lajunen, T., 2007. The role of personality, culture, and economy in unintentional fatalities: an aggregated level analysis. *Pers. Individ. Dif.* 43 (3), 519–530.
- Özkan, T., Lajunen, T., 2011. Person and environment: traffic culture. In: Porter, B. (Ed.), *Handbook of Traffic Psychology*. Elsevier, London, pp. 179–192.
- Özkan, T., Lajunen, T., 2015. A General Traffic (safety) Culture System (G-TraSaCu-S). TraSaCu project, European Commission, RISE Programme.
- Özkan, T., Lajunen, T., Chlioutakis, J.E., Parker, D., Summala, H., 2006. Cross-cultural differences in driving behaviours: a comparison of six countries. *Transp. Res. Part F Traffic Psychol. Behav.* 9 (3), 227–242.
- Papadimitriou, E., Theofilatos, A., Yannis, G., Sardi, G.M., Freeman, R.P., 2012. Road safety attitudes and perceptions of pedestrians in Europe. *Procedia-Social Behav. Sci.* 48, 2490–2500.
- Papadimitriou, E., Theofilatos, A., Yannis, G., 2013. Patterns of pedestrian attitudes, perceptions and behaviour in Europe. *Saf. Sci.* 53, 114–122.
- Qu, W., Zhang, H., Zhao, W., Zhang, K., Ge, Y., 2016. The effect of cognitive errors, mindfulness and personality traits on pedestrian behavior in a Chinese sample. *Transp. Res. Part F Traffic Psychol. Behav.* 41, 29–37.
- 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 Maced. J. Med. Sci.* 5 (7), 1036.
- Reason, J., Manstead, A., Stradling, S., Baxter, J., Campbell, K., 1990. Errors and violations on the roads: a real distinction? *Ergonomics* 33 (10–11), 1315–1332.
- Road Safety Strategy and Action Plan for Kosovo (2012)**. Retrieved from <http://docplayer.net/27409579-Road-safety-strategy-and-action-plan-for-kosovo.html>.
- Roccas, S., Sagiv, L., 2010. Personal values and behavior: taking the cultural context into account. *Soc. Personal. Psychol. Compass* 4 (1), 30–41.
- Rosenbloom, T., Nemrodov, D., Barkan, H., 2004. For heaven's sake follow the rules: pedestrians' behavior in an ultra-orthodox and a non-orthodox city. *Transp. Res. Part F Traffic Psychol. Behav.* 7, 395–404.
- Sagiv, L., Schwartz, S.H., 1995. Value priorities and readiness for out-group social contact. *J. Pers. Soc. Psychol.* 69 (3), 437.
- Schwartz, S.H., 1992. Universals in the content and structure of values: theory and empirical tests in 20 countries. In: Zanna, M. (Ed.), *Advances in Experimental Social Psychology* Vol. 25. Academic Press, New York, pp. 1–65.
- Schwartz, S.H., 1994a. Are there universal aspects in the structure and contents of human values? *J. Soc. Issues* 50 (4), 19–45.
- Schwartz, S.H., 1994b. Beyond individualism-collectivism: New cultural dimensions of values. In: Kim, U., Triandis, H.C., Kagitcibasi, C., Choi, S.C., Yoon, G. (Eds.), *Individualism and Collectivism: Theory, Method and Applications*. Sage, Thousand Oaks, CA, pp. 85–119.
- Schwartz, S.H., 2009. Basic values: how they motivate and inhibit prosocial behavior. In: Mikulincer, M., Shaver, P.R. (Eds.), *Prosocial Motives, Emotions, and Behavior: The Better Angels of Our Nature*. American Psychological Association, Washington, DC, pp. 221–241.
- Schwartz, S.H., 2012. An overview of the schwartz theory of basic values. *Online Read. Psychol. Cult.* 2 (1) <https://doi.org/1.9707/2307-0919.1116>.
- Schwartz, S.H., Rubel, T., 2005. Sex differences in value priorities: cross-cultural and multimethod studies. *J. Pers. Soc. Psychol.* 89 (6), 1010.
- Schwartz, S.H., Sagiv, L., 1995. Identifying culture-specifics in the content and structure of values. *J. Cross. Psychol.* 26 (1), 92–116.
- Schwartz, S.H., Sagiv, L., Boehnke, K., 2000. Worries and values. *J. Pers.* 68, 309–346.
- Schwartz, S.H., Melech, G., Lehmann, A., Burgess, S., Harris, M., Owens, V., 2001. Extending the cross-cultural validity of the theory of basic human values with a different method of measurement. *J. Cross. Psychol.* 32 (5), 519–542.
- Schwartz, S.H., Cieciuch, J., Vecchione, M., Davidov, E., Fischer, R., Beierlein, C., et al., 2012. Refining the theory of basic individual values. *J. Pers. Soc. Psychol.* 103 (4), 663.
- Shinar, D., 1998. Aggressive driving: the contribution of the drivers and the situation. *Transp. Res. Part F Traffic Psychol. Behav.* 1 (2) 137–160.
- Silfver, M., Helkama, K., Lonnqvist, J.E., Verkasalo, M., 2008. The relation between value priorities and proneness to guilt, shame, and empathy. *Motiv. Emot.* 32, 69–80.
- 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. *Transp. Res. Part F Traffic Psychol. Behav.* 38 137–15.
- Sortheix, F.M., Schwartz, S.H., 2017. Values that underlie and undermine well-being: variability across countries. *Eur. J. Pers.* 31 (2), 187–201.
- Sosik, J.J., Jung, D.I., Dinger, S.L., 2009. Values in authentic action: examining the roots and rewards of altruistic leadership. *Group Organ. Manag.* 34 (4), 395–431.
- Turkish Statistical Institute, 2018. Road Traffic Accident Statistics. Retrieved from <http://>

- www.turkstat.gov.tr/PreHaberBultenleri.do?id=30640.
- Üzümcüoğlu, Y., Özkan, T., 2019. Traffic climate and driver behaviors: explicit and implicit measures. *Transp. Res. Part F Traffic Psychol. Behav.* 62, 805–818.
- Üzümcüoğlu, Y., Özkan, T., Lajunen, T., 2018. The relationships between cultural variables, law enforcements and driver behaviours across 37 nations. *Transp. Res. Part F Traffic Psychol. Behav.* 58, 743–753.
- World Bank, 2019. **World Bank Country and Lending Groups**. Retrieved from <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups>.
- World Health Organization, 2015. **Global Status Report on Road Safety 2015**. World Health Organization.
- World Health Organization, 2018. **Global Status Report on Road Safety 2018**. World Health Organization.
- Xu, J., Ge, Y., Qu, W., Sun, X., Zhang, K., 2018. The mediating effect of traffic safety climate between pedestrian inconvenience and pedestrian behavior. *Accid. Anal. Prev.* 119, 155–161.
- Yıldırım, Z., 2007. **Religiousness Conservatism and Their Relationship with Traffic Behavior** (Unpublished Master's Thesis). Middle East Technical University, Ankara.
- Zhuang, X., Wu, C., 2011. Pedestrians' crossing behaviors and safety at unmarked roadway in China. *Accid. Anal. Prev.* 43 (6), 1927–1936.