An empirical characterization of high-risk drivers in Spain. The role of gender, age, marital status and education.

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Abstract

Traffic accidents are both a major economic and public health problem worldwide. We use data from the May 2016 Spanish barometer (n=1,632) to analyse the characteristics of drivers who declare different types of risky driving behaviours. Our estimates suggest that the likelihood of being a high-risk driver in Spain increases with educational attainment and decreases with age. Moreover, it is higher for those with previous sanctions and for men, particularly so regarding speeding and driving after drinking alcohol. These results suggest that prevention policies in Spain should be targeted to different collectives of drivers depending on the particular risky behaviour considered.

Keywords: Risky driving behaviours; individual characteristics; multivariate methods; Spain.

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1. Introduction

Road safety is both a major economic and public health problem worldwide. In 2016, more than 1.3 million people died on the world's roads. Moreover, many more people were injured, some of them with serious long-term health problems (World Health Organization [W.H.O], 2018).

In Spain, more than 100,000 traffic accidents took place in 2017, resulting in 1,830 deaths, 9,546 serious injuries and 129,616 minor injuries (Dirección-General-Tráfico [DGT], 2018). Additionally, the downward trend in road fatalities within 30 days broke down in 2013, resulting in an upward trend in both accidents and fatalities.[1]

Traffic accident costs are divided into three broad categories, with the human cost being the most relevant one. Human costs includes both the years of expected life expectancy lost by the dead, the quality of life lost by the injured and the pain experienced by relatives and friends. Besides, there are also direct (medical care, costs of fixing damaged vehicles, and administrative costs) and indirect economic costs (the losses of GDP due to premature death, permanent or temporary disability as a result of the traffic accident). Elvik (2000) reviewed estimates of total costs of road accidents for several countries and found that, on average, they amounted to about 2.5% of gross national product. In Spain, using the values obtained by Martínez Pérez, Sánchez Martínez, Abellán Perpiñán, and Pinto Prades (2015),[2] it was estimated that the total costs of traffic accidents ranged from 0.5% to 1% of gross domestic product in 2017 (DGT, 2018).

Previous studies have shown that Spanish drivers report different behaviours to those in other countries, probably for cultural reasons. This is particularly striking when the comparison is made between two countries, which apparently share many cultural aspects. For example, de Oña, de Oña, Eboli, Forciniti, and Mazzulla (2014) reported driving behaviours are very different among Spanish and Italian drivers. More specifically, the

driver´s psychophysical state and the violation of overtaking rules were considered more dangerous for the Italian drivers than Spanish ones. On the other hand, the violation of speed limits, the violation of safe distance, and inattentive driving were perceived as more dangerous for Spanish drivers than Italian ones. Another example, the use of the safety belt reported by drivers is higher in Spain than in Mexico or other Hispanic countries (González-pérez, Guadalupe, & Carlos, 2015). Spanish drivers show a higher reported frequency of driving under the influence of alcohol than other countries, despite reporting a higher probability of being stopped (Schlembach, Furian, & Brandstätter, 2016). Even more generally, there is evidence that drivers' criteria for responding to hazards are culturally sensitive when comparing UK, China and Spain (Ventsislavova et al., 2019). Likewise, Ramos et al., (2008) found Spanish cultural particularities related to driving such as non-acceptance of norms when they are considered unfair, Mediterranean culture about drug use and driving, attend social events such weddings, village fiestas, and company dinners where it is usual to drive after drinking, thinking of having a car as symbols of freedom and makes flirting with the opposite sex easier. Indeed, Calafat et al., (2011) pointed out that Mediterranean people are more likely to drive after drinking and assume risky sexual relations.

The goal of this paper is to identify the individual characteristics that are associated to high-risk driving in Spain. To our knowledge, this study is the first to examine the heterogeneity of risk behaviours and driver characteristics in Spain with a representative sample of the adult population. For example, Font-Ribera et al (2013) described driving under the influence of alcohol and drugs among adolescents in Spain. Another example is Prat, Planes, Gras, and Sullman (2014) who investigated the prevalence of driver engagement in secondary task in Girona, a region of Spain. Moreover, and as opposed to the existing evidence, this study simultaneously examines seven different types of risky

driving for the same sample: speeding in built-up areas, using a mobile phone while driving, passing through a yellow traffic light, speeding on a motorway, using GPS or radio while driving, driving after drinking alcohol, and driving without wearing a seat belt. This is relevant since high-risk drivers are not necessarily the same independently of the risky driving behaviour considered. Indeed, our estimates suggest that prevention policies in Spain should be targeted to different collectives of drivers depending on the particular risky behaviour considered.

1.1. Human factor

Road safety research has identified three factors that may cause a traffic accident: the human factor, the environment and the vehicle (Atombo, Wu, Zhong, & Zhang, 2016). Based upon National Motor Vehicle Crash Causation Survey, Singh (2015) pointed out that 94% of accidents are caused by the human factor.[3] Moreover, it is well known that the probability of engaging in risky driving behaviour is not uniformly distributed among the population. Conversely, empirical evidence shows that some individual characteristics like gender, age, marital status, educational attainment, ethnicity and driving experience significantly affect the probability of engaging in risky driving behaviour

1.1.1. Gender

Men are known to be more likely than women to engage in risky driving behaviour (Barr et al., 2015; Factor, 2018; Goetzke & Islam, 2015; Hassan, Shawky, Kishta, Garib, & Al-Harthei, 2017; Nurullah, Thomas, & Vakilian, 2013; Przepiorka, Błachnio, & Sullman, 2018; Shinar, Schechtman, & Compton, 2001; Stephens, Nieuwesteeg, Page-Smith, & Fitzharris, 2017; Varet, Granié, & Apostolidis, 2018) For example, Hassan et al. (2017) reported the probability of being involved in speed-related crashes for men is approximately 1.4 times higher than women. Factor (2018) evidenced not only men tended

to receive more traffic tickets for several violations, but this effect was consistent over the years. Varet et al. (2018) corroborated this finding by suggesting that men had a higher probability of committing driving offences than women. Finally, Przepiorka et al. (2018) found that male were more likely than women to intend to use their mobile phone while driving. Contrary to most previous findings, Fernandes, Hatfield, and Soames Job (2010) found that female drivers reported intention to speed more frequently.

1.1.2. Age

The probability of engaging in risky driving behaviour is also higher for younger drivers than for older ones (Factor, 2018; Goetzke & Islam, 2015; Nurullah et al., 2013; Pickrell, Li, & KC, 2016; Prat, Gras, Planes, Font-Mayolas, & Sullman, 2017; Prat et al., 2014; Shinar et al., 2001; Stephens et al., 2017; Strine et al., 2010). For instance, Factor (2018) found that the number of traffic tickets for their young (18-29) group were higher than for the other age groups (30-44, 45-59, +60). Pickrell et al. (2016) investigated seat belt use, finding that front seat belt use was lower for 16-24 than other age groups. Additionally, Prat et al. (2017) reported that younger drivers were more likely to engage in risky driving behaviour like reading and sending text messages, talking on a handheld phone, or manipulating the radio/GPS. Finally, Stephens et al. (2017) found that speed limit compliance were higher with increasing age.

1.1.3. Education level

Empirical evidence on the correlation between education and risky driving behaviour is not robust. Shinar et al. (2001) investigated self-reported seat-belt use as an example of a safe driving behaviour and findings revealed a negative correlation, that is, the use of seat-belts increased with increasing education. This negative correlation was corroborated by Sloan, Chepke, and Davis (2013) and Factor (2018). Sloan et al. (2013) reported that the odds of reporting driving under the influence of alcohol was lower for people with higher

education and Factor (2018) found people with junior high school or below were more likely to receive traffic tickets than higher-education drivers. Other authors, like Shinar et al. (2001), found a positive correlation since the percentage of drivers observing the speed limits decreased with increasing education.

1.1.4. Marital status

Although the literature relating marital status to driving violations appears to be scarce, it seems that single people are more prone to engage in risky driving behaviour than married ones (Factor, 2018; Sloan et al., 2013; Strine et al., 2010; West & Moskal, 1996). For example, Strine et al. (2010) found that the likelihood of reporting seat belt use was higher for married people compared to previously or never married. Sloan et al. (2013) investigated driving under the influence of alcohol and found that being married were associated with fewer episodes. Moreover, Factor (2018) observed that drivers who were single received more traffic tickets than drivers who were or had been married.

1.1.5. Driving experience

Empirical evidence on the effect of driving experience on risky driving behaviour is also mixed. Machado-León, de Oña, de Oña, Eboli, and Mazzulla (2016) found that more experienced drivers tend to perceive some dangerous driving behaviour such as speeding and distracted driving to be less dangerous. However, Tao, Zhang, and Qu (2017) showed drivers of increased experience were more likely to be involved in more traffic accidents and receive more tickets, but no effect of driving experience was found on unsafe driving behaviour.

1.1.6. Ethnicity

With respect to ethnicity, Lange, Johnson, and Voas (2005) found that Hispanic drivers

were 31% less likely to be speeders than White drivers in the 55 mph speed limit zones. Conversely, Lundman and Kowalski (2009) found that Hispanic drivers were significantly more likely to speed at high rates in a 65 mph zone as compared to White drivers. Specifically, the odds of being stopped for high rate speeding in a 65 mph zone were 38.9% higher for Hispanic drivers as compared to White drivers. In addition, these odds were higher (53.2%) if Hispanic drivers were stopped at night. Olsen, Shults, and Eaton (2013) found the prevalence of any texting while driving varied by race/ethnicity, being highest among white students (50.7%) and lowest among black students (30.1%) The prevalence of any texting while driving among Hispanic students was 38.8%. Elias and Shiftan (2017) found Arab ethnicity was negatively associated with the risk of committing a speeding violation. Romano et al. (2013) examined the prevalence of seat belt non-use, driving under the influence of alcohol, speeding and failures to obey a traffic signal in Florida and Tennessee. They found that Hispanic drivers in Florida were more like to be cited for seat belt non-use, driving under the influence of alcohol, failing-to-obey a traffic signal than White drivers. For speeding violations, both Hispanic and White drivers had a similar likelihood of receiving a citation. In Tennessee, Hispanic drivers were more likely to be cited for speeding or failing to obey a traffic signal; but less for seat belt non-use or driving under the influence of alcohol than White drivers. Conversely, Caetano and Clark (2000) found that the rate of driving a car after drinking and the rate of ever having been arrested for driving under the influence of alcohol were highest among Hispanic men.

1.2. Risky driving behaviour in Spain

According to the Spanish general traffic regulations, article 3.1: “Driving must be done with the diligence and precaution necessary to avoid any damage, personal or external, taking care not to endanger both the driver himself and the other occupants of the vehicle and the other road users” (Real Decreto 1428/2003, de 21 de noviembre, p. 45,689)".

However, it seems that many people drive dangerously disregarding and failing to comply with road safety rules (Alonso, Esteban, Montoro, & Useche, 2017; Rosenbloom, Pereg, & Perlman, 2014). In addition, according to a report of the OECD and the International Transport Forum (ITF), speeding was a contributing factor in 20% of fatal accidents and 9% of injury accidents in Spain in 2015. In addition, 5% and 10% of motorcycle user who died outside urban areas and in urban areas, respectively, were not wearing helmets. Finally, driver distractions were a concurrent factor in 29% of injury accidents, being the use of the mobile phone or GPS while driving factors that may affect attention (OECD & ITF, 2017). These percentages are very similar to previous years (OECD & ITF, 2015; 2016), suggesting that the incidence of speeding, not wearing seat belt and driving distractions has not been significantly reduced in recent years.

Driving under the influence of alcohol or drugs is a contributing factor in traffic accidents as well. According to the Instituto Nacional de Toxicología y Ciencias Forenses (INTCF), in 2017, 18.12% of those killed in a traffic accident tested positive for the presence of alcohol, while 6.29% tested positive for the presence of drugs (INTCF, 2018). It is therefore advisable to identify which groups of people are most likely to engage in dangerous driving behaviours to improve and prevent such behaviours through the implementation and evaluation of public policies.

1.3. Hypothesis

Our dataset along with both univariate and multivariate estimation methods will be used in order to test for the validity of these hypotheses:

H1. There are significant differences between male and female drivers with respect to being a high-risk driver.

H2. There is a monotonically decreasing relationship between a drivers' age and his likelihood of being a high-risk driver.

H3. There are significant differences between drivers grouped on marital status with respect to being a high-risk driver.

H4. There is a monotonically increasing relationship between a driver's educational attainment and his likelihood of being a high-risk driver.

2. Method

2.1. Participants

The data used in the estimation comes from the May 2016 barometer elaborated by the Spanish Sociological Research Centre. The barometers, conducted on a monthly basis - except in August, aim to measure Spanish public opinion. They involve interviews with around 2,500 randomly-chosen people aged over 18 years old from all over the country, with extensive social and demographic information on them.

The survey was completed by 2,484 individuals; however, our sample was restricted to those who regularly drove since they answered the questions related to dangerous driving behaviour (n=1,632).

2.2. Measures

Barometers elaborated by the Spanish Sociological Research Centre are divided into two blocks. The first block is a set of questions from which the "poll indicators are drawn up" and the second block is a set of questions, which focus on a particular political or social issue on each occasion. Because of the 10th anniversary in Spain of the Penalty Point System, the second block of May 2016 survey was focused on driving behaviour such risky driving, experience, habits, exposure, offences, etc. In particular, the survey assessed the frequency of seven risky behaviours: 1. speeding in built-up areas; 2. using a mobile phone while driving; 3. passing through a yellow light; 4. speeding on a motorway; 5. Handling GPS or radio; 6. driving after drinking alcohol; 7. driving without fastening the seat belt.

Participants responded to the frequency with which they engage in these seven risky behaviours on a 5-point Likert scale from 1 (always) to 5 (never) (See Appendix A for more information on the questionnaire).

2.3. Data analysis

Data used in the study are analysed using STATA (Version 13.0). Descriptive statistics are used to present and analyses the data. Shapiro-Francia Test and Bartlett´s test were conducted to check if normality and homoscedasticity assumptions are met, respectively.[4] An independent t-test is conducted to examine whether there is a significant difference between male and female drivers. Several one-way ANOVA are conducted to examine whether there is a significant difference between drivers grouped on the basis of age, marital status and education level, followed by Bonferroni test or Games-Howell test. Moreover, odds ratios were computed using binary logistic regression models for each of the seven risky driving behaviours analysed. This allows us to examine the probability of engagement in risky driving behaviour given a full set of potential confounding factors. Each of the 7 dependent variables is a dummy variable that has been created from questions related to risk behaviours. Thus, for example, for driving without wearing a seat belt, the dummy variable takes the value of one if the respondent has ever driven without wearing a seat belt and 0 otherwise. Finally, a linear regression was computed to examine the relationship between risky driving behaviour and our independent variables of interest, controlling for a full set of potential confounding factors. The new dependent variable was created by aggregating each of the seven risky driving behaviours into a single scored called risky driving total score (Cronbach´s alpha=.71). Scores can range from 5 to 35, with higher scores meaning lower engagement in risky driving behaviour. The independent variables of interest were gender, age, marital status and educational attainment. In

addition, we control for region of residence, main activity, monetary sanctions, non-monetary sanctions, driving experience, and traffic exposure measured as kilometres travelled on weekdays and kilometres travelled on weekends[5] (See Appendix B for more information on variables)

3. Results

3.1. Sample Characteristics

Table 1 describes the estimation sample. The sample consisted of male (58.9%) and female (41.1%), with 14.1% of the respondents aged between 18 and 29 years and the majority of them being middle-aged, i.e. 30 to 49 years old. Slightly more than half of participants were married and 26.9% of them had completed higher education.[6]

Table 1
Sample characteristics (N=1,632).

Variable		Frequency	Percent (%)
1. Gender	Male	962	58.9
	Female	670	41.1
2. Age	18-29 years old	230	14.1
	30-49 years old	741	45.4
	50-64 years old	440	27.0
	65 years old and over	221	13.5
3. Marital Status[a]	Married	903	55.5
	Single	528	32.4
	Divorced[c]	138	8.5
	Widower	59	3.6
4. Education[b]	No education	31	1.9
	Primary	181	11.1
	GCSEs	409	25.1
	A-Levels	236	14.5
	Vocational training	335	20.5
	Higher	439	26.9

Note: [a]Missing for 4 participants; [b]Missing for 1 participant; [c]Divorced includes those divorced or separated.

3.2. Risky driving behaviour

Table 2 presents the prevalence of engaging in each of dangerous driving behaviours and grouped risky driving behaviour. Most frequently reported risky driving behaviours were handling GPS or radio while driving (3.87) and passing through a yellow light (3.87). Speeding on a motorway (3.90) or in built-up areas (4.00) were the third and the fourth most frequently reported risky driving behaviours. Next, driving after drinking alcohol (4.58) and using a mobile phone while driving (4.60) were the following reported risky driving behaviours. Finally, the least frequently reported risky driving behaviour was driving without wearing seat belt (4.84)

Table 2
Summary statistics

Variable	Mean	Std. Dev.	N=1,632[a]
Speeding in built-up areas	4.00	.99	1,621[b]
Using a mobile phone while driving	4.60	.79	1,613[b]
Passing through a yellow light	3.87	1.01	1,622[b]
Speeding on a motorway	3.90	1.03	1,622
Handling GPS or radio while driving	3.87	1.14	1,617[b]
Driving after drinking alcohol	4.58	.79	1,593[b]
Driving without wearing seat belt	4.84	.58	1,612[b]
Risky driving total score	12.38	3.91	1,535

Note: Higher scores mean lower engagement in risky driving behaviour.

[a]These questions were only asked those participants who drive motor vehicles; [b]The remaining observations was missing.

3.3. Effects of gender

Table 3 shows mean scores, standard deviations, and mean differences for each risky driving behaviour and risky driving total score by gender. As expected, women reported to engage in less risky driving behaviours than men. These differences were statistically significant at the 1% significance level except for handling GPS or radio (no significant) and driving without wearing the seat belt (significant at the 5% level)

Table 3
Summary statistics and t-test by gender.

	Men	Mean	Std. Dev	Women	Mean	Std. Dev	MeanDiff
Speeding in built-up areas	953	3.89	1.00	668	4.15	.94	-.26**
Using a mobile phone while driving	953	4.56	.83	660	4.67	.74	-.11**
Passing through a yellow light	954	3.80	1.04	668	3.97	.96	-.17**
Speeding on a motorway	958	3.78	1.04	664	4.08	1.00	-.29**
Handling GPS or radio	950	3.84	1.16	667	3.91	1.12	-.07
Driving after drinking alcohol	944	4.46	.87	649	4.77	.61	-.31**
Driving without wearing the seat belt	947	4.81	.62	665	4.87	.52	-.06*
Risky driving total score	908	29.09	4.05	630	30.39	3.56	-1.30**

Note: Higher scores mean lower engagement in risky driving behaviour.

* $p < .05$.

** $p < .01$.

3.4. Effects of age, marital status and educational attainment.

Table 4 displays mean scores and one-way ANOVA analysis for all risky driving behaviours and risky driving total score by age, marital status and educational attainment. Statistically significant differences were found in six out of seven unsafe driving behaviours across age and marital status groups. Regarding educational attainment, statistically significant differences at the 1% were obtained for all risky driving behaviours. Moreover, statistically significant differences at the 1% were found between groups for risky driving total score.

Table 4

Means and ANOVA results by age, marital status and education.

	Age				Anova
	18-29	30-49	50-64	Over 65	F
Speeding in built-up areas	3.71	3.90	4.06	4.47	27.49**
Using a mobile phone while driving	4.55	4.48	4.70	4.91	19.85**
Passing through a yellow light	3.72	3.78	3.93	4.20	11.98**
Speeding on a motorway	3.77	3.75	3.99	4.37	24.05**
Handling GPS or radio while driving	3.27	3.65	4.15	4.64	82.34**
Driving after drinking alcohol	4.53	4.57	4.57	4.72	2.62*
Driving without wearing seat belt	4.85	4.83	4.80	4.91	2.03
Risky driving total score	28.36	28.95	30.16	32.18	50.05**

	Marital Status			Anova
	Married	Single	Prev. Married[a]	F
Speeding in built-up areas	4.10	3.79	4.08	17.30**
Using a mobile phone while driving	4.65	4.52	4.62	4.31*
Passing through a yellow light	3.97	3.69	3.87	12.68**
Speeding on a motorway	3.98	3.73	4.01	11.33**
Handling GPS or radio while driving	4.02	3.50	4.10	40.72**
Driving after drinking alcohol	4.65	4.45	4.60	10.80**
Driving without wearing seat belt	4.85	4.83	4.81	.46
Risky driving total score	30.20	28.46	30.00	33.58**

	Education			Anova
	None/Primary[b]	Secondary[c]	Higher	F
Speeding in built-up areas	4.38	3.94	3.95	18.68**
Using a mobile phone while driving	4.87	4.58	4.53	14.93**
Passing through a yellow light	4.31	3.85	3.71	27.02**
Speeding on a motorway	4.30	3.85	3.84	17.8**
Handling GPS or radio while driving	4.50	3.82	3.67	40.8**
Driving after drinking alcohol	4.72	4.54	4.61	4.87**
Driving without wearing seat belt	4.77	4.81	4.92	7.04**
Risky driving total score	31.82	29.36	29.20	36.93**.

Note: Higher scores mean lower engagement in risky driving behaviour.

[a]Prev.married includes those divorced, widowed, or separated. [b]None/primary includes no education and primary education; [c]Secondary includes GCSEs, A-Levels, and vocational training.

* $p < .05$.

** $p < .01$.

Table 5 shows that participants aged over 65 years old scored higher unsafe driving behaviours on all the indicators than the other age group. These differences decreased as age increased. Similarly, individuals aged 50-64 years old reported to participate in less unsafe driving behaviours than those aged 18-29, except in driving after drinking alcohol and using a mobile phone while driving, and 30-49, except in driving after drinking alcohol. Only two statistically significant differences were found among participants aged 18-29 and 30-49 years: handling GPS or radio while driving (1%) and speeding in built-up areas (10%).

Regarding risky driving total score, participants aged over 65 years old scored lower unsafe driving behaviour than the other age group. These differences decreased as age increased. Similarly, individuals aged 50-64 years old reported to participate in less unsafe driving behaviour than those aged 18-29 and 30-49. No significant difference was found among participants aged 18-29 and 30-49 years.

338 **Table 5**
339 Mean difference and Games-Howell test by age.

	(a)	Mean of (a)	(b)	Mean of (b)	(a-b)
Speeding in built-up areas	30-49	3.90	18-29	3.71	.19
	50-64	4.06	18-29	3.71	.35**
	Over 65	4.47	18-29	3.71	.76**
	50-64	4.06	30-49	3.90	.16*
	Over 65	4.47	30-49	3.90	.57**
	Over 65	4.47	50-64	4.06	.41**
Using a mobile phone while driving	30-49	4.48	18-29	4.55	-.07
	50-64	4.70	18-29	4.55	.15
	Over 65	4.91	18-29	4.55	.36**
	50-64	4.70	30-49	4.48	.22**
	Over 65	4.91	30-49	4.48	.43**
	Over 65	4.91	50-64	4.70	.21**
Passing through a yellow light	30-49	3.78	18-29	3.72	.06
	50-64	3.93	18-29	3.72	.21
	Over 65	4.20	18-29	3.72	.48**
	50-64	3.93	30-49	3.78	.14
	Over 65	4.20	30-49	3.78	.42**
	Over 65	4.20	50-64	3.93	.27**
Speeding on a motorway	30-49	3.75	18-29	3.77	-.02
	50-64	3.99	18-29	3.77	.23*
	Over 65	4.37	18-29	3.77	.61**
	50-64	3.99	30-49	3.75	.24**
	Over 65	4.37	30-49	3.75	.62**
	Over 65	4.37	50-64	3.99	.38**
Handling GPS or radio while driving	30-49	3.65	18-29	3.27	.38**
	50-64	4.15	18-29	3.27	.88**
	Over 65	4.64	18-29	3.27	1.37**
	50-64	4.15	30-49	3.65	.50**
	Over 65	4.64	30-49	3.65	.99**
	Over 65	4.64	50-64	4.15	.49**
Driving after drinking alcohol	30-49	4.57	18-29	4.53	.04
	50-64	4.57	18-29	4.53	.04
	Over 65	4.72	18-29	4.53	.19*
	50-64	4.57	30-49	4.57	.01
	Over 65	4.72	30-49	4.57	.15*
	Over 65	4.72	50-64	4.57	.15*

	(a)	Mean of (a)	(b)	Mean of (b)	(a-b)
Risky driving total score	30-49	28.95	18-29	28.36	.59
	50-64	30.16	18-29	28.36	1.80**
	Over 65	32.18	18-29	28.36	3.82**
	50-64	30.16	30-49	28.95	1.21**
	Over 65	32.18	30-49	28.95	3.23**
	Over 65	32.18	50-64	30.16	2.02**

Note: Higher scores mean lower engagement in risky driving behaviour.

* $p < .05$.

** $p < .01$.

As can be seen in Table 6 and Table 7, married scored higher on all the risky driving indicators than did single respondents. Similarly, previously married respondents also rated higher on all behaviours than single except for using a mobile phone while driving and passing through a yellow light where there were no significant differences between them. It is worth noting that no significant difference was found between married and previously married on risky driving behaviours.

Regarding risky driving total score, single scored higher on risky driving total score than did married and previously married respondents. No significant difference was found between married and previously married on risky driving behaviour.

As shown in Table 6 and Table 7, participants educated up to primary education reported to engage less frequently in unsafe driving behaviour than those with secondary education except in driving without wearing seat belt. Likewise, participants with higher education scored lower on all risky driving behaviours except for two of them: driving after drinking alcohol where there was no statistically significant difference and driving without wearing a seat belt where participants with higher education reported to engage less frequently in this behaviour than those educated up to primary education. Statistically significant differences between participants with higher education and secondary education were found in handling GPS or radio while driving (10%), driving without wearing seat belt

(1%), and passing through a yellow light (5%). People with higher education reported to engage less frequently in driving without wearing a seat belt than those with secondary education, whereas participants with secondary education scored higher on handling GPS or radio while driving and passing through a yellow light than people with higher education.

Regarding risky driving total score, participants educated up to primary education reported to engage less frequently in unsafe driving behaviour than those with secondary and higher education. In addition, no significant difference was found between participants with secondary and higher education.

Table 6

Mean difference and Games-Howell test by marital status and education.

	(a)	Mean of (a)	(b)	Mean of (b)	(a-b)
Speeding in	Single	3.79	Married	4.10	-.31**
built-up areas	Prev. Married[a]	4.08	Married	4.10	-.01
	Prev. Married[a]	4.08	Single	3.79	.29**
Using a mobile phone	Single	4.52	Married	4.65	-.13*
while driving	Prev. Married[a]	4.62	Married	4.65	-.03
	Prev. Married[a]	4.62	Single	4.52	.10
Handling GPS or radio	Single	3.50	Married	4.02	-.52**
while driving	Prev. Married[a]	4.10	Married	4.02	.08
	Prev. Married[a]	4.10	Single	3.50	.60**
Driving	Single	4.45	Married	4.65	-.20**
after drinking alcohol	Prev. Married[a]	4.60	Married	4.65	-.05
	Prev. Married[a]	4.60	Single	4.45	.15
Risky driving total score	Single	28.46	Married	30.20	-1.74**
	Prev. Married[a]	30.00	Married	30.20	-.20
	Prev. Married[a]	30.00	Single	28.46	1.54**

	(a)	Mean of (a)	(b)	Mean of (b)	(a-b)
Speeding in	Secondary[c]	3.94	None/Primary[b]	4.38	-.44**
built-up areas	Higher	3.95	None/Primary[b]	4.38	-.43**
	Higher	3.95	Secondary[c]	3.94	.01
Using a mobile phone	Secondary[c]	4.58	None/Primary[b]	4.87	-.29**
while driving	Higher	4.53	None/Primary[b]	4.87	-.35**
	Higher	4.53	Secondary[c]	4.58	-.06
Handling GPS or radio	Secondary[c]	3.82	None/Primary[b]	4.50	-.67**
while driving	Higher	3.67	None/Primary[b]	4.50	-.83**
	Higher	3.67	Secondary[c]	3.82	-.16
Driving	Secondary[c]	4.54	None/Primary[b]	4.72	-.18**
after drinking alcohol	Higher	4.61	None/Primary[b]	4.72	-.11
	Higher	4.61	Secondary[c]	4.54	.07
Driving without	Secondary[c]	4.81	None/Primary[b]	4.77	.05
wearing seat belt	Higher	4.92	None/Primary[b]	4.77	.16**
	Higher	4.92	Secondary[c]	4.81	.11**

	(a)	Mean of (a)	(b)	Mean of (b)	(a-b)
Risky driving total score	Secondary[c]	29.36	None/Primary[b]	31.82	-2.46**
	Higher	29.20	None/Primary[b]	31.82	-2.62**
	Higher	29.20	Secondary[c]	29.36	-.16

Note: Higher scores mean lower engagement in risky driving behaviour.

[a]Prev.married includes those divorced, widowed, or separated. [b]None/primary includes no education and primary education; [c]Secondary includes GCSEs, A-Levels, and vocational training.

* $p < .05$.

** $p < .01$.

Table 7

Mean difference and Bonferroni test by marital status and education.

	(a)	Mean of (a)	(b)	Mean of (b)	(a-b)
Passing through a yellow light	Single	3.69	Married	3.97	-.28**
	Prev. Married[a]	3.87	Married	3.97	-.10
	Prev. Married[a]	3.87	Single	3.69	.18
Speeding on a motorway	Single	3.73	Married	3.98	-.25**
	Prev. Married[a]	4.01	Married	3.98	.03
	Prev. Married[a]	4.01	Single	3.73	.28**

	(a)	Mean of (a)	(b)	Mean of (b)	(a-b)
Passing through a yellow light	Secondary[c]	3.85	[b]None/Primary	4.31	-.46**
	Higher	3.71	[b]None/Primary	4.31	-.61**
	Higher	3.71	Secondary	3.85	-.14*
Speeding on a motorway	Secondary[c]	3.85	[b]None/Primary	4.30	-.45**
	Higher	3.84	[b]None/Primary	4.30	-.45**
	Higher	3.84	Secondary[c]	3.85	-.01

Note: Higher scores mean lower engagement in risky driving behaviour.

[a]Prev.married includes those divorced, widowed, or separated. [b]None/primary includes no education and primary education; [c]Secondary includes GCSEs, A-Levels, and vocational training.

* $p < .05$.

** $p < .01$.

3.5. Predictors of engagement in each risky driving behaviour and risky driving total score

Table 8 presents the results of seven logistic regressions predicting driver's engagement in each one of the unsafe driving behaviours. Moreover, it presents the results of linear regression predicting driver's engagement in risky driving total score. All independent variables were entered into the models in one step.

Although, as shown in Table 8, all models significantly fitted the data (Wald chi-squares values <.0000), the proportion of variance explained for the dependent variable did differ lightly, with the Cragg and Uhler's R2 ranging from 13.7% to 22.3%. Regarding linear regressions, the model significantly fitted the data (F (37, 1255) = 14.71; p-value <.0000) and the proportion of variance explained for the dependent variable was 27%.

Men are more likely to exceed the speed limit in urban areas (OR=1.4668) and outside urban areas (OR=1.6050). In addition, they are more likely to drive after drinking alcohol (OR=2.7423). In addition, men reported a higher scored in risky driving total score than women did. Specifically, risky driving total score was 0.91 points higher in men than women were.

Age, once controlled for other variables, appeared not to have a statistically significant effect. Only statistically significant effects were found for speeding in urban areas (all age groups), mobile phone use (age group over 65), and radio or GPS use (age group 50-64 and over 65). However, for risky driving total score, age appeared to show a monotonically decreasing, that is, the older the drivers were, the lower score they reported.

Regarding marital status, only one statistically significant effect was found. Married people were 47.76% less likely to drive after drinking alcohol. When analysing risky driving total score, married people reported a lower score in risky driving behaviour than single did. Specifically, risky driving behaviour was 0.76 points lower in married people

than single. Surprisingly, no difference was found between single and previously married.

Education did have a statistically significant effect. In general, people with a higher level of education were more likely to engage in risky driving behaviour, except for seat belt use where a negative relationship was found. Regarding risky driving total score, people with a higher level of education were more likely to engage in risky driving behaviour. Specifically, people with higher education scored 1.08 higher on risky driving behaviour than participants with primary or lower education. This score was 1.3 higher for people with higher education.

As expected, dangerous driving behaviour is positively related to both the loss of points and monetary sanctions.

Finally, it is worth noting that, once controlled for other variables including age, the driving experience did not have a statistically significant effect, except for speeding on a motorway. Drivers with more experience were less likely to exceed the speed limit on a motorway

Table 8

Results of engagement in each risky driving behaviour (1-7) and risky driving total score (8)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)[a]
Male	1.4668** (2.75)	1.2789 (1.58)	1.1728 (1.14)	1.6050** (3.38)	1.0733 (.51)	2.7423** (6.10)	1.1108 (.45)	.91** (.22)
30-49 years old	.6057* (-2.14)	.9191 (-.35)	.9554 (-.2)	1.0504 (.21)	.7299 (-1.34)	.8360 (-.73)	1.1234 (.30)	-.97* (.39)
50-64 years old	.5527* (-1.98)	.6101 (-1.34)	1.1046 (.31)	1.3473 (.90)	.4339** (-2.58)	1.2040 (.51)	1.5486 (.83)	-1.35** (.51)
Over 65 years old	.3003** (-2.66)	.2849* (-2.02)	1.2787 (.55)	1.4767 (.84)	.2236** (-3.27)	.9951 (-.01)	.6097 (-.71)	-2.09** (.68)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)[a]
Married	.8958 (-.65)	1.0022 (.01)	.7450 (-1.75)	.9315 (-.41)	.8590 (-.91)	.5224** (-3.79)	.8278 (-.69)	-.76** (.28)
Previously married	1.0607 (.24)	1.1551 (.55)	1.1170 (.45)	.8148 (-.86)	.9150 (-.38)	.6782 (-1.51)	.6387 (-1.09)	-.20 (.37)
Secondary education	1.4572 (1.82)	1.7779 (1.81)	2.5237** (4.63)	1.4348 (1.73)	1.8593** (2.87)	1.8802* (2.38)	.4869* (-2.41)	1.08** (.30)
Higher education	1.4592 (1.64)	2.1354* (2.26)	3.3787** (5.31)	1.4286 (1.55)	2.4154** (3.75)	1.8738* (2.20)	.2154** (-4.17)	1.29** (.33)
Non-monetary sanctions	1.4632* (2.08)	1.0451 (.26)	.9225 (-.47)	1.6254** (2.63)	1.6507** (2.83)	1.5843** (2.83)	1.1203 (.44)	.88** (.29)
Monetary sanctions	2.1542** (5.62)	1.9984** (4.32)	2.1951** (5.72)	1.8694** (4.60)	1.6100** (3.50)	1.7726** (3.59)	1.8607* (2.52)	1.73** (.21)
Unemployed	.9051 (-.57)	.7759 (-1.39)	.9313 (-.42)	.8618 (-.83)	.7892 (-1.38)	1.2119 (1.04)	1.7458* (2.16)	-.25 (.28)
Inactive	.7882 (-1.21)	.6257 (-1.88)	.6902 (-1.87)	.4692** (-3.93)	.8948 (-.54)	.8629 (-.66)	1.2773 (.71)	-.54 (.32)
Experience	.9979 (-.24)	.9905 (-.89)	.9961 (-.44)	.9791* (-2.31)	.9911 (-1.03)	1.0032 (.30)	.9917 (-.58)	-.02 (.01)
Constant								10.94** (.50)
N	1,355	1,351	1,355	1,357	1,358	1,327	1,314	1,293
Wald Chi^2/ F(37, 1255)	178.57**	13.56**	139.85**	194.16**	20.21**	126.98**	83.27**	14.71**
Cragg and Uhler´s R^2/ R-squared	19.7%	16.1%	14.7%	2.9%	22.3%	17.0%	13.7%	27%

Note: (1) Speeding in built-up areas; (2) Using a mobile phone while driving; (3) Passing through a yellow light; (4) Speeding on a motorway; (5) Handing GPS or radio; (6) Driving after drinking alcohol; (7) Driving without wearing the seat belt (8) Risky driving total score. Omitted reference group: female, age 18-29 years old, single, none/primary education, not getting penalty points, not being fined, employee. All models included autonomous community and traffic exposure (kilometres travelled on working day and weekend) dummies. Exponentiated

coefficients in logistic regressions; Robust t statistics in parentheses.

[a.] In order to facilitate the interpretation and analysis of the coefficients in column (8), risky driving behaviour items were reversely coded so that higher score mean higher engagement in risky driving

* $p < .05$.

** $p < .01$.

4. Discussion

The goal of this study was to identify the individual characteristics that are associated to risky driving in Spain. In particular, and as opposed to the existing evidence for Spain, we distinguish among seven different types of risky driving behaviours

4.1. Gender and age

Our preferred multivariate estimates attest that men are more likely to exert high-risk driving behaviours than women but only regarding speeding and driving after drinking alcohol, two of the risky behaviours more closely related to fatal accidents. These results are in line with previous studies (Font-Ribera et al., 2013; Hassan et al., 2017; Shinar et al., 2001; Sloan et al., 2013; Stephens et al., 2017; Tomas et al., 2010; West & Moskal, 1996). Unlike Barr et al. (2015), no difference based on gender was found with respect to using the mobile phone when driving and not wearing the safety belt. The fact that the latter study was conducted on a selected sample of high school students might account for this discrepancy.

Moreover, risky driving total score was predicted by gender. This finding was consistent with previous literature (Bachoo, Bhagwanjee, & Govender, 2013; Dahlen & White, 2006)

Regarding age, we find that risk-driving behaviours increase until mid-age and then start to decrease while still being more likely than for the youngest drivers. Remarkably, this effect is estimated once conditioning on driving experience. This, in turn, means that there is no monotonic association between a driver's age and his likelihood of exhibiting risky

457 driving behaviours. Indeed, the estimated marginal effect of age is only statistically
458 significant in three out of the seven behaviours analysed: speeding in built-up areas, using
459 a mobile phone while driving and driving without wearing the seat belt. Qualitatively
460 similar results were obtained by other authors (Nurullah et al., 2013; Prat et al., 2017, 2015;
461 Stephens et al., 2017)

462 A monotonically decrease was found in age with respect to the risky driving total score.
463 Similar results were found by Dahlen & White (2006), but contrary to Bachoo et al. (2013).
464 This can be attributed to the fact that the latter study was conducted on a sample aged 18
465 and 52

466 These differences in risky driving behaviours based on sex and age may be due to
467 differences in risk perception since perceived risk is lower in male than in female drivers
468 and higher in adults than in young drivers (Rhodes & Pivik, 2011). In fact, Rhodes and
469 Pivik (2011) showed that male drivers reported more dangerous driving behaviours than
470 female ones and teen drivers reported more dangerous driving behaviours than adult ones.
471 However, when risk perception was taken into account, the relationship between
472 gender/age and driving behaviour became non-significant.

473 *4.2. Marital status*

474 The ANOVA and Games-Howell or Bonferroni post hoc tests revealed statistically
475 significant differences between married or previously married and single people. These
476 differences were significant for all dangerous driving behaviours except for seat belt usage.
477 This result was contrary to West and Moskal (1996) who did find a difference between
478 single and married people when wearing a seat belt while driving. However, this study did
479 not control for confounding variables and its sample was restricted to undergraduate
480 students. Our multivariate estimates confirm that the univariate association between marital
481 status and risky-driving behaviours was mediated by other confounding factors since

significant association between a respondent's marital status and his probability of declaring risky behaviours became non-significant. The exception to the latter rule is obtained with respect to driving after drinking alcohol. This result was consistent and similar to the results in Sloan et al. (2013), where being married reduced percent the odds of driving under the influence of alcohol by about 40 percent. Furthermore, it is worth noting that neither the ANOVA analysis nor the logistical regressionrevealed a statistically significant difference between married and previously married people, indicating unsafe driving behaviours in these two groups appears to be quite similar.

4.3. Education level

Linear regression revealed significant statistical association between a respondent's educational attainment and his likelihood of being a risky driver. This result is in line with those obtained by Mohammed Najeeb (2012) and Dobson, Brown, Ball, Powers, and McFadden (1999)

Moreover, logistic regression revealed that this association is particularly stronger regarding using the mobile phone while driving, passing through a yellow light, handing GPS or radio and driving without wearing the seat belt. Interestingly, respondents with a university degree are less likely to speed while driving than those with a high school diploma.

These results are similar to findings in Hassan, Vinodkumar, and Vinod (2017) and Strine et al. (2010), but contrary to Sloan et al. (2013) who found that higher education attainment was associated with a lower odd of driving under the influence of alcohol. One reason may be the way in which the variable educational attainment was incorporated into the model. Sloan et al. (2013) used educational attainment in years ranging from 11 to 18 years; while our model incorporated educational level using dummies variables for each

educational attainment.

4.4. Previous sanctions and driving experience

Risky driving behaviour was associated with having lost points in the recent past. Compared to drivers who had not lost points from their license, drivers who had lost points were more likely to exceed the speed limit in urban area, exceed the speed limit on motorway, driving after drinking alcohol and using radio/GPS while driving. These results are similar to Gras, Font-Mayolas, Planes, and Sullman (2014), who found that risky driving behaviour was related to both the loss of points and involvement in a crash. This relationship was also observed with monetary sanctions, that is, drivers who had ever been fined were more likely than drivers who had not been ever fined to engage in risky behaviours. These two findings were not surprising at all since drivers who engage in dangerous driving behaviours are punished with a loss of points,[7] a monetary sanction,[8] or both if they are caught by the authorities.

In regards to driving experience, our findings, in line with previous studies Machado-León et al. (2016) showed that more experienced drivers tended to exceed the speed limit; however our study failed to find any effects of driving experience on distracted driving.

4.5. Strengths and Limitations

The strengths of the study include a large sample of drivers (n=1,632), giving a great statistical power to our analysis. Moreover, the breadth of data allows us to control for several potential confounding factors. Finally, as shown in section 2, previous literature has focused its attention on analysing only one or two behaviours at the same time. However, this research analysed seven dangerous driving behaviours for the same sample. Montoro, Roca, and Tortosa (2008) and Gras et al. (2014) examined several dangerous driving behaviours as well, but they focus their attention on analysing how penalty point system in Spain changed these driving behaviours, while our study has examined the main

531 determinants that influenced this behaviour. To our knowledge, this study was the first to
532 do so for the Spanish population. However, this study has some limitations as well. The
533 main limitation was that data on risky driving behaviour was extracted from self-reported
534 measures, so individuals' responses could be influenced due to memory and social
535 desirability biases. However, Lajunen and Summala (2003) suggest that self-reported driving
536 behaviours are relatively reliable and free from social desirability bias. Another limitation
537 was that the survey items to measure risky driving behaviour were not validated, but were
538 based on some typical example of aberrant driving behaviour. Finally, although statistically
539 significant associations were found between certain socio-demographic variables and
540 dangerous driving behaviours, we cannot interpret these estimates as causal effects but as
541 correlations that allow us to characterize high-risk drivers in Spain. Additionally, some of these
542 correlations might be spurious due to sample size limitations and/or unobserved relevant
543 factors biases.[9]

544 **5. Conclusions**

545 The present study investigated the empirical characterization of risky drivers in Spain.
546 The dataset used allowed us to distinguish among seven different categories of risky
547 driving behaviours. Our preferred multivariate estimates attest that risky driving
548 behaviours are more frequent among the middle-aged than among other drivers, with risky
549 behaviours being less frequent among younger drivers. Remarkably, the driver's age is
550 only associated to the frequency of three out of the seven risky behaviours analysed.
551 Equivalently, being a male only increases the frequency of speeding and driving after
552 drinking alcohol. According to our estimates, the driver's educational attainment is the
553 characteristic that better distinguishes high- and low-risk drivers in Spain. We find a
554 positive and in most cases monotonically increasing correlation between educational

555 attainment and the likelihood of being a high-risk driver. Overall, our estimates suggest
556 that policies aimed to lower the frequency of risky driving behaviours in Spain should be
557 targeted to different collectives of drivers depending on the particular risky behaviour
558 considered.

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Appendix

Appendix A. Questions extracted from the barometer may 2016 included in the manuscript

1. Do you have any driving license?
   - Yes
   - No
   - Do not answer
2. If 1=yes, since when do you have it
   - ( )Years
3. Do you drive a motor vehicle even if it's in a way occasional?
   - Yes
   - No
   - Do not answer
4. If 3=yes, how many kilometers do you drive on a weekday? and on weekend?
   - (…) kilometers (weekday)
   - (…) Kilometers (weekend)

5. If 3=yes, how often do you…

	Always	Quite often	Sometimes	Hardly ever	never	Do not apply	Do not know	Do not answer
Speeding in built-up areas								
Using a mobile phone while driving								
Passing through a yellow light								
Speeding on a motorway								
Handling GPS or radio								
Driving after drinking alcohol								
Driving without wearing the seat belt								

6. Have you ever got penalty points on his/her driving record? Have you ever been fined?

	Penalty points	Fine
Yes		
No		
Do not answer		

7. Gender
   - Male
   - Female

8. How old are you?
   - ( ) years old
   - Do not answer

9. What is your highest qualification?
   -

10. What is your marital status?
    - Married
    - Single
    - Widowed
    - Legally Separated
    - Divorced

11. Which of the things best describes what you are currently doing?
    - Employee
    - Pensioners
    - Unemployed
    - Students
    - Housewives

12. In which autonomous community do you live?
    -

Appendix B. Data

- **Speeding in built-up areas:** Dummy variable equal to one if the respondent has ever been speeding in built-up areas.

- **Using a mobile phone while driving:** Dummy variable equal to one if the respondent has ever driven using a mobile phone.

- **Passing through a yellow light:** Dummy variable equal to one if the respondent has ever passed through a yellow light.

- **Speeding on a motorway:** Dummy variable equal to one if the respondent has ever been speeding on a motorway.

- **Handling GPS or radio:** Dummy variable equal to one if the respondent has ever driven handing GPS or radio.

- **Driving after drinking alcohol:** Dummy variable equal to one if the respondent has ever driven after drinking alcohol.

- **Driving without wearing the seat belt:** Dummy variable equal to one if the respondent has ever driven without wearing the seat belt.

- **Risky driving total score:** this variable has been created by aggregating each of the seven risky driving behaviours into a single score. It ranges from 5 to 35. A higher score indicates lower engagement in risky driving.

- **Male:** Dummy variable equal to one if respondent is male.

- **Age:** A four-category age measure including 18-29 years old, 30-49 years old, 50-64 years old, and over 65 years old. Each age group is included separately as a dummy variable.

- **Marital status:** A three-category marital status measure including married, previously married, and single. Each marital status is included separately as a dummy variable.

845 • **Education level:** Three dummy variables are included separately indicating the
846 highest academic level achieved by the respondent. The categories indicate three levels:
847 none/primary, secondary/vocational training, and higher degree.

848 • **Region of residence:** A seventeen-category region of residence measure including
849 Andalusia, Aragon, Asturias, Balearic Islands, Canary Islands, Cantabria, Castilla-La-
850 Mancha, Castilla and Leon, Catalonia, Valencia, Extremadura, Galicia, Madrid, Murcia,
851 Navarre, Basque Country and La Rioja. The small autonomous towns of Ceuta and Melilla
852 are excluded. Each region of residence is included separately as a dummy variable.

853 • **Monetary sanction:** Dummy variable equal to one if respondent has ever been
854 fined.

855 • **Non-monetary sanction:** Dummy variable equal to one if respondent has ever got
856 penalty points on his/her driving record.

857 • **Main activity:** A three-category main activity measure including employee,
858 unemployed, and inactive population (students, pensioners, and housewives). Each main
859 activity is included separately as a dummy variable.

860 • **Driving experience:** A measure of the duration of driving license, in years.

861 • **Kilometres travelled per workday:** A banded measure of kilometres travelled on
862 weekdays, including seven categories ranging from the lowest band, under 10 kms per
863 workday, to the highest band, above 100 kms per workday. The bands are included
864 separately as dummy variables.

865 • **Kilometres travelled on weekend:** A banded measure of kilometres travelled on
866 weekend, including seven categories ranging from the lowest band, under 10 kms on
867 weekend, to the highest band, above 100 kms on weekend. The bands are included
868 separately as dummy variables.

869

Notes

1. The downward trend in Road fatalities within 24 hours was broken in 2016 as well.

2. These authors found that the cost of preventing a fatal accident was 1.4 million euros. Respect to severe and minor non-fatal accidents, the authors estimated values of 219,000 and 6,100 euros, respectively.

3. As long as the human factor is considered to be equivalent to the driver factor.

4. These results are not displayed, but they are available on request.

5. Other variables such as having children, perception of risk or presence of passengers could influence on driving behaviour and it would be interesting to add them to the model. Unfortunately, our database does not provide this information.

6. This sample was representative of the driver population in terms of sex and age. Information on the population of drivers by marital status and educational attainment was not available (DGT, 2017).

7. Exceeding the speed limit is punishable by a loss of 2-6 points depending on the extent to which the limit was exceeded; driving above the legal alcohol limit is punishable by a loss of 4-6 points depending on the extent to which the limit was exceeded; Driving while using a handheld mobile phone, GPS, or radio is punishable by a 3 point loss, as well as driving without a seat belt is also punishable by a 3 point loss; passing a red traffic light is punished by the loss of 4 points, but not passing the yellow traffic light (Ley 17/2005, de 19 de julio).

8. Drivers who commit minor offenses are fined up to 90 euros; serious offenses range from 91 to 300 euros; and very serious offenses range from 301 to 1500 euros (Ley 17/2005, de 19 de julio).

9. For example, Rosenbloom and Perlman (2016) showed that the presence of at least one passenger decreases the likelihood violating the traffic rules.