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## Persistent Traffic Offenders: Alcohol Consumption and Personality as Predictors of Driving Disqualification

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### ABSTRACT

Traffic safety is an important social problem. Many accidents are due to non-compliance with traffic regulations. Serious or repeated offenses are sanctioned with penalty points or court conviction, and sanctions can lead to disqualification from driving. This paper explores the relevance of alcohol consumption and personality factors as predictors of driving disqualification. The aim of the study is to determine whether the behaviors of persistent offenders and their propensity for law-breaking are related to their characteristics and patterns of drinking. A sample of 358 drivers participated in the study: 126 non-offender habitual drivers and 232 persistent traffic offenders disqualified from driving for serious or repeated traffic offenses, 127 of them after conviction, 105 without conviction (by accumulation of penalties). Participants were given a battery of tests measuring a set of explanatory personality and alcohol consumption factors. We used a cross-sectional study design and performed statistical analysis of variance and regression searching for differences among the groups. The results reveal group effects, with significant differences in a number of factors between traffic offenders and non-offenders, and between both categories of offenders in a number of variables, including traffic violations that lead to demerit points and/or loss of a driver's license and crash involvement. Certain variables, including problem drinking, high levels of activity or excitement, penchant for thrill or sensation seeking, and propensity to hostility while driving, can accurately predict group membership. Alcohol disorders are the best predictors of disqualification from driving for serious or repeat traffic offenses, both penalized and convicted.

### Los infractores de tráfico persistentes: el consumo de alcohol y la personalidad como predictores de la retirada del permiso de conducir

### RESUMEN

La seguridad vial es un importante problema social. Muchos accidentes se deben al incumplimiento de las normas de tráfico. Las infracciones graves o reiteradas se sancionan por la vía administrativa o judicial y en ambos casos las sanciones pueden suponer la pérdida del permiso de conducir. Este artículo explora la relevancia del alcohol y la personalidad como factores predictivos. El objetivo del estudio es determinar si el comportamiento delictivo de los infractores persistentes está relacionado con sus características de personalidad y patrones de consumo de alcohol. Se utilizó una muestra de 358 conductores: 232 infractores persistentes, a los que les había sido retirado el carnet de conducir (127 por sentencia judicial y 105 por pérdida total de puntos), y 126 conductores habituales no infractores. Se administró una batería de pruebas que miden un conjunto de factores explicativos de personalidad y consumo de alcohol. Se utilizó un diseño transversal y se realizaron análisis estadísticos de varianza y regresión buscando diferencias entre los grupos. Los resultados revelan diferencias significativas en el tipo de infracciones y accidentes entre infractores de tráfico y no infractores y entre ambas categorías de infractores. Además, ciertas variables, como el abuso de alcohol, altos niveles de actividad, activación emocional, búsqueda de sensaciones y la tendencia a la hostilidad durante la conducción, pueden predecir con precisión la pertenencia a uno u otro grupo. Los problemas con la bebida son el mejor predictor de la pérdida del permiso de conducir, tanto por condena como por acumulación de sanciones.

#### Palabras clave:

Infractores de tráfico  
Consumo de alcohol  
Factores de personalidad  
Retirada del permiso de conducir  
Sistema de puntos  
Seguridad vial

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Psychological research has identified a number of personal traits associated with different types of antisocial behavior, including aggression and violence, vandalism, risk-taking, alcohol and drug abuse, delinquency, and criminal behavior. [Castillo-Manzano, Castro-Nuño, and Fageda \(2015\)](#) have recently investigated the connection between crime and road safety in the 28 member states of the European Union during the 1999-2010 period, revealing that crime rates, and specifically motor vehicle-related crimes, can be predictors of fatal road traffic accidents.

Traffic safety is a major public health problem. According to the last global status report on road safety, launched by [World Health Organization in December 2018](#), the number of annual road traffic deaths has reached 1.35 million, someone dies on the road every 23 seconds, and every death is a tragedy ([World Health Organization, 2018](#)). A battery of measures has been implemented to improve road safety legislation. Improvements have also been introduced to road and vehicle design to make them safer. However, laws, cars, and roads do not cause traffic accidents: what individuals do with those cars, on those roads, and under those laws causes them. Psychological research shows that human actions contribute to most accidents and that 90% of collisions are caused by driving errors or traffic violations. This applies to less serious traffic offenses (e.g., careless or inconsiderate driving while using a mobile phone, not wearing a seat belt, or driving too close to another vehicle), and to more serious traffic offenses, (e.g., exceeding speed limits or driving under the influence of alcohol or drugs) ([Hughes, Anund, & Falkmer, 2016](#)). In their review on aggression and violence of children and adolescents, [Petermann and Koglin \(2013\)](#) analyze the personality traits and behavior of risky, aggressive young drivers as a disruption or psychological disorder affecting their social behavior.

Personality characteristics are believed to play a critical role in accident involvement. Evidence worldwide shows that people who commit other offenses typical of antisocial attitudes and personalities are more likely to have road accidents and infringe traffic laws. Previous studies underscore the significance of certain psychological characteristics ([Alonso et al., 2007](#)). In this regard, [Ross and Antonowicz \(2004\)](#) describe that many antisocial drivers are impulsive and impatient and have a limited ability to tolerate delay. They have a penchant for activities that involve thrill, excitement, and risk. They show a lack of objectivity in their thinking, fail to recognize problems, and underestimate danger. They have difficulty calculating possible consequences of their behavior and fail to understand the cause-and-effect relationship between their behaviors and people's reaction to them. They lack the skills necessary to solve interpersonal problems and to cope with conflicts and the stress they involve. They pursue exclusively personal goals, lack sensitivity towards other people's thoughts and feelings, and have no concern for the possible consequences of their behavior on others.

Although a number of studies have shown that certain personality characteristics, such as sensation seeking and conscientiousness, are consistently associated with risky driving and/or high accident rates. [Sümer, Lajunen, and Özkan \(2006\)](#) revealed that past research evidence relating personality characteristics to accident involvement had been largely equivocal because of methodological limitations and the lack of well-established models examining the mediational links between them. Some other studies have investigated the potential contribution of personality factors in predicting law breaking and risky driving supporting the use of multiple personality factors. [Dahlen, Martin, Ragan, and Kuhlman \(2005\)](#), for instance, have demonstrated by means of multiple regression analyses that sensation seeking, impulsiveness, and boredom proneness add incremental accuracy in predicting crash-related conditions, aggressive driving, risky driving, and driving anger expression. In a similar study, [Gulliver and Begg \(2007\)](#) identified personality factors as predictors of persistent risky driving behavior and crash

involvement among young drivers. More specific studies have focused on the relationship between personality characteristics of drivers and the number and amount of fines they have in a year ([Esmaeili, Reza, Hosseini, & Sharifi, 2012](#)).

The driving style is the way a driver chooses to drive. Using a structural equation modelling, [Ebolfi, Mazzulla, and Pungillo \(2017\)](#) argue that the driving style depends on physical and emotional conditions that drivers exhibit in different ways while driving, including tiredness, sleepiness, sickness, gloom, worry, nervousness, boredom, and anger. In the proposed model, a driving style is considered an endogenous, latent construct, while drivers' characteristics were considered exogenous. In a review of the literature, [Taubman and Skvirsky \(2016\)](#) suggest that driving styles represent a relatively stable and universal trait. [Sagberg and Ingebrigtsen \(2018\)](#) mention a driving style effect implying that drivers with previous penalty points have a higher probability of incurring additional penalties in the future than drivers without previous penalties, but is there an offending driving style conducive to disqualification?

This study investigates the potential contribution of another set of personality traits, all of them identified as predictors of antisocial driving and presumably associated with persistent risky driving and crash involvement. These include a tendency to anger, behavioral inhibition, aggression, activity, extraversion, neuroticism, and sensation seeking. Additionally, as there are clear links between drinking and traffic offenses ([Alonso, Pastor, Montoro, & Esteban, 2015](#); [Cavaiola, 2013](#); [Hubicka, Källmen, Hiltunen, & Bergman, 2010](#); [Hubicka, Laurell, & Bergman, 2008](#); [Nochajski & Stasiewicz, 2006](#)), alcohol consumption has been included as an explanatory factor as well. The prevalence of each of these factors has been tested in a sample of persistent traffic offenders whose driving privilege has been suspended or revoked due to severe or recurrent traffic offenses, and compared with a group of non-offenders. The study examines whether certain personality characteristics and patterns of alcohol consumption can influence their disregard for traffic rules and their propensity for relapsing or law breaking.

## Study Aim

The aim of this study is to check whether certain personality characteristics and patterns of alcohol consumption may enhance the propensity for law-breaking and/or relapsing, leading to disqualification from driving. Three main objectives are set:

1. To describe the characteristics of a sample of persistent traffic offenders whose driving privilege has been suspended or revoked due to severe or recurrent traffic offenses. The first testable hypothesis is that there are significant differences among traffic offenders in a number of variables, including traffic violations that lead to demerit points and/or loss of license and crash involvement.
2. To test whether there are significant differences between traffic offenders and non-offenders in a set of explanatory personality traits and alcohol consumption, as well as specific differences among offenders based on the reason for disqualification: court mandate or demerit points. The second hypothesis is that there are significant differences between traffic offenders and non-offenders and between both subgroups of offenders
3. To test whether changes in these explanatory factors would subsequently affect the probability of being banned from driving by serious or repeat traffic offenses, either with or without a court mandate. The third hypothesis is that some of these factors, above all alcohol consumption, will be a better predictor of disqualification from driving.

**Table 1.** Demographic Factors and Accident Involvement

| Participants<br>( <i>N</i> = 358)                  | Group A.<br>Non-offenders ( <i>n</i> = 126) | Group B. Offenders<br>court order ( <i>n</i> = 127) | Group C. Offenders<br>penalty points ( <i>n</i> = 105) | <i>p</i>        |
|--|---|---|--|-----------------|
| Gender   |   |   |  | <i>p</i> < .026 |
| Men ( <i>n</i> = 316)                              | 86.5% (109)                                 | 84.2% (107)   | 95.2% (100)  |                 |
| Women ( <i>n</i> = 42)                             | 13.5% (17)                                  | 15.8% (20)  | 4.8% (5)   |                 |
| Age <i>M</i> ( <i>SD</i> )                         | 34.7 (10.5)                                 | 34.6 (10)   | 33.7 (11.1)  | <i>p</i> < .802 |
| Age group  |   |   |  | <i>p</i> < .935 |
| 18-24 years  | 20.6%                                       | 18.1%   | 22.9%  |                 |
| 25-34 years  | 34.1%                                       | 34.6%   | 35.2%  |                 |
| 35-49 years  | 35.7%                                       | 39.4%   | 31.4%  |                 |
| 50-64 years  | 8.7%  | 7.9%  | 9.5%   |                 |
| 65 or more   | 0.8%  | 0.0%  | 1.0%   |                 |
| Education  |   |   |  | <i>p</i> < .000 |
| Primary education                                  | 1.6%  | 8.9%  | 8.6%   |                 |
| Primary education completed                        | 4.8%  | 26.0%   | 35.2%  |                 |
| Secondary education                                | 5.6%  | 9.8%  | 7.6%   |                 |
| Secondary education completed                      | 21.6%                                       | 26.0%   | 20.0%  |                 |
| Higher education                                   | 29.6%                                       | 8.1%  | 8.6%   |                 |
| Higher education completed                         | 36.8%                                       | 21.1%   | 20.0%  |                 |
| Driving experience in years <i>M</i> ( <i>SD</i> ) | 15.5 (10.6)                                 | 13.7 (9.6)  | 14.2 (11)  | <i>p</i> < .398 |
| Driving frequency                                  |   |   |  | <i>p</i> < .000 |
| Driving every day or almost every day              | 73.8%                                       | 83.1%   | 97.1%  |                 |
| Driving occasionally                               | 8.7%  | 16.9%   | 2.9%   |                 |
| Accident involvement                               |   |   |  |                 |
| Accident involvement with no victims               | 1.67 (1.8)                                  | 1.45 (1.6)  | 1.91 (2.5)   | <i>p</i> < .470 |
| Accident involvement with victims                  | 0.10 (0.4)                                  | 0.17 (0.5)  | 0.43 (0.8)   | <i>p</i> < .001 |

Note. Group A = non-offenders; group B = offenders banned from driving by court order; group C = offenders banned from driving by accumulation of penalty points.

## Method

### Participants

A sample of 358 drivers participating in the study was divided into two groups: a target group of 232 traffic offenders taking a re-education driving course after revocation of their driver's license, and a reference group of 126 habitual drivers with a valid driver's license, randomly selected from the normal population. Participants were holding a driver's license for an average of 15 years and driving regularly or on a daily basis. Table 1 displays the distribution of men and women, demographic characteristics, and accident involvement in the driver sample.

Concerning gender, 88% of them were male (*n* = 316), and only 12% were women (*n* = 42): there were 109 men and 17 women in the group of non-offenders, 107 men and 20 women in the group of offenders banned from driving by court order, and 100 men and 5 women in the group of offenders banned from driving by accumulation of penalty points.

Concerning age, participants were 34 years old on average, with values of mean age and standard deviation of 34.7 (10.5) in the group of non-offenders, 34.6 (10) in the group of offenders banned from driving by court order, and 33.7 (11.1) in the group of offenders banned from driving by accumulation of penalty points.

The statistical analysis did not reveal significant differences in the gender variable, comparing the groups of offenders and non-offenders,  $\chi^2(1, N = 358) = 0.58, p = .44$ . Regarding age, neither age,  $t(355) = 0.20, p = .84$ , nor age ranges,  $\chi^2(4, N = 358) = 0.21, p = .995$ , revealed differences between the groups of offenders ( $M = 34.23, SD = 10.50$ ), and non-offenders ( $M = 34.47, SD = 10.51$ ).

There were no significant differences in driving experience (namely, how long they had had their driver's license) between offenders ( $M = 13.98, SD = 10.23$ ), and non-offenders ( $M = 15.51, SD = 10.66$ ). There were no differences in driving frequency either,  $\chi^2(3, N$

= 358) = 17.733,  $p < .001$ , except a percentage of daily drivers slightly higher than expected in the group of offenders (89.5%) compared to the group of non-offenders (73.8%).

The group of offenders was divided into two categories or subgroups, according to the reason their driving privileges had been suspended or revoked: a group of 127 traffic offenders disqualified by a court conviction (54.74%) and a second group of 105 traffic offenders disqualified without court conviction (45.26%).

It should be noted that in the Spanish legal system traffic offenses can be criminal or civil offenses. Civil offenses or infractions are generally punishable only by fines or administrative action such as demerits (penalty points), whereas a criminal offense is usually punishable with jail time, a fine, or both. For instance, drinking and driving can be either a misdemeanor or a crime, sanctioned or punished depending on the blood alcohol content (BAC) level when operating a vehicle (over 0.5 g/l means 4 penalty points, over 1.0 g/l means 6 penalty points, over 1.2 g/l means the driver is legally impaired to drive). Since revocation of a driver's license may be the result of any of these two causes, administrative or judicial cause, both subgroups of traffic offenders were differentiated and compared. Habitual traffic offenders (HTO), i.e., drivers whose driving privileges have been suspended or revoked and get caught driving while disqualified (during the period of suspension or revocation), were excluded. Professional drivers were excluded, too.

### Procedure and Research Design

We used a cross-sectional study design. The study was conducted in six qualified driving schools where driver re-education and awareness-raising courses usually take place. As explained above, drivers are disqualified when they get twelve or more demerit points within a three-year period, or when they are convicted of a traffic offense and lose their license. In both cases, disqualified drivers take

these intensive, mandatory courses and have to pass a new driver's test.

Traffic offenders were asked to participate in the study on a voluntary basis before beginning the course. Anonymity and confidentiality were ensured. Those who agreed were informed that the research was a study designed at the university and independent from the re-education course, with no influence on their driving license suspension or test to avoid any tendency towards social approval.

Once they knew the aim of the study and after signing their informed consent, they were given the battery of tests by a team of qualified surveyors, and all the research was supervised by university professors.

Non-offenders used as the reference group were common drivers, randomly selected from the general population, using the latest data provided by the General Directorate of Traffic (DGT), the Spanish agency responsible for driver's licenses and mobility and transport policies. Thus, the same study was conducted on a random sample of 126 Spanish habitual drivers with a valid driving license, as similar as possible in age, gender, driving frequency, and driving experience. Like traffic offenders, the group of non-offenders participated on a voluntary basis and gave their informed consent, too. Ethics and procedure were similar, except they did not have to attend classes, and an appointment was scheduled to interview them for the survey.

Ethics statement: The research was conducted according to the ethical principles for medical research involving human subjects, including research on identifiable material and data of the Declaration of Helsinki adopted by the World Medical Association (WMA). All participants were invited to take part in the study on a voluntary basis and gave their informed consent. The methods proposed for research were reviewed by an institutional review board (an independent ethics committee at the University Research Institute on Traffic and Road Safety (INTRAS) to ensure that they were ethical.

## Measurement Instruments

**Social desirability** of respondents was assessed with the Marlowe-Crowne Social Desirability Scale (MC-SDS), translated into Spanish (Ferrando & Chico, 2000). The scale consists of 33 items that assess whether respondents are concerned with social approval. A high number of socially desirable responses indicates that the respondent is generally concerned with social approval and conforming to societal conventions, while a low score indicates that the respondent is less concerned with such things and is more willing to answer a survey truthfully and represent himself or herself accurately (Crowne & Marlowe, 1964). To prevent any possible bias, we performed statistical analysis comparing responses of each group of drivers (non-offenders, convicted, and penalized offenders) in negation (15 items) and attribution (18 items). There were no significant differences in attribution  $F(2.35) = 0.96, p = .38, \eta^2 = .00$ , or negation  $F(2.35) = 0.00, p = .99, \eta^2 = .00$ , meaning that our results would not be better explained by a possible bias of social desirability.

**Personality and alcohol consumption** were assessed using three different tests: the Driving Anger Scale (DAS), the Sensitivity to Punishment and the Sensitivity to Reward Questionnaire (SPSRQ-20) and the Zuckerman-Kuhlman-Aluja Personality Questionnaire (ZKA-PQ). As the scales were already established, we performed confirmatory factorial analysis for validating our constructs. With DAS and SPSRQ-20, we used the direct oblimin rotation method to test whether our data fit the hypothesized measurement model. With ZKA-PQ, we selected the method of extraction using orthogonal rotation varimax as the authors did in their original research. The results were similar to those obtained in original and previous studies. Table 3 displays the means and standard deviations in measured

variables of personality and alcohol consumption for each group, and Table 4 shows the internal validity of measures.

Although driving anger cannot be considered as a personality trait, it was included because of its potential value for research on accident prevention and health psychology. Responses to different potentially angering driving-related situations involving hostile gestures, illegal driving, police presence, slow driving, discourtesy, and traffic obstructions correlate positively, suggesting a general dimension of driving anger as well as anger linked to specific driving-related situations.

**Driving anger** was assessed with the 14 items short form of the Deffenbacher Driving Anger Scale (DAS) (Deffenbacher, Oetting, & Lynch, 1994), translated into Spanish and validated for the Spanish driver population in two previous studies (Egea-Caparrós, Velandrino-Nicolás, Fernández-Ros, & Prieto-Martínez, 2012; Herrero-Fernández, 2011). A first principal component factorial analysis confirmed the good fit in three factors suggested by Herrero-Fernández (2011), explaining 53.62% of variance. A second factorial analysis confirmed a four-factor model suggested by Egea-Caparrós et al. (2012), explaining a 60.01% variance. The scale demonstrated good internal reliability using the four-factor model, with Cronbach  $\alpha$  for each subscale ranging from .50 to .82, and total score of .85. The Kaiser-Meyer-Olkin measure of sample adequacy was meritorious (KMO = .86), as well as Barlett's test of sphericity,  $\chi^2(91) = 1380.19, p < .001$ . We considered, therefore, using four subscales for the purposes of our study, concerning anger over traffic obstructions, illegal driving, hostile gestures, and the possibility of being fined: DAS-FI- Impeded Progress, DAS-FII- Reckless Driving, DAS-FIII- Direct Hostility, DAS-FIV- Sanction Hostility.

**Behavioral inhibition** was assessed with the 20-item short form of the Sensitivity to Punishment and Sensitivity to Reward Questionnaire (SPSRQ-20) using a Likert-type rating scale for responses (Torrubia, Ávila, Moltó, & Caseras, 2001). The results of our statistical analysis were similar to those obtained in the original studies (Aluja & Blanch, 2011), with two factors explaining 36.09% of variance: sensitivity to punishment and sensitivity to reward. In our analysis, Cronbach  $\alpha$  was: .80 in the total score,  $M = 43.33, SD = 8.65$ ; .79 in the sensitivity to punishment factor,  $M = 21.31, SD = 5.58$ ; and .78 in the sensitivity to reward factor,  $M = 22.03, SD = 5.59$ . Both were included.

**Five other personality traits** were measured using the 200 items of the Zuckerman-Kuhlman-Aluja Personality Questionnaire (ZKA-PQ) (Aluja et al., 2013), which includes five factors with four facets per factor and ten items per facet. Confirmatory factor analysis showed satisfactory goodness of fit indexes: the Kaiser-Meyer-Olkin measure of sample adequacy was meritorious (KMO = .80), as well as Barlett's test of sphericity,  $\chi^2(190) = 3229.17, p < .001$ . As in an earlier study by Aluja, Kuhlman, and Zuckerman (2010), our factorial analysis showed a five-factor structure agglutinating 20 facets and explaining 56.08% of variance, with Cronbach  $\alpha$  of .80 in total score and ranging from .86 to .91 for aggression ( $\alpha = .91$ ), activity ( $\alpha = .88$ ), extraversion ( $\alpha = .87$ ), neuroticism ( $\alpha = .89$ ), and sensation seeking subscales ( $\alpha = .86$ ).

**Problematic drinking** was assessed using the ten item Alcohol Use Disorders Identification Test (AUDIT), which measures four levels of alcohol consumption: non-problematic, hazardous, harmful, and dependence (Saunders, Aasland, Babor, de la Fuente, & Grant, 1993). The AUDIT was developed as a simple screening method for excessive drinking, and it is useful to identify persons with hazardous and harmful patterns of alcohol consumption. It also helps identify alcohol dependence and some specific consequences of harmful drinking. In our study, and based on recommendations provided in the manual (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001), we used the total score, taking scores over eight as indicators of problematic alcohol consumption.

**Table 2.** Types of Traffic Offenses

|                  | Group A.<br>Non-offenders | Groups B + C.<br>Offenders | Group B.<br>Court order | Group C.<br>Penalty point |
|------------------|---------------------------|----------------------------|-------------------------|---------------------------|
| Alcohol          | 2.4% (3)                  | 70.2% (163)                | 94.5% (120)             | 41.0% (43)                |
| Speeding         | 4.0% (5)                  | 22.4% (52)                 | 0.8% (1)                | 48.6% (51)                |
| Cellphone        | 2.4% (3)                  | 15.5% (36)                 |                         | 34.3% (36)                |
| Seatbelt         | 3.2% (4)                  | 15.1% (35)                 |                         | 33.3% (35)                |
| Road signs       | 1.6% (2)                  | 7.7% (18)                  |                         | 17.1% (18)                |
| Reckless driving |                           | 0.4% (1)                   | 0.8% (1)                |                           |
| Valid license    |                           | 0.8% (2)                   | 1.6% (2)                |                           |
| Other            |                           | 9.5% (22)                  | 4.7% (6)                | 15.2% (16)                |

Note. Group A = non-offenders; group B = offenders banned from driving by court order; group C = offenders banned from driving by accumulation of penalty points.

## Data Analysis

Statistical analysis was performed using the SPSS Statistics 19. A database was prepared with respondent information including demographics, data about driving experience, traffic offenses, and crash involvement, and responses to selected subscales as part of the battery of tests. Data were cleaned, checking for mistakes or inconsistencies, so that some subjects were removed, decreasing the sample size. To check the distribution of the statistical data set and the assumption of normality before running the statistical test of regression, a descriptive analysis was done, with measures of central tendency, scattering, skewness, and kurtosis, for quantitative variables. Statistical analysis was performed according to the aims.

First, we described the characteristics of the target group of traffic offenders and compared them with the reference group of common drivers, including age, gender, driving frequency, and crash involvement. We considered the reason for disqualification and the offenses committed before being banned from driving and described common traffic violations that cost them demerit points and/or license suspension.

Second, to validate the measurement scales used in our study, we performed psychometric analysis. We did descriptive analysis of items, factors, and total scores of questionnaires selected for the study, with means and standard deviations for our sample. To check how suited our data were for factor analysis, we performed the KMO test for sampling adequacy for each variable of the model and the complete model, and Bartlett test of sphericity. Then, we proceed to confirmatory factorial analysis of each scale using methods of principal components and principal axis factoring, and methods of factor rotation oblimin direct or varimax, depending of the scale.

Third, to test whether or not there were significant differences between our groups in the selected set of individual characteristics (personality and alcohol consumption), we performed an analysis of variance of one factor (traffic offenses) with three levels (non-offenders, convicted offenders, penalized offenders). With this design, we obtained multiple observations in the form of scores on scales of personality and alcohol consumption, from a number of drivers belonging to the three levels of the traffic offences factor. Non-significance of the test statistic associated with this technique would imply that offending driving is not reflected in individual characteristics as measured by the scales. On the other hand, significance would imply that drinking and other individual tendencies (e.g., anger, behavioral inhibition, or aggression) afflict different groups differently.

Fourth, to determine whether there was a causal relationship and to identify predictors of an offending driving style conducive to disqualification, we performed a multinomial logistic regression, the linear regression analysis to conduct when the dependent variable is nominal with more than two levels. In this analysis, we used traffic offenses as dependent variable and those factors of personality and alcohol consumption that differed significantly among the groups of drivers in our previous analysis as independent variables. The model

can predict whether changes in these explanatory variables (related to personality and alcohol consumption) can subsequently affect the driving style and the probability of being banned from driving by serious or repeat traffic offenses, either penalized or convicted. We used the method of maximum likelihood to estimate the coefficients and calculate the odds ratio with a confidence interval of 95%, and the Nagelkerke  $R^2$  test of goodness of fit.

Finally, we performed two additional binary logistic regression analyses: one addressing both groups of traffic offenders jointly (to contrast offenders vs. non-offenders) and another considering them individually (to contrast convicted vs. penalized offenders). These analyses were performed using a stepwise regression and a method of maximum likelihood, with Hosmer-Lebeshow and Nagelkerke  $R^2$  test of goodness of fit.

## Results

### Differences in Traffic Violations and Crash Involvement

As mentioned above, all traffic offenders had been disqualified from driving, but the reasons for their disqualification differed, so that some were convicted and others were not. It was the first time for nearly all of them: only 3% of traffic offenders had already been disqualified from driving on account of offenses committed when driving. The offenses they had committed before being banned from driving were different, too.

Most common traffic violations that cost them demerit points and/or license suspension were: speeding (exceeding speed limits), driving under the influence of alcohol (blood alcohol level over 0.5 g/l while driving), cell phone ban (use of cell phone while operating a vehicle), seatbelt violations (failure to fasten seatbelt), violation of road signs (running a red light or illegal passing and other), reckless driving (turning or changing lanes without proper signaling, driving in wrong direction on highway, tailgating or inadequate distance from vehicle in front with endangerment or damage, and other), driving while disqualified (driving without a valid license or during the period of suspension or revocation), and other miscellaneous violations. Frequencies of these traffic offenses in the sample of our study are described in [Table 2](#).

As many as 163 drivers of the 232 traffic offenders (70%) drink and drive. A comparison of the two groups of traffic offenders shows a higher incidence of this offense on those who had been disqualified by court conviction (94%) compared to those who had been disqualified by accumulating penalty points (41%). Membership of this subgroup should be drawn primarily from drunk drivers, given that they have been arrested for driving under the influence with a high blood alcohol level over 1.2 g/l, and their driving privileges are revoked immediately.

In case of lower blood alcohol levels, driving under the influence can result in four or six penalty points for licensed drivers, so this type of offense is also found in the group of traffic drivers disqualified without a

**Table 3.** Variables of Personality and Alcohol Consumption. Means and Standard Deviations

| Variable                               | Group A.<br>Non-offenders | Group B.<br>Court order offenders | Group C.<br>Penalty points offenders | Test  |
|--|---------------------------|-----------------------------------|--------------------------------------|---|
| DAS-FI Impeded progress                | 11.31 (3.56)              | 12.93 (4.16)                      | 13.60 (4.14)                         | $F(2, 34) = 10.61^*$<br>$p < .001, \eta^2 = .06$  |
| DAS-FII Reckless driving               | 17.24 (3.91)              | 18.00 (4.10)                      | 18.38 (4.03)                         | $F(2, 34) = 2.46$<br>$p < .087, \eta^2 = .01$     |
| DAS-FIII Direct hostility              | 5.25 (2.57)               | 5.73 (2.39)                       | 5.62 (2.38)                          | $F(2, 34) = 1.59$<br>$p = .205, \eta^2 = .01$     |
| DAS-FIV Sanction hostility             | 5.06 (1.87)               | 5.46 (1.93)                       | 6.23 (2.10)                          | $F(2, 35) = 9.89^*$<br>$p < .001, \eta^2 = .06$   |
| SPSRQ Sensitivity to punishment        | 21.92 (5.34)              | 21.18 (5.45)                      | 20.72 (5.98)                         | $F(2, 35) = 1.03$<br>$p = .358, \eta^2 = .01$     |
| SPSRQ Sensitivity to reward            | 21.08 (5.03)              | 21.90 (5.92)                      | 23.31 (5.63)                         | $F(2, 35) = 4.02^*$<br>$p < .019, \eta^2 = .02$   |
| ZKAPQ Aggression                       | 83.74 (17.97)             | 90.88 (17.49)                     | 96.41 (17.30)                        | $F(2, 35) = 16.85^*$<br>$p < .001, \eta^2 = .08$  |
| ZKAPQ Activity                         | 112.54 (15.18)            | 120.02 (14.77)                    | 115.17 (14.76)                       | $F(2, 35) = 7.90^*$<br>$p < .001, \eta^2 = .043$  |
| ZKAPQ Extraversion                     | 119.52 (13.93)            | 120.00 (13.49)                    | 120.63 (13.10)                       | $F(2, 35) = 0.39$<br>$p = .677, \eta^2 = .02$     |
| ZKAPQ Neuroticism                      | 85.33 (15.39)             | 93.68 (16.16)                     | 89.06 (15.91)                        | $F(2, 35) = 8.69^*$<br>$p < .001, \eta^2 = .05$   |
| ZKAPQ Sensation seeking                | 91.30 (14.36)             | 97.52 (14.39)                     | 102.85 (14.69)                       | $F(2, 35) = 18.92^*$<br>$p < .001, \eta^2 = .09$  |
| AUDIT. Problematic alcohol consumption | 0.34 (0.26)               | 0.92 (0.30)                       | 0.76 (0.34)                          | $F(2, 32) = 123.29^*$<br>$p < .001, \eta^2 = .43$ |

\*Significant differences.

court conviction, i.e., by penalty points. However, the lower incidence of drinking and driving suggest a different pattern of alcohol consumption. We proceeded from that premise, searching for differences in alcohol consumption between these two subgroups in a further analysis.

Moreover, although the myriad traffic offenses among drivers disqualified without a court conviction (such as speeding, phone use ban, and seatbelt and road signs violations) show a recidivist behavior accumulating penalty points, all this suggests that membership of this subgroup may well be drawn primarily from repeat traffic offenders with a persistent risky driving behavior who probably are not aware of that fact, have little awareness of it, or are little concerned about it. We proceeded from that second premise, and we investigated additional differences between these two groups.

A first finding was that around 17% of them had previously and unsuccessfully completed re-education and awareness-raising courses. As explained above, any driver who commits a traffic offense can attend these classes and get privileges removing penalties (up to six points every two years). Some individuals may intentionally complete these courses to prevent being banned from driving when they are at risk of disqualification. Only ten people from the other groups (nine convicted and one non-offender) had taken courses before. Statistical differences between groups were significant,  $\chi^2(2, N = 358) = 20.15, p < .001$ .

Additionally, it should be taken into account that many traffic offenders had already been involved in crashes. When comparing crash involvement in both subgroups of traffic offenders, those disqualified without a court conviction are found to be responsible for a greater number of accidents involving persons and resulting in casualties. A first statistical analysis does not reveal significant differences in non-injury accident involvement among the three groups of common drivers, offenders disqualified by a court conviction and offenders disqualified by penalty points,  $\chi^2(2, N = 358) = 1.5, p = .47$ , but a second analysis reveals that there are significant differences in accidents causing injuries to people and fatal accidents. In other words, they are not more frequently involved in crashes, but the accidents they cause are more serious and more likely to result in death and injuries. Mann-Whitney's *U* test using Bonferroni adjustments in three possible combinations reveals significant differences between traffic offenders disqualified

by penalty points and traffic offenders disqualified by a court conviction,  $z = 2.79, p = .005$  and, of course, between the former and common drivers,  $z = 3.45, p = .001$ . In short, the convicted are mostly drunk drivers, responsible for more serious offenses, and the sanctioned are mostly recidivists, responsible for less serious but repeat offenses causing, despite this, more serious accidents.

### Differences in Personality and Alcohol Consumption

To know whether performance on each personality and alcohol consumption test differs significantly among three groups of drivers, i.e., whether all three levels (groups of offenders, convicted offenders, and penalized offenders) have similar average scores, scores on different scales were registered and analyzed. Means and standard deviations in each measured variable of personality and alcohol consumption for each groups are shown in Table 3.

Table 4 shows the internal validity of personality and alcohol consumption.

**Table 4.** Internal Validity of Measures of Personality and Alcohol Consumption

| Scale and Factors         | Cronbach $\alpha$<br>(current study) | Cronbach $\alpha$<br>(original study) |
|---------------------------|--------------------------------------|---------------------------------------|
| DAS                       | .85                                  | .83                                   |
| Impeded progress          | .75                                  | .76                                   |
| Reckless driving          | .72                                  | .74                                   |
| Direct hostility          | .82                                  | .73                                   |
| Sanction hostility        | .50                                  | .58                                   |
| SPSRQ-20                  | .80                                  | .80                                   |
| Sensitivity to punishment | .79                                  | .79                                   |
| Sensitivity to reward     | .78                                  | .78                                   |
| ZKA-PQ                    | .90                                  | .90                                   |
| Aggression                | .91                                  | .91                                   |
| Activity                  | .88                                  | .88                                   |
| Extraversion              | .87                                  | .87                                   |
| Neuroticism               | .89                                  | .89                                   |
| Sensation seeking         | .86                                  | .86                                   |
| AUDIT                     | .81                                  | .81                                   |

Table 5 shows data of group effect and statistical differences among the groups. Results reveal significant differences in eight of the variables analyzed, the one related to alcohol consumption and seven variables of personality: anger over impeded progress (DAS-FI), sanction hostility (DAS-FIV), sensitivity to reward, aggression, activity, neuroticism, and sensation seeking.

Pairwise comparison of groups reveals some significant differences between the group of non-offenders and both groups of traffic offenders (A-B and A-C). Basically, non-offenders are less inclined than offenders to lose their temper in certain situations that easily cause frustration and anger (such as being stuck in a traffic jam, tailgating a cyclist, or waiting while a vehicle is being parked). Compared with offenders, non-offenders are also less likely to be hostile, aggressive drivers, or have a penchant for thrill and excitement while driving, and less likely to have alcohol issues.

Other differences can be found between the group of non-offenders and only one of the two groups of offenders. Non-offenders appear to be, in this sense, less inclined to get annoyed in situations conducive to penalties (such as being caught or detected by radar while driving too fast, or regular police traffic controls on the road) compared with the offenders disqualified by penalties, and less inclined to activity and anxiety compared with those disqualified by conviction.

Pairwise comparisons of groups also reveal some subtle yet significant differences between the group of penalized offenders and the group of convicted offenders (B-C). Basically, convicted

offenders are less inclined than penalized offenders to get annoyed at the possibility of being fined and less inclined to be active and aggressive while driving. A more obvious difference between these two groups is that convicted offenders are more likely to have a problem with alcohol.

### Predictors of Disqualification from Driving

A regression model is used to determine whether there is a causal relationship. In our analysis, we selected disqualification from driving (Y) as dependent variable and used explanatory factors that highlighted significant differences in our previous analysis as independent variables (X): anger over impeded progress, sanction hostility, sensitivity to reward, aggression, activity, neuroticism, sensation seeking, and problematic alcohol consumption.

We found a moderate coefficient of determination, Nagelkerke  $R^2$  (.57). The highest coefficient value, and consequently the highest predictive power, was found, as expected, in alcohol consumption, with lower values in sanction hostility and activity. Table 6 displays the coefficients resulting from this regression analysis.

On the basis of a cut-off estimated probability of  $p$  ( $Y = 1$ ), the model enables adequate estimates in as much as 67.1% of cases. The model, nevertheless, fits well with non-offenders (classifying 87.9% of subjects in this group), but it does not fit as neatly with offenders (classifying 60.8% of convicted and 45.8% of penalized). Such low percentages suggest that both groups of traffic offenders should be addressed as a single group.

**Table 5.** Differences in Personality and Alcohol Consumption. Group Effect and Pairwise Comparison

| Variable                  | Group effect      | A-B                       | A-C                        | B-C                       |
|---------------------------|-------------------|---------------------------|----------------------------|---------------------------|
| Anger. Impeded progress   | *** $p \leq .001$ | I-J = -1.61<br>$p = .003$ | I-J = 2.28<br>$p = .001$   |                           |
| Anger. Reckless driving   | $ns$ $p \leq .10$ |                           |                            |                           |
| Anger. Direct hostility   | $ns$ $p > .10$    |                           |                            |                           |
| Anger. Sanction hostility | *** $p \leq .001$ |                           | I-J = -1.13<br>$p = .001$  | I-J = 0.73<br>$p = .014$  |
| Sensitivity to punishment | $ns$ $p > .10$    |                           |                            |                           |
| Sensitivity to reward     | * $p \leq .05$    |                           | I-J = -2.05<br>$p = .014$  |                           |
| Aggression                | *** $p \leq .001$ | I-J = -7.18<br>$p = .002$ | I-J = -12.47<br>$p < .001$ | I-J = -5.28<br>$p = .047$ |
| Activity                  | *** $p \leq .001$ |                           | I-J = -7.80<br>$p < .001$  | I-J = 5.260<br>$p = .025$ |
| Extraversion              | $ns$ $p > .10$    |                           |                            |                           |
| Neuroticism               | *** $p \leq .001$ | I-J = -8.18<br>$p < .001$ |                            |                           |
| Sensation seeking         | *** $p \leq .001$ | I-J = -6.47<br>$p = .001$ | I-J = -10.52<br>$p = .001$ |                           |
| Alcohol consumption       | *** $p \leq .001$ | I-J = -0.59<br>$p = .001$ | I-J = -0.41<br>$p < .001$  | I-J = -0.17<br>$p < .001$ |

Note. Group A = non-offenders; group B = offenders banned from driving by court order; group C = offenders banned from driving by accumulation of penalty points.  $ns = p > .10$ ,  $ns1: p \leq .10$ , \* $p \leq .05$ , \*\* $p \leq .01$ , \*\*\* $p \leq .001$ .

**Table 6.** Multinomial Regression Analysis. Coefficients

|         | Coeff.              | SE     | Wald | df    | $p >  z $ | OR  | 95% CI           |
|---------|---------------------|--------|------|-------|-----------|-----|------------------|
| Group B | Intercept           | -6.68  | 1.73 | 14.85 | 1         | .00 |                  |
|         | Sanction hostility  | -0.05  | 0.10 | 0.26  | 1         | .60 | 0.95 [0.78-1.15] |
|         | Activity            | 0.03   | 0.01 | 6.46  | 1         | .01 | 1.03 [1.00-1.06] |
|         | Alcohol consumption | 0.75   | 0.09 | 63.10 | 1         | .00 | 2.12 [1.76-2.55] |
| Group C | Intercept           | -10.62 | 1.78 | 35.37 | 1         | .00 |                  |
|         | Sanction hostility  | 0.27   | 0.09 | 8.04  | 1         | .00 | 1.31 [1.08-1.58] |
|         | Activity            | 0.05   | 0.01 | 17.31 | 1         | .00 | 1.05 [1.03-1.08] |
|         | Alcohol consumption | 0.66   | 0.09 | 49.89 | 1         | .00 | 1.94 [1.61-2.33] |

Note. Group A = non-offenders; group B = offenders banned from driving by court order; group C = offenders banned from driving by accumulation of penalty points.

**Table 7.** Binary Regression Analysis-1. Omnibus and Goodness of Fit Tests

|        |                     | Omnibus  |    |      | Hosmer-Lemeshow |    |      | Nagelkerke R <sup>2</sup> |
|--------|---------------------|----------|----|------|-----------------|----|------|---------------------------|
|        |                     | $\chi^2$ | df | Sig. | $\chi^2$        | df | Sig. |                           |
| Step 1 | Alcohol consumption | 167.46   | 1  | .00  | 9.01            | 7  | .25  | .57                       |
|        | Model               | 167.46   | 1  | .00  |                 |    |      |                           |
| Step 2 | Activity            | 16.21    | 1  | .00  | 2.50            | 8  | .96  | .62                       |
|        | Model               | 183.68   | 2  | .00  |                 |    |      |                           |

Note. Dichotomous dependent variable = disqualified (1), non-disqualified (0).

**Table 8.** Binary Regression Analysis-1. Coefficients

|                     | Coeff. | SE   | Wald  | df | $p >  z $ | OR   | 95% CI      |
|---------------------|--------|------|-------|----|-----------|------|-------------|
| Activity            | 0.04   | 0.01 | 14.32 | 1  | .00       | 1.04 | [1.02-1.07] |
| Alcohol consumption | 0.70   | 0.09 | 58.94 | 1  | .00       | 2.02 | [1.69-2.43] |
| Constant            | -7.47  | 1.54 | 23.36 | 1  | .00       | 0.00 |             |

Note. Dichotomous dependent variable = disqualified (1), non-disqualified (0).

To test it, we performed two additional binary regression analysis with a dichotomous dependent variable (Y): disqualified (1), non-disqualified (0), and disqualified with conviction (1), disqualified without conviction (0). In both cases, the explanatory factors (X) were the same as before.

In the first binary regression analysis (disqualified-non-disqualified), we found a better coefficient of determination, Nagelkerke R<sup>2</sup> (.62). On the basis of a cut-off estimated probability of  $p$  ( $Y = 1$ ), the model enables adequate estimates of as much as 84.7% of cases. It has high specificity and sensitivity, classifying correctly 82.8% of non-offenders and 85.9% of offenders. Tables 7 and 8 display the results of this analysis. The highest coefficient value, and consequently the highest predictive power, was found in alcohol consumption, with lower values in activity.

In the second binary regression analysis (disqualified with court conviction-disqualified without court conviction), we found moderate goodness of fit coefficients, indicating that 20% of variance in our dependent variable can be explained. On the basis of a cut-off estimated probability of  $p$  ( $Y = 1$ ), the model enables adequate estimates of 68.6% of cases. It has medium specificity and high sensitivity, classifying correctly 56.6% of non-convicted and 78.4% of convicted. Tables 9 and 10 display the results of this second binary

analysis. The highest coefficient value, and consequently the highest predictive power, was found, again, in alcohol consumption, with lower values in sanction hostility and sensation seeking.

Results reveal that personality characteristics are not as good predictors of driving offenses as drinking is. Alcohol disorders are depicted in a showy way as the best predictor of disqualification from driving by serious or repeat traffic offenses, either penalized or convicted.

According to the first binary regression analysis, this probability is 2.02 times greater for drivers with high levels of alcohol consumption as measured by the Alcohol Use Disorders Identification Test (AUDIT), and 1.04 times greater for drivers with high scores in "activity" as measured by the ZKA-PQ.

According to second binary regression analysis, the probability of disqualification from driving with a court conviction would be 1.11 higher for drivers with high levels of alcohol consumption as measured by the Alcohol Use Disorders Identification test (AUDIT). The probability of disqualification from driving without a court conviction is 0.97 greater for drivers with high scores in sanction hostility as measured by the DAS and 0.76 times greater for drivers with high scores in sensation seeking as measured by the ZKA-PQ.

**Table 9.** Binary Regression Analysis-2. Omnibus and Goodness of Fit Tests

|        |                     | Omnibus  |    |      | Hosmer-Lemeshow |    |      | Nagelkerke R <sup>2</sup> |
|--------|---------------------|----------|----|------|-----------------|----|------|---------------------------|
|        |                     | $\chi^2$ | df | Sig. | $\chi^2$        | df | Sig. |                           |
| STEP 1 | Sanction hostility  | 13.49    | 1  | .00  | 4.80            | 6  | .57  | 0.09                      |
|        | Model               | 13.49    | 1  | .00  |                 |    |      |                           |
| STEP 2 | Sensation seeking   | 10.95    | 1  | .00  | 12.01           | 8  | .15  | 0.16                      |
|        | Model               | 24.43    | 2  | .00  |                 |    |      |                           |
| STEP 3 | Alcohol consumption | 5.50     | 1  | .01  | 7.55            | 8  | .47  | 0.20                      |
|        | Model               | 29.94    | 3  | .00  |                 |    |      |                           |

Note. Dichotomous dependent variable = disqualified with court mandate (1), disqualified without court mandate (0).

**Table 10.** Binary Regression Analysis-2. Coefficients

|                     | Coeff. | Std. err. | Wald  | df | $p >  z $ | Odds ratio | 95% Confidence Intervals |
|---------------------|--------|-----------|-------|----|-----------|------------|--------------------------|
| Sanction hostility  | -0.26  | 0.08      | 9.09  | 1  | 0.00      | 0.76       | [0.64-0.91]              |
| Sensation seeking   | -0.02  | 0.01      | 5.25  | 1  | 0.02      | 0.97       | [0.95-0.99]              |
| Alcohol consumption | 0.11   | 0.03      | 11.72 | 1  | 0.00      | 1.11       | [1.04-1.19]              |
| Constant            | 3.49   | 1.10      | 10.08 | 1  | 0.00      | 32.93      |                          |

Note. Dichotomous dependent variable = disqualified with court mandate (1), disqualified without court mandate (0).

## Discussion

A number of studies have assessed the effectiveness of the penalty point system in reducing traffic injuries (Beke & Blomeyer, 2016; Novoa et al., 2010). Its widespread use in Spain and other European countries is based on the assumption that this measure is effective in preventing drivers from committing traffic offenses and ensure greater security.

Most studies mention as main operating mechanism a “deterrence effect.” From this perspective, it is assumed that drivers who are at high risk of being banned from driving will refrain from committing traffic violations for fear of losing their driver's license (Basili & Nicita, 2005). Beside this significant deterring effect, some studies mention a “driving style effect” implying that drivers with previous penalty points have a higher probability of incurring new penalties in the future than drivers without previous penalties (Sagberg & Ingebrigtsen, 2018).

Our study offers evidence to this effect, highlighting significant differences among traffic offenders in a number of variables, including unsafe attitudes and antisocial behaviors, traffic violations that lead to demerit points and/or loss of license, and crash involvement. According to the aims of our research, we generated three testable hypotheses and tested them by means of three types of analysis.

### Differences in Traffic Violations and Crash Involvement

Our first testable hypothesis was that there were significant differences among traffic offenders in a number of variables, including traffic violations that lead to demerit points and/or loss of license and crash involvement.

The results show that offenders are responsible of more accidents than non-offenders, but penalized offenders are responsible of more accidents with victims than convicted offenders. Whereas convicted are mostly drunk drivers, responsible of more serious offenses, sanctioned offenders are mostly recidivists, responsible of less serious but repeat offenses. However, their recidivist behavior and the countless traffic offenses they commit show this group of offenders as less concerned with other individuals, i.e., drivers at higher risk of accident and death. Novoa et al. (2010) and other similar studies (Castillo-Manzano et al., 2015; Pulido et al., 2010; Watson, Watson, Siskind, Fleiter, & Soole, 2015) show this relationship between frequent penalties and disregard for public safety or causing death and harm and find correlation between a decrease in the number of sanctions and a reduction of the number of accidents and deaths. Our study supports this finding.

### Differences in Personality and Alcohol Consumption

The second hypothesis was that there were significant differences between traffic offenders and non-offenders and between both subgroups of offenders in a set of explanatory factors of personality and alcohol consumption, as well as specific differences among offenders based on the reason for disqualification.

Our study also supports the belief that certain personality factors may influence a person's proclivity to commit offenses. We find significant differences concerning personality and alcohol consumption between traffic offenders and non-offenders, as well as specific differences among offenders based on the reason for disqualification, a court mandate or demerit points. In that respect, penalized offenders have higher scores than non-offenders and convicted offenders on personality factors that different studies have proved to be associated with risky behaviors and negative attitudes towards traffic safety (Dahlen & White, 2006; Ledesma, Poó, & Peltzer, 2007; González-Iglesias & Gómez-Fraguela, 2010;

Herráiz, Chamarro-Lusar, & Villamarín, 2011; Ulleberg, 2002), such as sensation seeking, aggressiveness, anger, and alcohol abuse.

Aluja et al. (2010) described sensation seekers as people who do not tolerate boredom and prefer different and exciting activities, as well as impulsive, not reflective, impatient individuals, who often make hasty decisions without considering the consequences. More than 30 years ago, Weinstein (1980) already suggested that sensation seekers have an “optimistic bias” and feel that the negative consequences of their actions are less likely to occur. These personal characteristics may lead to committing offenses while driving, repeatedly, without considering the legal consequences.

Regarding aggressiveness, Aluja et al., (2010) described aggressive individuals as prone to anger, having strong temperaments, who easily feel annoyed or disturbed and things get on their nerves. This trait may lead to unsafe behaviors while driving, such as speeding, reckless driving, and other actions involving endangerment, that are usually penalized. In our study, penalized offenders get higher scores on aggressiveness than convicted offenders, whose unsafe behavior is mainly due to their drinking problems rather than personality-related variables.

Anger has been described either as a personality factor related to aggressiveness, or a person's emotion that elicits aggression or motivates aggressive behaviors (Egea-Caparrós et al., 2012). Some authors such as Underwood, Chapman, Wright, and Crundall (1999) and Deffenbacher et al., (1994) consider aggressiveness as the behavioral expression of choleric states. The questionnaire used in this research evaluates anger in driving as one person's proclivity to experience this emotion while driving in specific traffic situations (Herrero-Fernández, 2011). The study shows that non-offenders display lower anger than offenders, and penalized offenders display the highest anger among offenders. By analyzing the specific factors one by one, the highest differences are registered in impeded progress and sanction hostility, meaning that penalized offenders are prone to feel angry and to show hostility over the possibility of being fined and while driving in heavy traffic conditions or other frustrating situations. Similar conclusions by comparing offenders and non-offenders are drawn in studies by Sullman (2006), Gómez-Fraguela, and González-Iglesias (2010), or Egea-Caparrós et al. (2012).

Many studies have confirmed the relationship between traffic offenses, recidivism and drinking (Cavaiola, Strohmets, & Abreo, 2007; Hubicka et al., 2008; Nochajski & Stasiewicz, 2006). This study openly and clearly indicates the salience of alcohol problems among traffic offenders, especially among those disqualified by a court conviction, who are mostly drunk drivers. Failde-Garrido et al. (2016) report similar findings using the same instrument in a group of convicted traffic offenders, when compared with drivers with no criminal record. Hubicka et al. (2008) and Cavaiola et al., (2007) have also reported the relationship between alcohol dependence and the manifest proclivity to committing an offense.

Recent studies by Useche, Ortiz, and Cendales (2017) and Montoro, Useche, Alonso, and Cendales (2018) have shown an association between work-related psychosocial factors and individual characteristics of public transport drivers and the rate of traffic sanctions they are subject to, assessing the mediation of driving anger in this relationship. The former study examines the association between stress-related work conditions of professional drivers and risky driving behaviors, whereas the latter supports the idea that traffic penalties reported by public transport rates are preceded by work-related, personality, and other individual factors that, when combined with driving anger, enhance the occurrence of road misbehavior that may affect overall road safety.

## Predictors of Disqualification from Driving

Finally, we conducted a third analysis to test whether changes in these explanatory factors would subsequently affect the probability of being banned from driving by serious or repeat traffic offenses, either with or without court mandate. The third hypothesis was that some of these factors, mainly alcohol consumption, will be a better predictor of disqualification from driving.

In fact, our regression analysis shows that high levels of activity, a penchant for thrill or sensation seeking, and some propensity to hostility while driving can satisfactorily predict group membership. When considering both subgroups of traffic offenders together, the probability of “disqualification from driving” is higher for drivers with alcohol problems and highly active drivers. When considering both subgroups individually, the probability of “disqualification from driving with a court conviction” is higher for drivers with alcohol problems, and the probability of “disqualification from driving without court conviction” is higher for drivers who get angry over the possibility of being fined and for sensation seekers. In both cases, alcohol issues are depicted as the best predictor of disqualification from driving by serious or repeat traffic offenses, either penalized or convicted.

## Conclusions

The purpose of this study was to contribute to the literature by comparing the sociodemographic, personality, and alcohol consumption profiles of a group of common drivers, a group of offenders banned from driving by a court order, and a group of offenders banned from driving by penalty points. In summary, the study confirms the differences in personality between penalized drivers and convicted offender drivers, providing evidence that they are two groups with different psychological characteristics. Three other conclusions arise from the study concerning the aim of each analysis.

First, the group of traffic offenders disqualified without a court conviction displays persistent risky driving behavior, little self-awareness, and little concern about themselves. They are mostly recidivists, responsible for a greater number of accidents. They commit a myriad of traffic offenses and do it repeatedly, causing more severe accidents. Re-education and awareness-raising courses do not work with them, taking into account that a non-negligible number of them had completed some of these courses unsuccessfully before losing their license. Many of them drink and drive, but to a lesser extent than convicted drivers, and others exceed speed limits, use a cell phone while driving, drive without a seatbelt or recklessly, and disobey traffic signs. The group of traffic offenders disqualified with a court conviction are mostly drunk drivers. Nearly all of them (94%) have been arrested for driving under the influence with a substantial blood alcohol level over 1.2 g/l. of alcohol and had their driving privileges immediately revoked.

Second, our results also reveal significant differences between traffic offenders and non-offenders, and between both categories of offenders, in a number of personality factors and alcohol consumption. All in all, traffic offenders attain higher scores in all measured personality factors, while it is true that differences are significant just in some of them. Certain variables, including problem drinking, high levels of activity, a penchant for thrill or sensation seeking, and some propensity to get angry while driving, can predict group membership satisfactorily.

Third, when considering both subgroups of traffic offenders together, the probability of disqualification from driving is higher for drivers with alcohol problems and highly active drivers. By considering both subgroups separately, the probability of disqualification from driving with court conviction is higher

for drivers with alcohol problems, and the probability of disqualification from driving without court conviction is higher for drivers who get angry over the possibility of being fined and sensation seekers. In both cases, alcohol issues are depicted as the best predictor of disqualification from driving for serious or repeat traffic offenses for either penalized or convicted drivers.

## Limitations

This study certainly has some limitations, including common method biases. Cross-sectional surveys are limited in their ability to draw valid conclusions as to the association between a risk factor and outcome. In this type of study, the risk factors and outcome are measured simultaneously; therefore, it may be difficult to determine whether the exposure preceded or followed the outcome. Social desirability of respondents was assessed, to be sure that our results would not be better explained by a possible social desirability bias. Nevertheless, we exercised discretion in the selection of personality factors, taking into account the instruments available in our language and properly validated to be used in a sample of Spanish drivers; with another set of factors, or a different set, some estimations would probably change. On the other hand, our standards of investigation are in accordance with national laws and regulations, restraining their application to specific contexts, with other legal provisions and regulations, or different social and cultural norms. In addition, we have been concerned about the representativeness of our sample of traffic offenders disqualified from driving with a conviction, since the court decision is based on how serious they think the offense is, and only some of them participate in programs while many others are incarcerated. Concerning methodology, accuracy of concepts and definitions can be improved and additional statistical analysis may be planned to provide the necessary accuracy to understand these often difficult concepts and relationships. As pointed out by [Podsakoff, MacKenzie, Lee and Podsakoff \(2003\)](#) in their critical review of the literature and recommended remedies, a comprehensive summary of the potential sources of method biases and how to control them does not exist. Beyond these and other weak points to correct, the study may contribute to a better understanding of those who repeatedly commit gross violations of safety regulations and incur point penalties and loss of license.

Spain's penalty point system and its related re-education and awareness-raising courses offer a good opportunity to study the population of traffic offenders, but some considerations are necessary.

On the one hand, it is assumed that criminals will commit the most serious and most hazardous traffic offenses, although based on our data, non-criminals are causing more danger and unsafety. Violations by criminals, even if extremely serious, are more occasional than those by non-criminals. As revealed in our sample of traffic offenders, criminals have a very specific profile and they are referred to as problem drinkers, while non-criminals commit more infractions and are recidivists, more resistant to behavior change, and more hazardous than criminals. These characteristics should be considered to improve the effectiveness of our current re-education and awareness-raising courses.

On the other hand, drivers who are arrested for driving under the influence in Spain are legally treated as criminals, while many of them mostly suffer from a psychological disorder. Some are imprisoned and others are given the opportunity to take a re-education and awareness-raising course, but even in this favorable case these courses are not enough because these people need rehabilitation courses focused on drinking problems or therapy. Most of these problems can be overcome by different treatments and these measures have proved to be effective with recidivists. However, there is no specific rehabilitation course for drivers with drinking problems or alcohol disorders in Spain.

Driving, like most interpersonal activities, is organized and controlled by rules and social conventions that stem from the community. Traffic rules have been designed to ensure order and safety and driving requires developed social skills and values that enable interpersonal understanding and concern for other people's rights and safety. Non-compliance, deliberate violation and law breaking, or disregard for formal or informal rules and social conventions are common among traffic offenders. Deterioration in social values may explain their risky driving, and it should be considered when working with this population to prevent accidents and reduce harm.

Recent empirical studies in Spain have identified certain attitudes and perceptions preceding driving that influence the interaction with traffic rules, police supervision, penalties, and justice in traffic (Alonso, Esteban, Montoro, & Useche, 2017). Most drivers consider they know traffic rules enough and consider them effective, as well as police supervision, although they generally assume that traffic agents prefer to wait at strategical places to catch offenders rather than in really dangerous places. Regarding sanctions, many drivers see sanctions and fines as educational or monetary measures aimed at getting their money. Justice in traffic gets a low rating from Spanish drivers as well. These results lead us to discuss the interaction between traffic rules and road users to promote a more positive view of law enforcement as a means to build a safer road culture.

### Conflict of Interest

The authors of this article declare no conflict of interest.

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### Note

<sup>1</sup>L. M. was in charge of overall direction and planning. A.M.B. and J. R. conceptualized the study and designed the methodology. A. M. B. carried out the implementation and data collection. P. B. performed the statistical analysis. J. C. P. designed the model and wrote the manuscript. All authors have read and approved the final manuscript.

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