Strong predictors of offender drivers: Drug and alcohol addiction and the inability to dissociate binge alcohol or drug consumption from driving. Revoking their driver's licence may not be enough

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A R T I C L E I N F O

A B S T R A C T

The causes underlying traffic offender behaviour might be the tip of the iceberg that represents a persistent burden on global health and serves to detect other serious social, family, work problems. Better understanding and prevention of recidivism following a First-time driving under the influence conviction and analysis of High Risk offender driver behaviors are needed. This study seeks to identify the factors that predict an offender driver profile, analysing not only drivers' general use of alcohol and/or drugs, but also their ability to dissociate the use of alcohol and other substances from driving. A total of 315 drivers — 97 offenders (95.9 % men) and 218 non-offenders (47.2 % men) responded to a battery of self-report evaluation questionnaires on: alcohol use habits (measured with the AUDIT); drug use (measured with the DAST-20); the ability of dissociating alcohol and substance use from driving; educational level; self-reported traffic violations, errors and lapses (measured with the DBQ, Driver Behaviour Questionnaire); and sociodemographic questions. The model showed good fit indicators ($R2 = 0.74$). It also displayed good predictive power: (1). It correctly classified 91 % of participants as offender or non-offender drivers. (2). More specifically, its sensitivity was 88 %, having correctly classified offenders as offenders. And its specificity was 92 %, having correctly classified non-offenders as non-offenders. The findings underscores that not only is alcohol use a key predictor of offending behaviour, but so is drug use. These addictions are a health problem, and their consequences are more serious when the afflicted individual drives a vehicle. This article makes evident that repeat offenders have a lower ability of dissociating alcohol and substance use from driving than do non-offender drivers. Non-offenders are shown to be more capable than offenders of dissociating consumption from driving: offender drivers are unable to dissociate the consumption of more than 5 spirit drinks, or the consumption of cannabis, from driving. More than half of non-offender drivers admitted to driving after having had 1 or 2 beers. Along these same lines, we found that offenders believe they have fewer lapses than non-offenders. This could be due to the optimism bias of bold offender drivers, who overestimate their abilities and underestimate their lapses. We also found that offender drivers have a lower educational level. Revoking the High Risk offender's driver's licence may not be enough. Instead, High Risk Offenders should be given the support they need to give up the consumption of alcohol and drugs, at least while driving. This could be achieved if they receive motivational interventions and are referred for detoxification treatment.

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1. Introduction

According to the European Commission, 19,800 people were killed in traffic crashes in 2021. That is an increase of 1000 deaths (+5%) over 2020, but still 3000 (−13 %) fewer fatalities compared to the pre-pandemic year of 2019 (European Commission, 2022). Even so, driving Under the Influence (DUI) remains one of the leading road safety and public health concerns at the global level. It is estimated that between 5 and 35 % of road fatalities are associated with alcohol and injuries caused by traffic accidents are the eighth cause of death across all age groups (World Health Organization, 2018) and traffic accidents are the leading cause of death for persons between the ages of 5 and 29.

Offender driver behaviours at the wheel are a road safety issue, but they may also be the tip of the iceberg that serves to detect other serious problems, such as addiction to substances, that have social, family, work and health repercussions. Driving while impaired by alcohol or drugs (DWI and DWID) represents a persistent burden on global health. Better understanding and prevention of recidivism following a first-time DWI conviction and analysis of High Risk offender driver behaviors are needed. A DWI can result in high fines, jail time, the revocation of one's driver's license and the loss of one's time and reputation. Further research and assessment are needed to better understand the aberrant behavior of offender drivers. The following classical finding is still worrisome: "Direct comparisons of the randomly assigned control and treatment offender groups revealed a tendency for lower total mortality and significantly lower mortality from accidental and violent death in those assigned to rehabilitation (Mann et al., 1994)". More recently, Spain's National Institute of Toxicology and Forensic Science (*Instituto Nacional de Toxicología y Ciencias Forenses*) (INTCF, 2022) autopsied 812 deceased drivers (90.6 % were men) who perished in traffic crashes in 2021 in Spain. A total of 401 (49.4 %) tested positive for alcohol and other substances. More specifically, 34.5 % tested positive for alcohol, 21.3 % for abused drugs and 11.7 % for psychotropic drugs. Men accounted for 92.3 % of the drivers that tested positive. And 75 % of the drivers that tested positive for alcohol had a blood alcohol level of 1.20 g/L or higher. Consequently, ¾ of these drivers can be considered High Risk offenders. The most consumed substance was cocaine (63 %) followed by cannabis (48.5 %). Cannabis was the most consumed drug in the <18–34 age group, while cocaine was the most consumed drug in the 35–64 age group.

Predictor factors of the offender driver profile include: (1.) habitual and excessive consumption of alcohol; (2.) imprudence at the wheel; (3.) underestimating the risk of leisure activities that generate adrenaline (for example, adventure sports); and (4.) having high sensitivity to reward (Padilla et al., 2018). According to a recent study (Escamilla-Robla, Beleña-Mateo, & Mateu-Mollá, 2022), repeat offenders present a greater incidence of several personality disorder indicators, including paranoia, dissocial, impulsive, borderline and anxiety, as well as greater prevalence of alcohol abuse. These studies, however, did not explore other possible predictors of the offender driver profile like drug use. The consequences of driving under the influence of drugs (DUID) are harder to identify than those of DUI mainly because, firstly, it is more difficult to confirm positive blood analysis results to determine the type of substance consumed, and, secondly, it is a challenge to establish a causal relation between the amount of a drug found and the deterioration of driving skills.

The implementation of drug testing for drivers is relatively recent. Spain's Directorate General of Traffic (Dirección General de Tráfico, DGT) began testing drivers for alcohol use on the roadways in 1981, and for drug use in 2010 (Fraile, 2021). Legislation on which substances drivers are prohibited from consuming differs from country to country. Substances that drivers are prohibited from consuming before getting behind the wheel are easily classified in three categories: depressants (alcohol, opium and derivatives, tranquilizers, soporifics); stimulants (amphetamines, cocaine, speed, nicotine, caffeine, theine, theobromine); and hallucinogenic drugs (LSD, mescaline, hashish, marijuana, ecstasy, inhalants (DGT, 2014). At the European level, all nations prohibit driving following the consumption of certain drugs, such as marijuana, cocaine and methylamphetamine, while some nations, such as Spain, Finland, Ireland and Poland, as well as others, prohibit driving following the consumption of any type of drug (Moraleja, 2016).

The effects and influence of psychoactive substances on driving differ considerably, although all of them affect behaviour (OEDT, 2008). There has been debate not only about their effect on driving abilities (Lenné et al., 2000; Robbe et al., 1993) but also on what their cut-off limit should be for safe driving (Vindenes et al., 2012). Driving under the effect of drugs hampers one's ability to drive and increases the likelihood of a traffic accident (Elvik, 2013; Jongen et al., 2016; Ramaekers et al., 2006; Ronen et al., 2008). Depending on the amount and combination of substances, the risk of a crash can increase as much as 200-fold. The consumption of alcohol (0.5–0.8 g/l) and cocaine increases the risk 2–10 times. The consumption of alcohol (0.8–1.2 g/l), amphetamines and a combination of drugs multiplies the risk by 5–30. The consumption of alcohol (no more than 0.5 g/l), cannabis, opiates, benzodiazepines and similar substances multiplies the risk by 3. The consumption of alcohol (more than 1.2 g/l) and other drugs multiplies the risk by 20–200 (Hels et al., 2011).

Traffic education programs and campaigns have attempted to identify drug use and driving behaviors among drivers with and without alcohol-related infraction and address this problem ("DWI" Driving While Intoxicated) (Buckley, et al., 2016; Lapham et al., 2006; Scherer et al., 2020), but have not managed to reduce the high levels of recidivism among drivers that break the law, especially in the case of offenders who drive under the influence of substances (Ouimet et al., 2013). Previous attempts may have served more to "punish" repeat offenders than to "treat" them (Cavaiola, 2013). Punishment, whether by fines or imprisonment, may have little effect if they are not adapted to the unequal needs of each group of repeat offenders.

1.1. Sociodemographic variables and offender status

Gender is considered a predictor factor for driving in a state of inebriation and also for recidivism. Men constitute the majority of persons detained for this type of infraction (Snyder, 2012) and are overrepresented in statistics on repeat offender drivers (C'de Baca

et al., 2001; Dickson et al., 2013). Besides excessive or binge alcohol consumption (Lapham et al., 2000; Schell et al., 2006), the consumption of drugs (Dickson et al., 2013; Wieczorek & Nochajski, 2005) and having a substance use disorder (Dugosh et al., 2013; McCutcheon et al., 2009) are also associated with offender drivers. Repeat DUI (*Driving Under the Influence*) offenders tend to drive in a risky manner and receive more traffic tickets and commit more types of infractions and criminal offenses than non-repeat offenders (DeMichele & Lowe, 2011; Dickson et al., 2013; Rauch et al., 2010; Schell et al., 2006). First-time driving offenders don't get off easy. Driving offences and the risk of subsequent crashes in novice drivers should be analysed (Möller et al., 2022). According to Fell and Voas (2013), studies have shown that approximately-one third of all offenders arrested for DUI are repeat offenders. Further, drivers with a DUI offense are at approximately-four times the risk of being alcohol positive in a fatal crash. It is crucial accurately identify first-time DUI offenders at high risk of re-offending. Harrison (1998) used the occupational information of drink drivers to identify targetable characteristic of offenders. According to Jones-Webb and Karriker-Jaffe (2013), individuals who reside in disadvantaged neighbourhoods (e.g. a high percentage of residents without a college degree, high unemployment, income under the poverty line or below the average) or in majority black neighbourhoods have more negative consequences related with alcohol consumption (e.g. fights with family members and friends, run-ins with the criminal justice system and difficulty finding employment). Drivers who were identified as having versatile (i.e., "multiple offenses in varying categories") or criminal-type offense profiles (i.e., "offenses that were considered to approximate criminal offenses") were both significantly more likely to be at fault for a fatal crash (Davey et al., 2022). A driver's traffic history might be used to identify those who are more at risk of being involved in a crash.

1.2. Dissociating alcohol and substance consumption from driving: "Don't drink and drive"

"Dissociation from consumption" is understood as one's awareness and decision not to drive after having consumed alcohol and to find alternative means of transportation. One alternative is to have a "designated driver", a member of a group of friends who abstains from drinking while the others party in order to remain sober to drive every-one home at the end of the festivities. Other alternatives include taxis and buses.

The decision to drive after having consumed alcohol is based as much on environmental factors as on the individual's interoceptive signals. The interoceptive factor that has been studied is "perceived intoxication" (Beirness, 1987). Self-evaluations of intoxication are based on subjective and behavioural changes, such as sedation and difficulty speaking, and the self-evaluation of these indicators can weigh in the drinker's decision whether to drive or not (Marczinski & Fillmore, 2009). In general, research has demonstrated that people tend to be inexact when it comes to estimating their level of intoxication from drinking alcohol. In some classic studies, participants were asked to calculate their blood alcohol level at different times and it was found that participants tended to under-estimate this reading (Ogurzsoff & Vogel-Sprott, 1976). Beirness (1987) determined that the perceived ability to drive after having consumed alcohol became less precise as one's blood alcohol level increased. According to Marczinski et al. (2007), re-offending drivers underestimate their blood alcohol levels and the amounts of alcohol they consume. They also self-report lower subjective intoxication and less deterioration of perception. These misconceptions lead them to drive under the influence of alcohol.

1.3. Overestimating ability and underestimating risk: Ignorant novice drivers and bold offender drivers

The estimation of risk depends on a self-evaluation of our own abilities to drive and the calibration of the risk we take when we drive, weighing the benefits and costs of our decision. Some drivers are unaware of the risks of certain driving situations (Armsby et al., 1989). The underestimation of risk while driving may be related to a personality trait, which implies that the person also assumes more risk in other areas of life, or has a propensity to make risky decisions. Gugliotta et al., (2017) found differences between offender and non-offender drivers, particularly in self-report measures on the ability to drive and self-confidence to drive. More precisely, the group of repeat offender drivers reported having a greater ability to drive and more confidence than the non-repeat offender drivers. The bold offender drivers displayed an optimism bias that led them to believe there was a lower probability of negative events occurring.

The optimism bias also affects young drivers, who underestimate the risk and overestimate their driving abilities (Farrand & McKenna, 2001). This tendency to perceive oneself as more capable and less prone to suffer crashes than one's peers can result in fewer prudent behaviours and more dangerous behaviours behind the wheel (Padilla et al, 2018; White, Cunningham & Titchener, 2011). The classic literature affirmed that young drivers do not adapt their behaviour to the demands of traffic (e.g. they drive above the speed limit, leave little distance between themselves and the vehicle ahead of them, drive aggressively and engage in risky behaviours, such as using a cell phone while driving) (De Craen, 2010, Engström et al., 2003; Kuiken & Twisk, 2001). According to Horrey et al., (2015), driver estimations of their abilities are often inflated or erroneous. Such errors in judgement in calibration result in poor decision making and lead to risky behaviours (e.g. inexperienced young drivers can overestimate their abilities and drive too fast on slippery surfaces). That said, Gugliotta et al., (2017) found significant differences between drivers of varying levels of driving experience in three self-report scales on driving ability. Novice drivers reported having less driving ability and less confidence in themselves than experienced drivers, and less awareness of the others. It is likely that inexperienced young drivers travel at high speeds on a slippery surface because of ignorance and their inability to foresee the challenging demands of the road under unfavourable weather conditions. In the case of young drivers, inexperience in calibrating their perceived abilities with respect to challenging road conditions may be the cause of crashes more so than excessive self-confidence in their abilities per se.

1.4. Research aims

This study aims to determine the profile of the offender driver by: (1.) performing an analysis on the variables measured to compare

offender and non-offender drivers; (2). discovering the role and predictive power of these variables (alcohol consumption, substance use, the ability of dissociating alcohol and drug consumption from driving, educational level, commission of infractions, errors and lapses, as measured with the DBQ).

2. Method

2.1. Participants

A total of 315 drivers participated in this study. The sample of non-offender drivers was comprised of 218 participants (47.2 % men) with ages ranging from 18 to 70 (M = 36.56, SD = 13.14). The sample of offender drivers was comprised of 97 participants (95.9 % men) with ages ranging from 18 to 67 (M = 34.49, SD = 11.34). Table 1 shows descriptive statistics for the study's main socio-demographic variables.

All participants were at least 18 years of age and held a driver's license. Offender drivers were recruited from the Victoria and Genil driving school, where they were taking refresher courses on road awareness in order to renew their driving licence after disqualification or removing the penalty points on their license per Spain's demerit credit point system.

Non-offender drivers were employees and students from the University of Granada (UGR). In order to recruit this sample, an email was sent to several distribution lists of administrative and service personnel, UGR faculty and researchers and students, informing them of the objectives of the study and the inclusion criteria, and inviting them to participate voluntarily.

This research followed the ethical principles of the Helsinki declaration for research with humans and the researchers were awarded a favourable report for their execution of the study by the ethical committee of the University of Granada "*Comité de Ética de Investigación en Humanos de la Universidad de Granada*" (2218/CEIH/2021). Participants were informed and signed consent to participate in the study. Personal data was codified to preserve anonymity and is kept in secure custody in accordance with the

Table 1
Demographic data and offender status.

	Non-offender		Offender		Total	
	N	Mean (SD)	N	Mean (SD)	N	Mean (SD)
Age	218	36.56 (13.13)	97	34.49 (11.34)	315	35.93 (12.62)
Years of driving car license	208	16.75 (12.29)	79	14.54 (10.98)	287	16.14 (11.97)
	N	**%**	**N**	**%**	**N**	**%**
Male	218	47.2	97	95.9	315	62.2
Driving Experience						
2 years of less	36	16.5	16	16.5	52	16.5
Between 3 and 5 years	23	10.6	10	10.3	33	10.5
More than 5 years	159	72.9	71	73.2	230	73
Driving Frequency						
Once a month or less	8	3.7	7	7.2	15	4.8
Sometimes a month	30	13.8	5	5.2	35	11.1
Once a week	16	7.3	0	0	16	5.1
Sometimes a week	64	29.4	8	8.2	72	22.9
Everyday	100	45.9	77	79.4	177	56.2
Educational Level						
Primary	4	1.8	17	17.5	21	6.7
Secondary	3	1.4	37	38.1	40	12.7
High School	43	19.7	25	25.8	68	21.6
Superior studies	168	77.1	18	18.6	186	59
Near-misses						
0 times	66	30.3	39	40.2	105	33.3
1–5 times	127	58.3	50	51.5	177	56.2
6–10 times	17	7.8	6	6.2	23	7.3
11–15 times	5	2.3	1	1	6	1.9
More than 16 times	3	1.4	1	1	4	1.3
Fines						
0 times	110	50.5	7	7.2	117	37.1
1–5 times	99	45.4	59	60.8	158	50.2
6–10 times	6	2.8	16	16.5	22	7
11–15 times	2	0.9	3	3.1	5	1.6
More than 16 times	1	0.5	12	12.4	13	4.1

legislation in effect. The data obtained were used solely for the purposes of the research contemplated in this study. The results may be shared with the scientific community.

2.2. Instruments

A battery of questionnaires was administered to gather information on: (a.) unsafe behaviours (lapses, errors, infractions and violent infractions) as measured by the DBQ (Driver Behaviour Questionnaire, Gras et al., 2006); (b.) the consumption of alcohol as measured by the AUDIT (Alcohol Use Disorders Identification Test, Contel-Guillamón et al., 1999); (c.) drug use as measured by the DAST-20 (Drug Abuse Screening Test, Skinner & Goldberg, 1986); (d.) dissociation (do not drive after drinking and/or consuming substances) as measured by 7 items adapted from the Driving Styles questionnaire, Jiménez-Mejías et al. (2014), created for the DGT; and (e.) driving habits as measured by a sociodemographic questionnaire.

2.3. Procedure

All participants completed the battery of questionnaires individually, seated before a computer and after receiving a link (URL address) that granted access to: (1.) information about the study; (2.) informed consent to participate in the study; (3.) a personal encryption code to anonymize their data; and (4.) the battery of questionnaires. The average time required to complete this battery was approximately 30 min.

2.4. Design and data analysis

The data analyses carried out in this study are presented below. First, the relationship between re-offender status and sociodemographic variables was tested: (a) for categorical variables, the relationship with offender status was analysed using a χ^2 test for independency and a Cramer's V to determine the intensity of the relationship when one existed; (b) for quantitative variables, a t-test for independent samples was used to compare reoffender and non-offender means. Secondly, the relationship between offender status and a diagnosis of alcohol and drug addiction was analysed again using a χ^2 test for independency plus Cramer's V. Thirdly, the relationship between offender status and ability to dissociate alcohol and substance consumption from driving was analysed using, once again, a χ^2 test for independency plus Cramer's V. Fourth, comparisons between the DBQ measures of offenders and non-offenders were made using a t-test for independent samples plus Cohen's d to determine the intensity of the effect. Finally, a logistic regression model was fitted to predict offender status on the basis of several variables of interest. The level of significance adopted for all the analyses was $\alpha = 0.05$. The analyses were conducted using three statistical software programs: SPSS version 25.0, JASP version 0.16.3 (JASP Team, 2022) and R studio version 3.6.3 (RStudio Team, 2019).

2.5. Psychometric properties of the questionnaires

2.5.1. DBQ (Driver behaviour Questionnaire) (Gras et al., 2006)
The Driver Behaviour Questionnaire (DBQ) (Reason et al., 1990) was used to obtain an estimation of a driver's aberrant behaviour. This questionnaire consists of 28 items and measures four dimensions: violations; aggressive violations; errors; and lapses. DBQ responses are registered on a six-point Likert-type scale, with (0) being never, (1) almost never, (2) occasionally, (3) very frequently, (4) almost always and (5) always. It was originally developed by Reason et al., at the University of Manchester and adapted in Spanish by Gras et al., (2006). The psychometric properties obtained in this study show values greater than $\alpha = 0.59$ for all dimensions. Here are some representative examples of the type of items for each dimension: (a.) Errors: "*Fail to check rear-view mirror before a manoeuvre*". (b). Lapses: "Forget where you left your car in the car park". (c). Violations: "Overtake a slow driver on the inside"; (d.) Aggressive Violations: "*Angered by another driver, give chase*" (See Appendix 1).

The DBQ was adapted for Spanish-speaking populations by Grass et al., (2006) and showed adequate psychometric properties, with values for the Cronbach alpha coefficients (α) above 0.59 for all dimensions. The Errors factor explained 21.21 % of total variance, Violations 9.24 %, Aggressive Violations 5.75 % and Lapses 4.75 %.

In the present study, alpha values for Violations, Errors and Total Scale are acceptable (above 0.70). The alpha values for Aggressive Violations and Lapses are slightly below the acceptable cut-off point. More specifically, the alpha values were as follows: Errors ($\alpha = 0.71$); Lapses ($\alpha = 0.67$); Violations ($\alpha = 0.75$); Aggressive Violations ($\alpha = 0.69$); and total ($\alpha = 0.88$).

2.5.2. AUDIT (Alcohol use Disorders Identification Test) (Saunders et al., 1993)
The AUDIT (Alcohol Use Disorders Identification Test) was created by Saunders et al. (1993) with the aim of identifying individuals at risk of developing problems with alcohol. It was adapted to the Spanish context by Contel-Guillamón et al. (1999). The questionnaire is comprised of 10 items that explore the amount and frequency of consumption, dependent behaviours and problems related with alcohol. Here is an example of an AUDIT item from the original version by Saunders et al. (1993): "How many drinks containing alcohol do you have on a typical day when you are drinking?" (See Appendix 2). The AUDIT displays adequate internal consistency ($\alpha = 0.88$) and sets forth three possible diagnoses: (1.) No Risk; (2.) Risk (or Moderate Alcohol Consumption); and (3.) Alcohol Use Disorders (AUD).

In the present study, the reliability of AUDIT scores was high (Cronbach's α of 0.80) but lower than that obtained by the authors of the adaptation. The alcohol consumption of participants was assessed using the following cut-off scores: scores of 9 or below indicated

No Risk or Risk (Moderate Alcohol Consumption) and scores of 10 or above indicated possible Alcohol Use Disorders (Contel-Guillamón et al., 1999).

2.5.3. DAST-20 (Drug abuse Screening test – 20) (Skinner & Goldberg, 1986)

The DAST-20 (Drug Abuse Screening Test) was originally an adaptation of the Michigan Alcoholism Screening Test (MAST; Selzer, 1971) to screen for other substances besides alcohol and tobacco. Initially, it was comprised of 28 items (DAST-28). A posteriori, two abbreviated versions were developed for adults, the DAST-20 (Skinner & Goldberg, 1986) and the DAST-10 (Bohn et al., 1991). The DAST-20 consists of 20 yes–no questions and is designed to identify participants with a drug problem. Here is an example of an item from the original DAST-20: "Have you used drugs other than those required for medical reasons?" (See Appendix 3). The DAST-20 was adapted into Spanish by Pérez-Gálvez et al., (2010) and displayed adequate internal consistency ($\alpha = 0.92$). In the present study, the reliability of DAST-20 scores was high (Cronbach's α of 0.78), but lower than that obtained by the authors of the Spanish adaptation. Drug use by participants was assessed using the following cut-off scores: scores below 5 indicated no addiction to drug use and scores of 5 or above indicated addiction to drug use (Pérez-Gálvez et al., 2010).

2.5.4. Ability to dissociate alcohol and substance consumption from driving

The ability to dissociate alcohol and substance use from driving (to drink and/or consume substances and then not drive) was measured via seven questions that were drawn from the questionnaire developed for the DGT (Dirección General de Tráfico) by Jiménez-Mejías et al. (2014): (1.) Drive a little after drinking alcoholic beverages (any amount); (2.) Drive a little after drinking 1 or 2 beers or glasses of wine; (3.) Drive a little after drinking more than 3 beers or wines; (4.) Drive a little after drinking 5 or more spirit drinks in a period of approximately-two hours; (5.) Drive a little after consuming cocaine, amphetamines or designer drugs; (6.) Drive a little after consuming tranquilizers or drugs that cause sleepiness; (7.) Drive a little after consuming cannabis, hashish or marijuana. The response options to these questions were "Yes/No" (See Appendix 4).

3. Results

3.1. Analysis of variables and offender status

A chi-square independent test was conducted when the variable being compared was categorical (gender, educational level, alcohol consumption, drug consumption, ability to dissociate alcohol and substance consumption from driving). A t-test for independent samples was run when the variable was quantitative (age, health perception and DBQ measures).

3.1.1. Sociodemographic variables

Several analyses were run to compare non-offenders and offenders across socio-demographic variables. In the case of gender, a significant relation was found with offender status [$\chi^2(1) = 67.53$, $p < .001$]. A Cramer's V value of 0.463 indicated a moderate association. The distribution of gender was not at all the same between the two groups of drivers: within non-offenders, males accounted for 47.2 % of the sample, but within offenders this percentage rose to 95.9 %.

A significant relation was also found with educational level [$\chi^2(3) = 136.314$, $p < .001$]. A Cramer's V value of 0.658 indicated a strong association. The educational level distribution is very different between non-offenders and offenders: 77.1 % of non-offenders had an advanced education, compared to 18.6 % of offenders. Non-offenders with only a primary or secondary education were almost anecdotal (1.8 % and 1.4 % respectively) compared to offenders (17.5 % and 38.1 %). In the case of a high school education, the gap is less pronounced (19.7 % of non-offenders and 25.8 % of offenders).

In the case of age (Mean = 36.56 and SD = 13.13 for Non-offenders; Mean = 34.50 and SD = 11.34 for Offenders), there wasn't a significant difference between the two groups [t[1] ($df = 211.33$) = 1.42; $p = .156$].

Similarly, there wasn't a significant difference between the groups in the case of perception of health [t ($df = 313$) = -1.85; $p = .065$]. On a scale of 0 to 100, the mean was 81.53 (SD = 20.27) for non-offenders and of 85.81 (SD = 15.55) for offenders.

3.1.2. Alcohol consumption

The AUDIT's diagnosis of alcohol consumption presented a significant relation with "offender status" [$\chi^2(2) = 37.793$, $p < .001$]. A Cramer's V of 0.375 indicated a moderate association. Fig. 1 shows the distribution of alcohol consumption for the two groups. In the offender group, 10.30 % were at risk for alcohol consumption and 29.5 % had a possible Alcohol Use Disorder (AUD). In the non-offender group, these values dropped to 2.1 % and 6.3 %, respectively.

3.1.3. Drug consumption

Drug addiction as diagnosed by the DAST also presented a significant relation with "offender status" [$\chi^2(1) = 46.86$, $p < .001$]. A Cramer's V value of 0.386 indicated a moderate association. Fig. 2 shows the distribution of drug addiction in the two groups. In the offender group, 33 % received a diagnosis of drug addiction, compared to only 4.6 % in the non-offender group.

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[1] In this case, Welch's alternative to t was used because homogeneity of variance assumption couldn't hold.
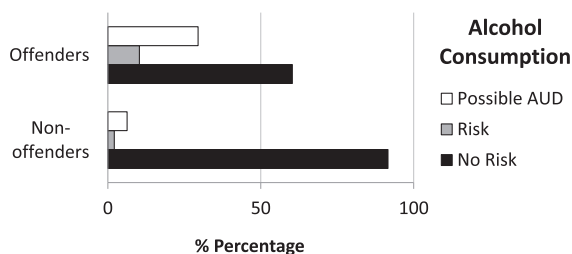
Fig. 1. Alcohol consumption distribution for the non-offender and offender groups, as measured with AUDIT (Contel-Guillamón et al., 1999): (a.) No Risk, (b.) Risk (Moderate Alcohol Consumption scores of 9 or below) and (c.) Alcohol Use Disorders (AUD; scores of 10 or above).
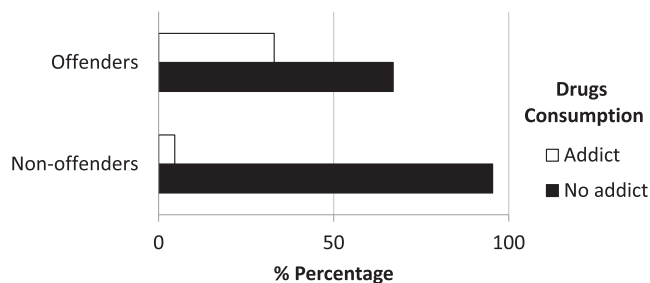

Fig. 2. Drug consumption distribution for the non-offender and offender groups, as measured by the DAST-20 (Drug Abuse Screening Test, as adapted by Pérez-Gálvez et al., (2010): (a.) No drug addiction (scores below 5), and (b). Drug addiction (scores of 5 or above).

3.1.4. Offender status and the ability to dissociate alcohol and drug consumption from driving

This study also explored the relationship between offender status and the ability to dissociate alcohol and substance consumption from driving. Several chi-square tests of independence were conducted between offender status and the ability to dissociate alcohol and substance consumption from driving (Table 2).

The ability to dissociate alcohol and drug consumption from driving has a significant relation with offender status. The strongest relations were found for items 3 and 7, and the weakest for item 6. In Fig. 3, it can be seen that the proportion of drivers incapable of dissociating alcohol or substance consumption from driving (i.e., drivers that answered "Yes") is systematically higher for the sample of "offenders".

3.1.5. Driver behaviour Questionnaire (DBQ) and offender status

Table 3 and Fig. 4 show comparisons between DBQ factor means for non-offenders and offenders. Offenders had a higher mean in Violations and Aggressive Violations than did non-offenders, although this difference had a small effect size. No significant differences were found for the Errors factor means. In the Lapses factor, non-offenders had a higher mean than offenders, but here again the effect size was small.

Table 2

Chi-square of independence tests between offender status and the ability to dissociate alcohol and substance consumption from driving.

| Capability of dissociating item	χ^2 (df)	p - value	Cramer's V
1. Driving after drinking alcohol (any quantity)	29.14 (1)	< 0.001	0.324
2. Driving after drinking 1 or 2 cups of beer or wine	12.10 (1)	0.001	0.209
3. Driving after drinking more than 3 cups of beer or wine	47.64 (1)	<0.001	0.414
4. Driving after drinking 5 or more spirit drinks in a period of two hours approximately	34.50 (1)	<0.001	0.352
5. Driving after taking cocaine, amphetamines or designer drugs	18.35 (1)	<0.001	0.257
6. Driving after taking tranquilizers or somnolent medicines	7.17 (1)	0.007	0.161
7. Driving after taking cannabis, hashish or marijuana.	40.90 (1)	<0.001	0.384
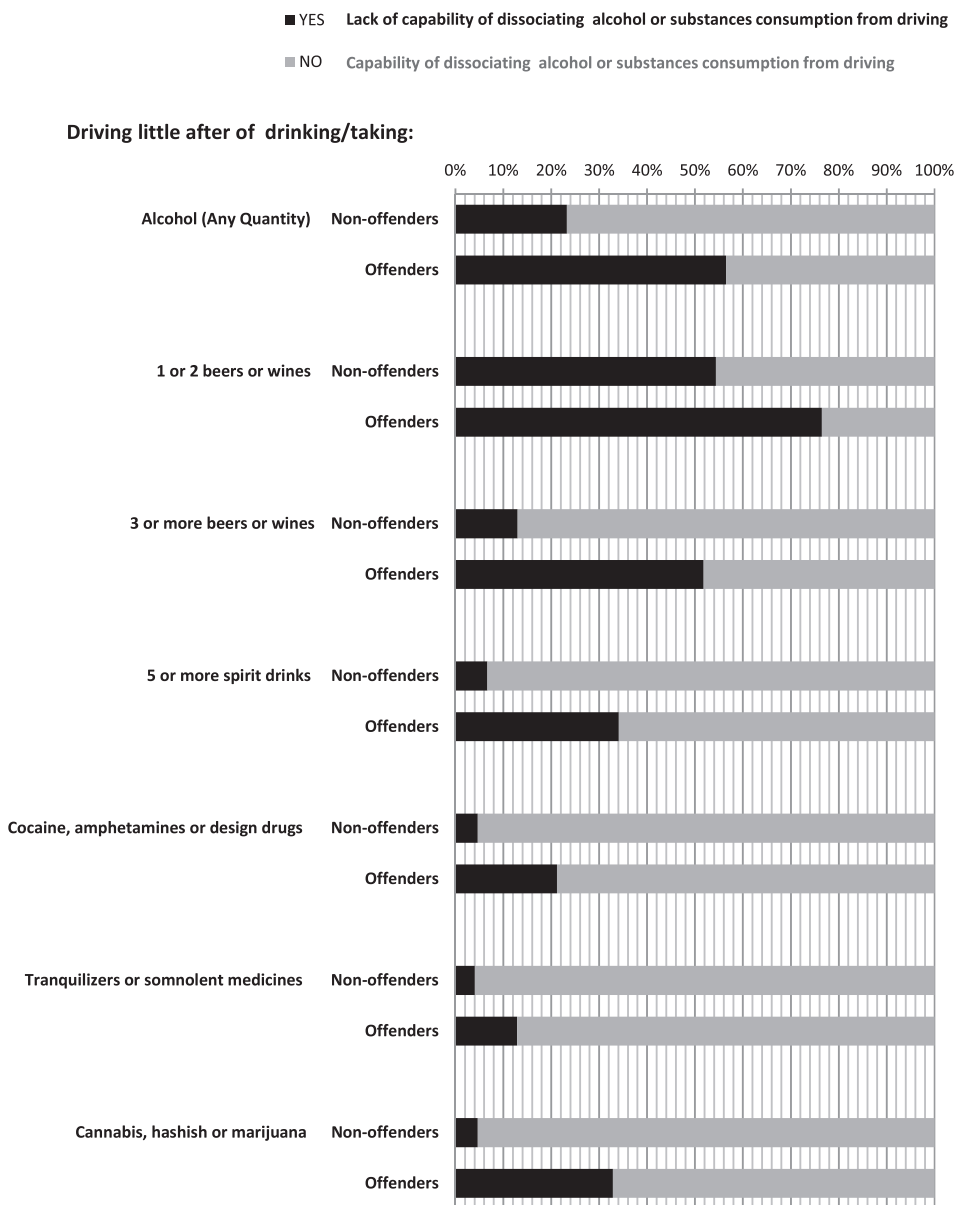
Fig. 3. Ability to dissociate alcohol or drug consumption from driving by offender and non-offender status.

Table 3
Driver Behaviour Questionnaire Scores as self-reported by non-offender and offender drivers. Means comparisons via Student's T test.

	Factor	Profile	N	Mean (SD)	t(gl)	p-value	Cohen's d
Driver Behaviour Questionnaire (DBQ)	Violations	Non-offender	218	1.03 (0.65)	−2.27 (313)	0.024	−0.28
		Offender	97	1.21 (0.69)			
	Aggressive violations[1]	Non-offender	218	0.85 (0.52)	−2.18 (153.55)	0.030	−0.28
		Offender	97	1.01 (0.65)			
	Errors[1]	Non-offender	218	0.50 (0.35)	−1.65 (152.62)	0.101	−0.21
		Offender	97	0.59 (0.44)			
	Lapses	Non-offender	218	0.91 (0.46)	2.27 (313)	0.024	0.28
		Offender	97	0.78 (0.46)			

[1] In this case, Welch's alternative to t was used because homogeneity of variances assumption couldn't hold.
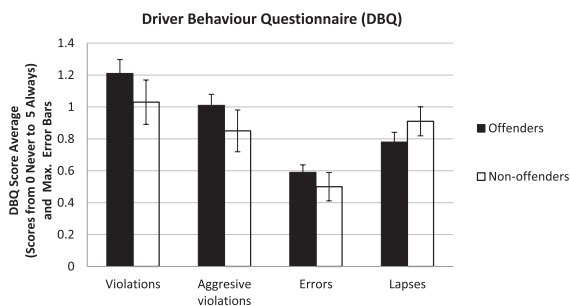
Driver Behaviour Questionnaire (DBQ)

Fig. 4. Driver Behaviour Questionnaire Score Averages and Max Errors bars (DBQ, Gras et al., 2006): Violation, Aggressive violations, Errors and Lapses as self-reported by Non-offender and Offender drivers.

3.2. Prediction model for offender status

A logistic regression model was used to explore the ability of the study's different variables to predict offender status. A model was fitted introducing DBQ factors, ability to dissociate variables, AUDIT diagnosis, DAST diagnosis and Educational Level, using a forward stepwise selection method with the Likelihood ratio statistic.

The resulting model (Table 4) includes: the DBQ Lapses factor; item 4 of the ability to dissociate variables ("Driving a little after drinking 5 or more spirit drinks in a period of approximately-two hours"); the Alcohol Use Disorder (AUD) diagnosis from the AUDIT; the addiction to drugs diagnosis from the DAST; and Educational Level.

This model was fitted according to the Hosmer and Lemeshow test [$\chi^2(8) = 5.57$, $p = .695$], and reduced the unfitting of the null model by 74 % (R^2 de Nagelkerke = 0.74). In terms of the model's classification power, using a cut-off point of 0.30 (based on observations of classification graphics to find the optimal cut-off point), it correctly classified 91.1 % of the subjects in their correct offender status, attaining a sensitivity of 88.5 % and a specificity of 92.1 %. No significant interaction effects were observed between the model's variables.

In terms of the capability of each of the model's variables to predict Offender status, the negative coefficient for "Lapses" indicates that the probability of being an offender decreases as the "Lapses" score increases, and the coefficient's exponential value indicates that with every additional "Lapses" point, the odds of being an offender decreases by 92 %.

The coefficient for item 4 of the ability to dissociate ("Driving after drinking 5 or more spirit drinks") has a positive value, indicating that the probability of being an offender is higher for those who responded "Yes" (i.e., those who do not dissociate between consumption and driving) than for those who responded "No". The coefficient's exponential value indicates that the odds of being an offender are 13.20 times greater for non-dissociators than for dissociators.

The DAST Diagnosis coefficient has a positive value, indicating that people with a drug addiction have a greater probability of being offenders than those without a drug addiction. This variable's exponential value indicates that the odds of being an offender are 8.24 times greater for those with a drug addiction than for those without a drug addiction.

With respect to the AUDIT Diagnosis, because this is a categorical variable with three categories, it required the creation of two dummy variables. The global effect of the AUDIT diagnosis was significant. Those with a "Risk" diagnosis had 20.16 times higher odds of being an offender than those with a "No Risk" diagnosis. Those with a "Possible AUD" diagnosis had 9.60 times higher odds of being an offender than those with a "No Risk" diagnosis.

In terms of educational level, because this is a categorical variable with four categories, it required the creation of three dummy

Table 4
Logistic Regression model to predict offender profile.

	β	SE	Wald	Df	p-value	Exp (β)	95 % C.I. for Exp(β)	
							Lower	Higher
Constant	1.26	0.80	2.50	1	0.114	3.53		
DBQ Lapses[1]	−2.51	0.65	14.88	1	<0.001	0.081	0.023	0.291
Capability of dissociating Item 4	2.58	0.64	16.12	1	<0.001	13.17	3.74	46.35
DAST Diagnosis	2.11	0.68	9.67	1	0.002	8.24	2.18	31.15
AUDIT Diagnosis[2]			18.78	2	<0.001			
Risk Consumption (Moderate Risk)	3	1.06	8	1	0.005	20.16	2.52	161.40
Possible AUD (Alcohol Use Disorder)	2.26	0.62	13.14	1	<0.001	9.60	2.83	32.61
Educational Level[3]			54.37	3	<0.001			
Secondary Studies	0.75	1.10	0.47	1	0.49	2.12	0.25	18.22
High School Studies	−3.40	0.95	12.73	1	<0.001	0.033	0.005	0.22
Superior studies	−5.42	1	29.45	1	<0.001	0.004	0.001	0.031

[1] Scores centered on the median of each variable.
[2] "No Risk" is the reference category.
[3] "Primary or inferior" is the reference category.

variables. Those with a secondary education had the same odds of being an offender as those with a primary education. Those with a High School education had 3.30 % higher odds of being offenders than those with a primary education. Finally, for those with an advanced education, the odds of being an offender were 0.40 % of those with a primary education.

4. Conclusions

This study aimed to determine the profile of the offender driver by: (1.) performing an analysis of the variables measured to compare offender and non-offender groups of drivers; and (2.) discovering the role and predictive power of these variables (alcohol consumption, substance consumption, ability to dissociate alcohol and drug use from driving, educational level, commission of infractions, errors and lapses as measured by the DBQ).

The model to predict offender status was satisfactory in terms of fit and predictive power, being theoretically sound (see for instance, Martí-Belda et al., 2019; Padilla et al., 2018). The current model showed good fit indicators ($R^2 = 0.74$) and good predictive power: (1) It correctly classified 91 % of participants as offender or non-offender driver. (2) More specifically, it had a sensitivity of 88 % (percentage of offenders correctly classified as offenders) and a specificity of 92 % (percentage of non-offenders correctly classified as non-offenders).

Studies highlighted offender drivers' alcohol consumption, imprudence, underestimation of risk or greater sensibility to reward (Padilla et al., 2018). However, this study's findings go even further, underscoring that not only alcohol consumption but also drug use is a key predictor of recidivist behaviour. Alcohol and drug abuse are health problems, but their impact is worsened when they are combined with driving. This study analysed the ability of repeat offenders to say no to drinking and driving in order to avoid the risks of drunk or drugged driving. Along these lines, another original finding of this research makes clear that offender drivers do not only consume more alcohol and substances than non-offender drivers but are also less able to dissociate consumption from driving. More specifically, offender drivers do not have the ability to dissociate the consumption of more than 5 spirit drinks, or the consumption of cannabis, from driving. Although less concerning, we also found that non-offender drivers give themselves a certain amount of leeway when it comes to drinking and driving. Nearly half of non-offender drivers admitted to having driven after consuming 1 or 2 beers or wines.

The self-report measures of the DBQ also show differences in driving behaviour between the groups. Offenders tend to report more violations and aggressive violations while driving than non-offenders, and also fewer lapses. The belief among offenders that they commit fewer lapses may be due to an optimism bias. Bold offender drivers overestimate their abilities and believe the situations described by the items on lapses or inattention do not happen to them.

Turning to sociodemographic variables, it can be said that: (a) the majority of offenders are men; (b) the higher the education level, the lower the probability of being an offender; and (c) alcohol and drug consumption are related with offender drivers.

The problem of offender drivers is also more pronounced among populations with lower educational levels. It could also be linked to the inequality experienced by social classes with lower levels of education.

These results highlight once again, the need to address the problems of a good part of traffic offender drivers as a disorder that requires treatment with therapeutic/motivational intervention programs that are specific and individualized to reduce alcohol and drug use. Such addictions cannot be only overcome with the prosecution of these groups of people via the administering of penalties in the forms of fines or administrative or criminal charges (i.e. see the effects of increased speeding penalties in Watson et al., 2015). Neither do theoretical courses on road awareness help reduce the prevalence of alcohol or drug addiction among offender drivers. According to Möller et al. (2022), penalties are a key component to improve road user safety, but previous studies suggest that, in the case of offender drivers, they might not be successful in reducing crashes.

Researchers have made only modest advances in understanding what enforcement can do to reduce drug use and related problems. But society has made some progress in developing interventions that have both a sound theoretical basis and hold promise in terms of avoiding the unintended negative consequences of a highly punitive system (Pardo & Reuter, 2018). It would probably be more effective to treat them with psychological programs of clinical intervention rather than to void their driver's license for driving under the influence of alcohol, or fine or jail them, or require them to take refresher courses on road awareness that were not sufficiently successful previously (DeMichele & Payne, 2013; Cordovilla-Guardia, et al., 2017; Padilla et al., 2018). See, for instance Choi et al. (2019) findings, recidivism of drunk driving and reinstatement of license after suspension or revocation and the drink drivers' views of a voluntary alcohol interlock programme for drink driving offenders (Forsman & Wallhagen, 2019).

In fact, the antidote for preventing individuals from becoming offender drivers may be a mixture of: greater personal education and motivation to prevent alcohol and drug consumption behind the wheel; raising awareness of the problem in order to help people to make the own decision to quit alcohol and substance consumption (Lev, Hershkovitz, & Yechiam, 2008); and, for the numerous offender cases where the addiction problem already exists, referring those for therapeutic detoxification treatment.

5. Limitations and further research

The size of the groups of non-offenders (N = 218) and offenders (N = 97) was large. The sample of offender drivers was recruited from enrolees in courses to recover points on a driver's license under Spain's Demerit Point System. In this group, both the number of women and individuals with advanced education was low, reflecting the reality of the offender driver population at large. However, in the non-offender group, the number of individuals with advanced education is likely overrepresented due to a recruitment bias, as these participants were employees of the University of Granada. In future studies, we will correct this possible recruitment bias. In addition, it would be convenient to recruit more participants from different driving schools in order to obtain a more representative

and larger sample.

CRediT authorship contribution statement

Candida Castro: Conceptualization, Investigation, Supervision, Funding acquisition, Project administration, Writing – review & editing. **Pablo Doncel:** Data curation, Methodology, Formal analysis, Writing – original draft. **Andreea Ionela Dinu:** Writing – original draft, Writing – review & editing. **Francisca Padilla:** Supervision, Writing – original draft.

Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: "The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. This research received the Ethics committee approval (2218/CEIH/2021. *Comité de Ética en Investigación de la Universidad de Granada*).

Data availability

Data will be made available on request.

Acknowledgements

Appendix 1

DBQ (Driver Behaviour Questionnaire)

(Gras et al., 2006)

Below, you will be presented with a series of situations. Select the number that represents the frequency with which the situation happens to you. Please respond honestly.

A continuación, se le presentará una serie de situaciones. Seleccione el número que represente la frecuencia con la cual le ha sucedido esa situación. Por favor, conteste con sinceridad.

Nunca (0)	Casi nunca (1)	Ocasionalmente (2)	Con mucha frecuencia (3)	Casi siempre (4)		Siempre (5)	
Never (0)	*Almost never (1)*	*Occasionally (2)*	*Very Frequentl (3)*	*Almost always (4)*		*Always (5)*	

#								
1	**Ha chocado contra algo que no había visto al conducir marcha atrás**	0	1	2	3	4	5	
	Hit something when reversing you had not previously seen							
2	**Tenía la intención de ir a un sitio A, cuando se ha dado cuenta de que se estaba dirigiendo a otro sitio B donde quizás suele ir con más frecuencia**	0	1	2	3	4	5	
	Wake up to find yourself on a wrong, but more familiar route							
3	**Ha conducido creyendo que podía sobrepasar el límite legal de alcoholemia permitido**	0	1	2	3	4	5	
	Drive when you suspect you may be over the legal alcohol limit							
4	**Se ha incorporado en el carril inadecuado al acceder a una rotonda o un cruce**	0	1	2	3	4	5	
	Get into the wrong lane approaching a roundabout or junction							
5	**Estaba esperando para girar a la izquierda en una vía preferente y ha prestado tanta atención al flujo de vehículos que ha estado a punto de golpear al vehículo de delante**	0	1	2	3	4	5	
	Queuing to turn left, nearly hit the car in front							
6	**No se ha dado cuenta de que había peatones cruzando la calle cuando ha girado desde una vía preferente hacia una calle lateral**	0	1	2	3	4	5	
	Fail to notice pedestrians crossing when turning into a side street							
7	**Ha tocado el claxon para manifestar su enfado a otro conductor**	0	1	2	3	4	5	
	Sound your horn to indicate your annoyance at another road user							

(*continued*)

8	**Se ha olvidado de mirar el retrovisor antes de iniciar la marcha, cambiar de carril, etc** *Fail to check rear-view mirror before a manoeuvre*	0	1	2	3	4	5
9	**Ha dado un frenazo en una carretera resbaladiza o se ha desplazado al carril contrario como consecuencia de un patinazo** *Break too quickly, or steer the wrong way into a skid*	0	1	2	3	4	5
10	**Ha salido de un cruce de forma que el conductor con prioridad de paso se ha visto obligado a frenar y dejarle paso** *Pull out of an intersection so far your force your way into the traffic*	0	1	2	3	4	5
11	**No ha hecho caso al límite de velocidad en un área residencial** *Disregard the speed limit on a residential road*	0	1	2	3	4	5
12	**Ha accionado un mando, por ejemplo, el de los faros, cuando usted quería accionar otro, por ejemplo, el del limpiaparabrisas** *Switch on one thing when you meant to switch on something else*	0	1	2	3	4	5
13	**Al girar a la derecha casi colisiona con un ciclista que ha aparecido inesperadamente a su lado** *On turning right, nearly hit a cyclist coming up on your inside*	0	1	2	3	4	5
14	**No ha tenido en cuenta una señal de ceda el paso y por poco colisiona con los coches que tenían preferencia de paso** *Miss give way sign and narrowly avoid a collision*	0	1	2	3	4	5
15	***Ha intentado iniciar la marcha en un semáforo en tercera*** *Attempt to drive away from the traffic lights in third gear*	0	1	2	3	4	5
16	**Ha intentado adelantar un vehículo sin darse cuenta de que su conductor tenía puesto el intermitente para girar** *Attempt to overtake someone signalling a right turn*	0	1	2	3	4	5
17	**Se ha enfadado con otro conductor y lo ha perseguido con la intención de decirle cuatro verdades.** *Angered by another driver, give chase*	0	1	2	3	4	5
18	**Ha permanecido en un carril de la autopista, que sabe que se acaba más adelante, hasta el último momento en que se ha visto forzado a incorporarse a otro carril** *Stay in a lane about to close until the last minute, then dive in*	0	1	2	3	4	5
19	**Ha olvidado donde había dejado el coche en el aparcamiento** *Forget where you left your car in the car park*	0	1	2	3	4	5
20	**Ha adelantado a un conductor lento por la derecha** *Overtake a slow driver on the inside*	0	1	2	3	4	5
21	**Ha acelerado en el momento de salir de un semáforo con la intención de adelantar al conductor del otro carril** *Race away from the traffic lights to beat another driver*	0	1	2	3	4	5
22	**Ha malinterpretado las señales y se ha incorporado a una rotonda en sentido contrario** *Misread the signs and exit from a roundabout on the wrong road*	0	1	2	3	4	5
23	**Ha circulado tan cerca del vehículo que iba delante que hubiera sido difícil frenar a tiempo en caso de una emergencia** *Drive so close to the car in front making it difficult to stop in an emergency*	0	1	2	3	4	5
24	**Ha pasado un cruce sabiendo que el semáforo ya se había puesto rojo** *Cross an intersection knowing the traffic lights have already turned against you*	0	1	2	3	4	5
25	**Se ha enfadado con algún conductor y le ha mostrado su enfado de alguna manera visible** *Angered by a certain type of driver, show hostility*	0	1	2	3	4	5
26	**Se ha dado cuenta de que no tiene un claro recuerdo de la carretera por la cual estaba circulando** *No clear recollection of the road along which you have just travelled*	0	1	2	3	4	5
27	**Ha subestimado la velocidad de un vehículo que venía en sentido contrario en el momento de realizar un adelantamiento** *Underestimate the speed of an oncoming vehicle when overtaking*	0	1	2	3	4	5
28	**No ha hecho caso a los límites de velocidad en la carretera** *Disregard the speed limit on the highway*	0	1	2	3	4	5

Appendix 2

AUDIT (Alcohol Use Disorders Identification Test) (Saunders et al., 1993).

A continuación, se le presentará una serie de preguntas sobre hábitos y frecuencia de consumo de alcohol Seleccione el número que representa la frecuencia de su consumo de alcohol. Por favor, conteste con sinceridad.

Below, you will be presented with a series of questions about alcohol consumption habits and frequency. Select the number that represents the frequency with which you consume alcohol. Please respond honestly.

Nunca (0) *Never (0)*	Una o menos veces/mes (1) *Monthly or less (1)*	2 a 4 veces/mes (2) *2 to 4 times a month (2)*	2o 3 veces/semana (3) *2 or 3 times a week*	4o más veces/semana (4) *4 or more times a week (4)*

1.	**¿Con qué frecuencia consume alguna bebida alcoholica?** *How often do you have a drink containing alcohol?*	0	1	2	3	4
2	**¿Cuántas consumiciones de bebidas alcohólicas suele realizar en un día de consumo normal?** *How many drinks containing alcohol do you have on a typical day when you are drinking?*	1o 2	3o 4	5o 6	7 a 9	10o más
3	**¿Con qué frecuencia toma 6o más bebidas alcohólicas en un solo día?** *How often do you have six or more drinks on one occasion?*	0	1	2	3	4

(*continued*)

		0	1	2	3	4
4	**¿Con qué frecuencia en el curso del último año ha sido incapaz de parar de beber una vez había empezado?**	0	1	2	3	4
	How often during the last year have you found that you were not able to stop drinking once you had started?					
5	**¿Con qué frecuencia en el curso del último año no pudo hacer lo que se esperaba de usted porque había bebido?**	0	1	2	3	4
	How often during the last year have you failed to do what was normally expected from you because of drinking?					
6	**¿Con qué frecuencia en el curso del último año ha necesitado beber en ayunas para recuperarse después de haber bebido mucho el día anterior?**	0	1	2	3	4
	How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?					
7	**¿Con qué frecuencia en el curso del último año ha tenido remordimientos o sentimientos de culpa después de haber bebido?**	0	1	2	3	4
	How often during the last year have you had a feeling of guilt or remorse after drinking?					
8	**¿Con qué frecuencia en el curso del último año no ha podido recordar lo que sucedió la noche anterior porque había estado bebiendo?**	0	1	2	3	4
	How often during the last year have you been unable to remember what happened the night before because you had been drinking?					
9	**¿Usted o alguna otra persona han resultado heridos porque usted había bebido?**	0	1	2	3	4
	Have you or someone else been injured as a result of your drinking?					
10	**¿Algún familiar, amigo, médico o profesional sanitario han mostrado preocupación por su consumo de bebidas alcohólicas o le han sugerido que deje de beber?**	0	1	2	3	4
	Has a relative or friend, or a doctor or other health worker been concerned about your drinking or suggested you cut down?					

Appendix 3

Drug Abuse Screening Test − 20 (DAST-20) (Skinner & Goldberg, 1986).

A continuación, se le presentará una serie de preguntas sobre hábitos de consumo de sustancias Seleccione conteste si le han ocurrido estas situaciones. Por favor, conteste con sinceridad.

Below, you will be presented with a series of questions about your substance use habits. Indicate if the situation applies to you. Please respond honestly.

		Sí *Yes*	No *No*
1	**¿Ha consumido algún tipo de droga sin prescripción médica?**	1	2
	Have you used drugs other than those required for medical reasons?		
2	**¿Ha abusado de los medicamentos?**	1	2
	Have you abused prescription drugs?		
3	**¿Ha consumido más de una droga al mismo tiempo?**	1	2
	Do you abuse more than one drug at a time?		
4	**¿Puede pasar la semana sin consumir drogas?**	1	2
	Can you get through the week without using drugs (other than those required for medical reasons)?		
5	**¿Siempre que quiere es capaz de parar de consumir drogas?**	1	2
	Are you always able to stop using drugs when you want to?		
6	**¿Ha tenido pérdidas de memoria o le han aparecido imágenes del pasado como consecuencia de su consumo de drogas?**	1	2
	Have you had "blackouts" or "flashbacks"' as a result of drug use?		
7	**¿Se ha sentido mal consigo mismo o culpable por su consumo de drogas?**	1	2
	Do you ever feel bad about your drug abuse?		
8	**¿Su pareja o sus familiares suelen quejarse de su consumo de drogas?**	1	2
	Does your spouse (or parents) ever complain about your involvement with drugs?		
9	**¿El consumo de drogas le ha creado problemas de pareja o con sus padres?**	1	2
	Has drug abuse ever created problems between you and your spouse?		
10	**¿Ha perdido amigos por su consumo de drogas?**	1	2
	Have you ever lost friends because of your use of drugs?		
11	**¿Ha desatendido a su familia a consecuencia de su consumo de drogas?**	1	2
	Have you ever neglected your family or missed work because of your use of drugs?		
12	**¿Ha tenido problemas en el trabajo debido a su consumo de drogas?**	1	2
	Have you ever been in trouble at work because of drug abuse?		
13	**¿Ha perdido su trabajo por el consumo de drogas?**	1	2
	Have you ever lost a job because of drug abuse?		
14	**¿Se ha peleado con alguien mientras estaba bajo el efecto de alguna droga?**	1	2
	Have you ever gotten into fights when under the influence of drugs?		
15	**¿Ha realizado alguna actividad ilegal para obtener drogas?**	1	2
	Have you ever engaged in illegal activities in order to obtain drugs?		
16	**¿Ha sido detenido por posesión de drogas ilegales?**	1	2
	Have you ever been arrested for possession of illegal drugs?		

(*continued*)

		Sí Yes	No No
17	**¿Ha notado síntomas de abstinencia cuando deja de consumir drogas?** *Have you ever experienced withdrawal symptoms as a result of heavy drug intake?*	1	2
18	**¿Ha tenido problemas de salud como consecuencia del consumo de drogas? (Por ejemplo, pérdida de memoria, hepatitis, convulsiones, hemorragias, etc.)** *Have you had medical problems as a result of your drug use? (For example, memory loss, hepatitis, seizures, bleeding, etc.)*	1	2
19	**¿Ha solicitado ayuda a alguien por un problema con las drogas?** *Have you ever gone to anyone for help for a drug problem?*	1	2
20	**¿Ha recibido algún tratamiento por un problema de drogas?** *Have you ever been involved in a treatment programme specifically related to drug use?*	1	2

Appendix 4

Capability of dissociating the consumption of alcohol or drugs from driving
  Jiménez-Mejías et al (2014).

A continuación, se le presentará una serie de preguntas sobre hábitos de consumo de sustancias y conducción. Conteste si le han ocurrido estas situaciones. Por favor, conteste con sinceridad.

Below, you will be asked a series of questions about substance use and driving. Indicate if these situations apply to you. Please answer honestly

	Sí Yes	*No* No
1. **Conducir poco después de tomar bebidas alcohólicas (cualquier cantidad)** *Driving a little after drinking alcohol (any quantity)*	1	2
2. **Conducir poco después de tomar 1 ó 2 cervezas o vinos** *Drinking a little after drinking 1 or more cups of beer or wine*	1	2
3. **Conducir poco después de tomar más de 3 cervezas o vinos** *Driving a little after drinking 3 or more cups of beer or wine*	1	2
4. **Conducir poco después de tomar 5o más vasos o copas de bebidas alcohólicas** *Driving a little after drinking 5 or more cups of beer or wine*	1	2
5. **Conducir poco después de consumir cocaína, anfetaminas o drogas de diseño** *Driving a little after taking cocaine, amphetamines or design drugs*	1	2
6. **Conducir después de consumir tranquilizantes o fármacos que dan sueño** *Driving a little after taking tranquilizer of somnolent medicines*	1	2
7. **Conducir después de consumir cannabis, hachís o marihuana** *Driving a little after taking cannabis, hashish or marijuana.*	1	2

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