

Legal and Illegal Substance Consumption and Traffic Accident Risk Perception Among Spanish Young People

María J. Pino¹  · Carlos Herruzo² · Antonio Raya¹ · Javier Herruzo¹

Accepted: 28 September 2015 / Published online: 30 September 2015
© Springer Science+Business Media Dordrecht 2015

Abstract Traffic accidents today constitute a major public health problem and Spain is one of the countries with the highest rates of drug consumption by drivers. Since risk perception is one of the factors that influence impaired driving behavior, the aim of this research is to study the relationship between the consumption frequencies of legal (e.g., alcohol) and illegal (e.g., hashish, synthetic drugs or cocaine) substances and traffic accident risk perception in Spain, and to evaluate whether there are any differences between genders in this regard. The study was carried out using a prospective cross-sectional ex post facto design based on an adapted version of an instrument used in several other studies into the same population. The sample size was 3819, with all subjects resident in Andalusia (Spain). The results show that those young adults who most frequently consume any of the studied drugs have a lower perception of risk than those who do not consume the same substances. For example, 41.5 % of hashish users thought that driving under the influence of hashish never or rarely causes problems. The highest perception of risk observed was associated with alcohol consumption, the lowest with hashish. There were also differences between genders. It was concluded that the higher the level of consumption, the lower the risk perception. The results obtained emphasize the need for

✉ María J. Pino
mjpino@uco.es

Carlos Herruzo
z42hepic@uco.es

Antonio Raya
m02ratra@uco.es

Javier Herruzo
jherruzo@uco.es

¹ Departamento de Psicología, Facultad de Educación, University of Cordoba, C/San Alberto Magno s/n, 14071 Córdoba, Spain

² Risk Behavior and Health Group, University of Cordoba, C/San Alberto Magno s/n, 14071 Córdoba, Spain

more information campaigns and more severe penalties for driving under the influence of drugs.

Keywords Risk perception · Frequency of drug consumption · Hashish · Synthetic drug · Cocaine · Alcohol

1 Introduction

Traffic accidents today constitute a major public health problem. Injuries suffered as a consequence of traffic accidents are the eighth cause of death worldwide and the first for young people between 15 and 29 years of age (Kelly et al. 2004; Matthews et al. 2009; Veldstra et al. 2012). According to predictions by the World Health Organization (WHO 2013), if no preventive measures are taken traffic accidents will become the fifth cause of death in 2030. Victims are not limited to automobile drivers (31 %), but include other road users like motorcyclists (23 %), bicycle riders (5 %) and pedestrians (22 %), who make up a particularly vulnerable group.

In Spain, according to data from the *Ministerio de Sanidad, Servicios Sociales e Igualdad* (Ministry of Health, Social Services and Equality) (2015), 25 % of the deaths that took place in 2013 were caused by traffic accidents. Approximately one fourth of this percentage was caused by driving under the influence of alcohol, with over 40 % declaring they had driven at some time in the past year with an alcohol level in their blood above the legal limit of 0.5 g/l (*Ministerio de Sanidad, Servicios Sociales e Igualdad* & European Monitoring Centre for Drugs and Drug Addiction 2013). But alcohol is not the only drug Spaniards consume before driving. 12.7 % of the people who died as a consequence of traffic accidents and were tested for drugs (*Ministerio de Sanidad, Servicios Sociales e Igualdad* & European Monitoring Centre for Drugs and Drug Addiction 2013) tested positive for illegal substances, and 13.5 % tested positive for psycho-pharmaceutical drugs. These figures place Spain among the countries with the highest rates of drug consumption by drivers. Nevertheless, studies and data focusing on this problem in Spain are very scarce.

However, the problem does not only affect Spain. According to the National Survey on Drug Use and Health (NSDUH), in 2012 in the United States over ten million people over the age of 12 (3.9 % of the teenage and adult population) admitted having driven under the influence of drugs. In 2009 a study by the National Highway Traffic Safety Administration (NHTSA) reported that 18 % of drivers fatally injured in traffic accidents tested positive for at least one illegal substance or, in the case of legal drugs, had consumed more than the permitted maximum.

As the WHO Global Status Report on Road Safety 2013 indicated, driving under the influence of drugs is one of the five main risk factors or causes of accident-related injuries (Aitken et al. 2000; Asbridge et al. 2005). The other four causes—excessive speed, non-use of helmet, non-use of safety belt and non-use of retention systems for children—are also to some degree associated with this variable. Driving under the influence of drugs is one of the most important of the above five causes precisely because it is associated with a higher frequency of potentially risky behavior, such as breaking the speed limit, carrying more passengers than the vehicle is designed to carry, driving in a state of fatigue (Scott-Parker

et al. 2013), driving without a seat belt (Williams et al. 2011) and the frequent use of mobile phones while driving (Schlehofer et al. 2010).

In a longitudinal study of young drivers carried out using state records of crashes and offenses, Gjerde et al. (1993) found that substance use at 15 years of age (cigarettes, marijuana, and alcohol) was an important predictor of excessive risk with regard to later perpetration of serious offenses and involvement in serious crashes. High and rapidly increasing levels of substance use during adolescence have also been found to predict risky driving in young adulthood (Seymour and Oliver 1999) and evidence exists that drug users do not perceive drugs as a factor which significantly impairs driving performance (Kelly et al. 2004; Matthews et al. 2009; Scott-Parker et al. 2013).

This last point is very important because there is evidence that risk perception is closely associated with impaired driving behavior (García 2012; McIntosh et al. 2008). Drivers are more likely to drink drive if they perceive that being involved in an accident or being arrested for driving under the influence of alcohol is unlikely (Kelly et al. 2004; DeMichele et al. 2014). Alcohol and other drugs however, causes alterations in behavior and in decision making while driving. Thus, drivers are not usually aware of the risks they assume when driving under the influence of alcohol. Because they do not have a traffic accident every time they drink and drive, they tend to think there is no danger in driving under the influence of alcohol and to engage in the same high-risk behavior over and over again (Alonso et al. 2015; Linden and Lau-Barraco 2014). This tends to produce a greater sense of invulnerability, a more permissive attitude and a lower perception of risks (Calafat et al. 2008; McCarthy et al. 2007; Ruiz-Olivares et al. 2010).

To date, however, very little research has been carried out into the relationship between drug driving and risk perception, most studies having focused exclusively on alcohol (Kelly et al. 2004; Raes and Verstraete 2009). This lack of research is also evident in Spain.

On the other hand, some studies have highlighted the importance of age and gender as risk factors for accident-related injuries. The most common profile is that of a male under the age of 25 driving in a city in the early hours of the morning on a Sunday or a bank holiday (*Ministerio de Justicia & Dirección General de Tráfico* [Ministry of Justice and General Traffic Authority] 2012). As far as age is concerned, young people admit that their driving style is dangerous, suggesting that they more frequently indulge in risky driving behavior (Álvarez et al. 1995; Sánchez 2008). According to Becoña (2000), young people tend to engage in risky behavior but underestimate the negative consequences of that behavior (Chen et al. 2000; Comas et al. 2003; Jonah and Dawson 1987; Uribe et al. 2011).

With regard to gender, 14.4 % of young males between 18 and 25 years of age cause at least one accident per year, while the corresponding percentage among women is 10.26 %. If we combine the gender data with the age data, we find that younger drivers are more accident prone, with a proportion of 97 % for men and 72 % for women (*Ministerio de Justicia & Dirección General de Tráfico* 2012). According to Comas et al. (2003), men's greater likelihood of having a traffic accident compared with women has to do with the consumption of alcohol and illegal drugs. Males are more likely to drive after having drunk alcohol (Sabel et al. 2004; Brar and Rickard 2013). Furthermore, women have a higher perception of risk than men and this higher risk perception also applies to driving under the effect of alcohol (Alonso et al. 2015). Even though in recent years these differences between men and women have decreased, at present it can still be said that men engage in risky behavior more frequently whereas women are less inclined to do so. A study carried out in Australia by Armstrong et al. (2014) confirms this tendency, further noting that the

youngest women are the ones who exhibit the highest levels of alcohol concentration in their blood (the permitted maximum is 0.5 ‰).

Given the social relevance of traffic accidents and the link that exists between risk perception and high-risk behavior, there is a clear need for more research into the relationship between drug use and risk perception in Spain, one of the countries with the highest rates of drug consumption by drivers: a need that becomes even more evident considering that no in-depth study of this issue has yet been carried out in this country.

The aim of this work is therefore to investigate the relationship between the consumption of addictive substances (alcohol, cannabis, cocaine and synthetic drugs) and perception of the resulting risk of a traffic accident taking place, among Spanish young people. The study also examines gender-related differences. Considering the aforementioned age range of the group with the highest risk of involvement in traffic accidents in Spain, the study focusses on young people between 18 and 29 years of age.

2 Method

2.1 Participants

The participants were 3819 young people from Andalusia, Spain, aged between 18 and 29 (mean = 21.6; SD = 3.63). 46.7 % of them were men, 53.3 % women. The general characteristics of the sample were: overall age range between 18 and 29 years; 38.1 % aged between 18 and 20; 26 %; aged between 21 and 23; 17.9 % aged between 24 and 26; 13.5 % aged between 27 and 29 and 4.5 % older than 29. 40.5 % of the subjects were students, 32.1 % were employed, 13.4 % studied during the week and worked at weekends and 12.9 % were unemployed. 1400 were from a provincial capital and 2405 from other towns and cities, grouped together according to province and region (cluster sampling by administrative district).

2.2 Instruments

The questionnaire used was an adaptation of one employed in other research studies into the university population in Andalusia and some national data collection agencies (Ruiz-Olivares et al. 2010; Lucena et al. 2013; *Ministerio de Sanidad, Servicios Sociales e Igualdad* 2015, 2013), aimed principally at exploring substance (alcohol, cannabis, cocaine and synthetic drugs) consumption patterns in relation to variables like age, sex, university studies, family background, etc. The questionnaire included several blocks of questions: socio-demographic data, consumption patterns and risk perception. The questions on consumption patterns were divided so as to deal with each specific drug separately (alcohol, cannabis, cocaine and synthetic drugs) and had four answer options: I have never consumed it, I have used it at some time in my life, I have used it in the last 12 months and I have used it in the last 30 days. With regard to their perception of the risks associated with the consumption of the different substances, participants had to assess several risks such as (a) the possibility of having a traffic accident; (b) suffering from major psychological or physical problems; (c) experiencing difficulties in interpersonal relationships; (d) having legal-type problems (being arrested, having their ID card confiscated, being fined, etc.) and (e) suffering from irreversible physical or psychic health problems. A Likert-type scale of 1–5 was used, where 1 represented low perceived risk (“never

causes problems”) and five represented the highest perceived risk (“always causes problems”). The Cronbach’s alpha coefficient was $= 0.967$, classified as excellent by George and Mallery (2003, p. 231).

2.3 Design

The study was carried out using a prospective, cross-sectional ex post facto design. To predetermine the size of the sample we first used the statistical package EpiInfo 2000 to perform a simulation. This indicated that in order to obtain an expected frequency of 1 % and an error margin of 0.01 we needed a group of at least 1900 subjects. A proportional sample was formed by grouping the subjects together according to province and region.

2.4 Procedure

Data was collected with the collaboration of teachers at the University of Cordoba and coordinators from the *Ciudades ante las drogas* (“Cities Against Drugs”) program, who administered the questionnaire to members of the youth population in their town or village selected randomly from attendees at training courses, worksites, gyms and social centers. The personnel carrying out the survey had previously been trained to be able to give the subjects full, clear instructions. The instructions section of the questionnaire stated that it was a study into the consumption of various substances and certain behavior by young people, and that the aim was to identify preventive and corrective measures with which to deal with the potential problems arising from such behavior. The instructions also emphasized the importance of participating in the study and declared that the data would be processed statistically in such a manner as to guarantee total anonymity.

2.5 Data Analysis

With the data from the questionnaires, we used the statistical program SPSS 17.0 to create a database and assembled several contingency tables to relate substance consumption with variables like whether or not the subject was a university student and socio-demographic variables like sex, age and employment. We calculated the Pearson Correlation coefficient to measure the relationship between consumption and risk perception and then performed *T* tests and ANOVA to explore differences between users and non-users of drugs and between sexes. Later, we performed a within-subjects repeated measures ANOVA to find out whether risk perception varied between different drugs.

3 Results

Pearson correlation coefficients were calculated between the accident risk perception variable and the different consumption variables. In all cases there was a significant negative linear correlation between the perception of risk associated with each drug and consumption of that substance ($p = 0.000$). The higher the level of consumption, the lower the risk perception.

Figure 1 shows the perceived risk of traffic accidents by percentage of users and non-users respectively.

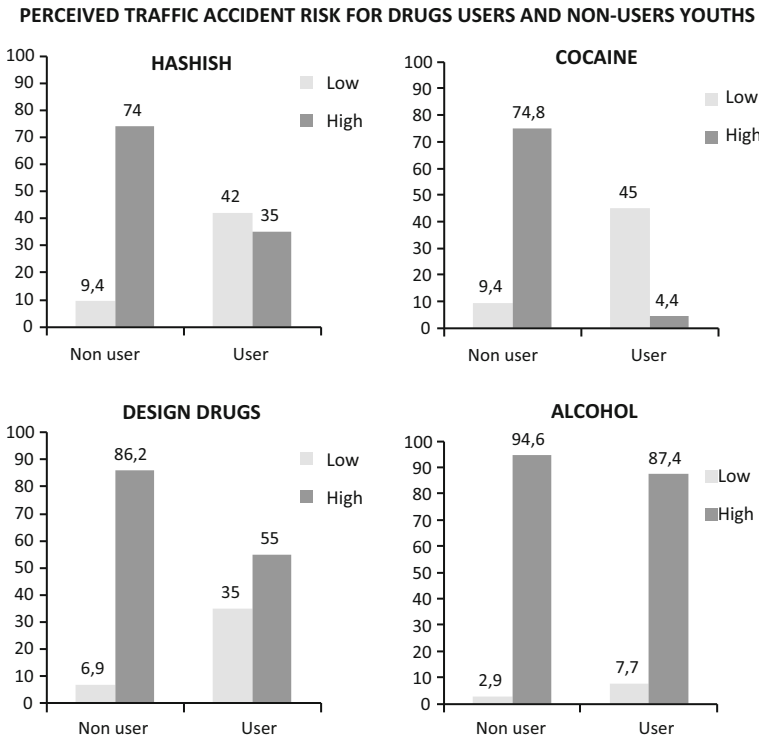


Fig. 1 Perceived risk of traffic accident by percentage of drug users and non-users respectively

As can be seen in the upper left quadrant of the figure, in the case, for example, of hashish there is a marked difference between people who have never used hashish and users of the substance. Only 9.4 % of the former stated that consuming hashish “causes no problem” or “rarely causes problems” in driving, while 74.8 % of them considered that it “causes problems rather frequently” or “always causes problems”. On the other hand, among habitual users of hashish, 41.5 % thought the drug does not cause problems and 35 % thought it does. That is to say, almost half of the hashish users believe consumption of the drug does not represent a danger for driving.

These results are statistically confirmed. We carried out variance analyses using risk perception as DVs and consumption of the respective substances as factors. In all cases significant differences were obtained.

Table 1 shows the values of *F* for the respective ANOVAs.

Table 1 Results of the ANOVAs for various drugs

	N	F	g.l.	Sig. (bilateral)
Hashish	2993	85,331	3	0.000
Synthetic	2012	6621	3	0.000
Cocaine	2986	46,860	3	0.000
Alcohol	3199	9866	3	0.000

$\alpha = 0.05$

Table 2 Mean of perceived risk of traffic accident × consumption

Consumption	Alcohol	Hashish	Cocaine	Synthetic
Never				
Mean	4.75	4.16	4.53	4.48
N	410	1636	2651	1802
SD	0.664	1.08	0.90	1.01
Once in their life				
Mean	4.65	3.97	3.94	4.31
N	815	897	257	161
SD	0.875	1.17	1.28	1.11
Last 12 months				
Mean	4.42	3.76	3.94	4.31
N	255	188	35	29
SD	1.26	1.25	1.25	1.03
Last 30 days				
Mean	4.51	2.97	3.55	3.60
N	1719	272	43	20
SD	1.08	1.39	1.25	1.53
Total				
Mean	4.57	3.97	4.45	4.45
N	3199	2993	2986	2012
SD	1.01	1.19	0.97	1.03

To analyze differences between groups of users the corresponding unplanned comparisons were carried out in each ANOVA using Dunnet’s T3 test, since all the Levene’s tests had shown significant differences (<0.05), indicating unequal variances. The results confirmed what we stated earlier: the higher the consumption, the lower the risk perception. In the case of alcohol, risk perception is higher than for other drugs, while for hashish it is the lowest (see Table 2). A within-subjects repeated measures ANOVA was performed, showing significant differences ($F = 739; p = 0.000$).

With regard to the gender variable, a significantly higher risk perception was found in women, for each of the studied drugs (Hashish $t_{1,2886} = -6044, p = 0.000$; Synthetic: $t_{1,2928} = -3169, p = 0.002$; Cocaine: $t_{1,2840} = -5141, p = 0.000$; Alcohol $t_{1,3091} = -3104, p = 0.002$). Consumption of all the drugs studied was higher among men than women ($p = 0.000$ in all cases).

4 Discussion and Conclusions

The aim of this study was to evaluate a possible relationship between the consumption of certain drugs, like hashish, cocaine, synthetic drugs and alcohol, and perception of the risk of suffering traffic accidents due to driving under the influence of those substances. The study was also designed to identify and evaluate any differences between genders. In view of the data obtained, it can be said that a negative correlation exists between the risk perception associated with each studied drug and consumption of that substance. The higher the level of consumption, the lower the risk perception. For all the drugs studied, these results confirm that the results previously obtained by other researchers, which

mainly focused on alcohol and marijuana (Alonso et al. 2015; Jonah and Dawson 1987; McCarthy et al. 2007), are also applicable in Andalusia (Spain).

For all the drugs we studied, the consumption-risk perception relationship was found to have significant values. In the case of habitual cocaine users (consumption in the last 30 days), only a small fraction responded that cocaine consumption “always causes problems.” This is a tendency that can be seen with respect to all the drugs we studied: there is a big difference in risk perception between those who have never tried the drug and those who have used it in the last 30 days (except in the case of alcohol, as previously described). This difference is not only noticeable between the answers “never tried” and “in the last 30 days”: a significant difference can also be observed between those who have never tried the drug and those who have tried it “once in their life.” The theoretical implication of these results is considerable, because they support the hypothesis that exposure to risks without negative consequences raises the probability of high-risk behavior by developing a false perception of safety, and simultaneously, by making the people involved more impervious to information campaigns. This may be due to the fact that youngsters who have used drugs without experiencing negative consequences develop a false perception of safety (Becoña 2002). As happens with all other types of high-risk behavior, frequent exposure to a risk without negative consequences reduces perception of the inherent danger, generating an illusion of safety that actually increases the probability of an accident (Melià 2007). However, caution should be exercised when interpreting these results because this is a correlational study and a much more experimental approach is needed if causal inferences are to be made.

The high percentage (41.5 %) of habitual users of hashish who perceive that hashish does not cause problems is also important. Hashish is a hallucinogenic drug which affects stimuli perception, so this complacent attitude towards the substance needs to be changed. Specific campaigns should be conducted to make these people aware of the falsity of their beliefs about the effects of hashish and about the “illusion of safety” that is generated by engaging in high-risk behavior without negative consequences.

Special attention should also be paid to alcohol, since, although the values of the risk perception variable are high for all frequencies of use, there is still a significant negative correlation between consumption and risk perception. In part, this could be attributed to information and sensitization campaigns about the impact of this legal drug on driving skills, to an increase in police checks and to the hardening of penalties. For other drugs hardly any specific information or controls exist (Camus et al. 2014). The result obtained in the study is consistent with the assertions made by Kelly et al. (2004) that drivers are more likely to drink drive if they perceive that being arrested for driving under the influence of alcohol or being involved in an accident is unlikely.

With regard to gender, our results confirmed those obtained in previous research in this area (Sabel et al. 2004; Comas et al. 2003), which showed differences between sexes in both substance consumption and risk perception (women perceive a higher risk).

In conclusion, it can be said that in Andalusia (Spain), one of the countries with the highest rates of drug consumption by drivers, the higher the level of alcohol, hashish, cocaine or synthetic drug consumption, the lower the perception of the risk of a traffic accident taking place for driving under the effects of each respective drug. This conclusion also applies to differences between sexes, with females showing a lower consumption of the four drugs studied and a higher risk perception than males.

One limitation of our research was that we did not evaluate whether or not the participants had been involved before in an accident. This, together with the possible

consumption of more than one drug by subjects, should be taken into consideration in future research.

4.1 Practical Applications

Drug-driving is clearly a road safety concern of increasing importance, and it is critical that factors such as perceptions of risk and another lifestyle factors are explored. This work and its results demonstrate the importance and necessity of implementing sensitization, information and control campaigns about the risks involved in driving under the influence of drugs, whether legal or illegal. In the case of alcohol, the fact that both habitual users and non-users of alcohol agree there is always a risk involved in driving after having consumed alcoholic beverages indicates that years of campaigns have evidently been successful in changing risk perception. This is very encouraging. This research therefore supports any initiatives aimed at altering perceptions of the risks involved in driving under the influence of other drugs too. The fact that users of these drugs appear to hold erroneous beliefs concerning consumption-related risks underlines the importance of identifying the target population in which attitudes need to be changed.

To this end, an increase in police checks would be very important because that would increase the perceived risk of being penalized. Since risk perception is lower among male drug users, it would also be advisable to focus campaigns specifically on the distorted perception drug users have of the risk of having an accident when driving after consuming drugs, especially when they are males. These campaigns could, perhaps, target people around the driver to raise their awareness of this distorted perception and its possible consequences for the drivers' passengers. To the extent that these people would be more receptive to such information, this type of initiative could persuade them to change the way they interact with drug-consuming drivers (e.g., to show disapproval, warn the drivers of the dangers, or even refuse to ride with them) and this would probably eventually change the beliefs of the drivers themselves.

Funding This study was funded by “Consejería para la Igualdad y Bienestar Social de la Junta de Andalucía” (Andalusian Govern) (Grant Number 01.19.00.01.00.482.02.31B).

Compliance with Ethical Standard

Conflict of interest The authors declare that they have no conflict of interest.

References

- Aitken, C., Kerger, M., & Crofts, N. (2000). Drivers who use illicit drugs: Behaviour and perceived risks. *Drugs Education & Prevention Policy*, 7, 39–50.
- Alonso, F., Pastor, J. C., Montoro, L., & Esteban, C. (2015). Driving under the influence of alcohol: Frequency reasons, perceived risk and punishment. *Substance Abuse Treatment, Prevention, and Policy*, 10, 11. doi:10.1186/s13011-015-0007-4.
- Álvarez, F. J., del Río, M. C., & Prada, R. (1995). Drinking and driving in Spain. *Journal of Studies on Alcohol and Drugs*, 56, 403–407.
- Armstrong, K. A., Watling, H., Watson, A., & Davey, J. (2014). Profile of women detected drink driving via Roadside Breath Testing (RBT) in Queensland, Australia, between 2000 and 2011. *Accident Analysis and Prevention*, 67, 67–74. doi:10.1016/j.aap.2014.02.006.
- Asbridge, M., Poulin, C., & Donato, A. (2005). Motor vehicle collision risk and driving under the influence of cannabis: Evidence from adolescents in Atlantic Canada. *Accident Analysis and Prevention*, 37, 1025–1034.

- Becoña, E. (2000). Los adolescentes y el consumo de drogas. *Papeles del Psicólogo*, 77, 25–32. Retrieved from <http://www.papelesdelpsicologo.es/vernumero.asp?id=843>.
- Becoña, E. (2002). *Bases científicas de la prevención de las drogodependencias*. (Informe Técnico para la Delegación del Gobierno para el Plan Nacional sobre Drogas). Madrid.
- Brar, S. S., & Rickard, D. P. (2013). *Teen and senior drivers*. Sacramento: California Department of Motor Vehicle.
- Calafat, A., Androver, D., Juan, M., & Frankze, N. (2008). Relación del consumo de alcohol y drogas de los jóvenes españoles con la siniestralidad vial durante la vida recreativa nocturna en tres comunidades autónomas en 2007. *Revista Española de Salud Pública*, 82(3), 323–331.
- Camus, J., Sastre, M. T. M., Sorum, P. C., & Mullet, E. (2014). French people's positions regarding national policies about illicit drugs: A preliminary study. *Social Indicators Research*, 118(3), 1191–1204. doi:10.1007/s11205-013-0454-0.
- Chen, L. H., Baker, S. P., Braver, E. R., & Li, G. (2000). Carrying passengers as a risk factor for crashes fatal to 16-and 17-year-old drivers. *JAMA*, 283(12), 1578–1582.
- Comas, D., Aguinaga, J., Orizo, F. A., Espinosa, A., & Ochaíta, E. (2003). *Jóvenes y estilos de vida. Valores y riesgos en los jóvenes urbanos, FAD (Fundación de Ayuda contra la Drogadicción)—INJUVE*.
- DeMichele, M., Lowe, N. C., & Payne, B. K. (2014). A criminological approach to explain chronic drunk driving. *American Journal of Criminal Justice*, 39(2), 292–314.
- García, J. A. (2012). Concepto de percepción de riesgo y su repercusión en las adicciones. *Salud y drogas*, 12(2), 133–151.
- George, D., & Mallery, P. (2003). *SPSS for Windows step by step: A simple guide and reference. 11.0 update* (4th ed.). Boston: Allyn & Bacon.
- Gjerde, H., Beylich, K. M., & Morland, J. (1993). Incidence of alcohol and drugs in fatally injured car drivers in Norway. *Accident Analysis and Prevention*, 25, 479–483.
- Jonah, B. A., & Dawson, N. E. (1987). Youth and risk: Age differences in risky driving, risk perception, and risk utility. *Alcohol, Drugs & Driving*, 3(3–4), 13–29. Retrieved from <http://search.proquest.com/docview/617445238?accountid=14520>.
- Kelly, E., Darke, S., & Ross, J. (2004). A review of drug use and driving: Epidemiology, impairment, risk factors and risk perceptions. *Drug and Alcohol Review*, 23(3), 319–344. doi:10.1080/09595230412331289482.
- Linden, A. N., & Lau-Barraco, C. (2014). A qualitative review of psychosocial risk factors associated with caffeinated alcohol use. *Experimental and Clinical Psychopharmacology*, 22(2), 144–153.
- Lucena, V., Ruiz-Olivares, R., Pino, M. J., & Herruzo, J. (2013). Consumo de alcohol, tabaco y psicofármacos en jóvenes universitarios y no universitarios. *Behavioral Psychology/Psicología Conductual: Revista Internacional Clínica y De La Salud*, 21(1), 123–136. Retrieved from <http://search.proquest.com/docview/1506433743?accountid=14520>.
- Matthews, A., Bruno, R., Johnston, J., Black, E., Degenhardt, L., & Dunn, M. (2009). Factors associated with driving under the influence of alcohol and drugs among an Australian sample of regular ecstasy users. *Drug and Alcohol Dependence*, 100(1–2), 24–31. doi:10.1016/j.drugalcdep.2008.08.012.
- McCarthy, D. M., Lynch, A. M., & Pedersen, S. L. (2007). Driving after use of alcohol and marijuana in college students. *Psychology of Addictive Behaviors*, 21(3), 425–430.
- McIntosh, J., O'Brien, T., & McKeganey, N. (2008). Drug driving and the management of risk: The perspectives and practices of a sample of a problem drug users. *International Journal of Drug Policy*, 19, 248–254.
- Melià, J. L. (2007). *El factor humano en la seguridad laboral. Psicología de la Seguridad y Salud laboral*. Bilbao: Lettera Publicaciones.
- Ministerio de Justicia y Dirección General de Tráfico. (2012). *Presencia de alcohol, drogas y medicamentos en conductores españoles*. Madrid: Dirección General de Tráfico.
- Ministerio de Sanidad, Servicios Sociales e Igualdad. (2013). *Encuesta Estatal sobre uso de drogas en Enseñanzas Secundarias (ESTUDES)*. Madrid: Ministerio de Sanidad, Servicios Sociales e Igualdad.
- Ministerio de Sanidad, Servicios Sociales e Igualdad. (2015). *Encuesta sobre alcohol y drogas en población general en España. EDADES 2013*. Madrid: Ministerio de Sanidad, Servicios Sociales e Igualdad.
- Ministerio de Sanidad, Servicios Sociales e Igualdad & European Monitoring Centre for Drugs and Drug Addiction. (2013). *Informe Nacional 2013 al OEDT por el Punto Focal Nacional Reitox. España, evolución y tendencias*. Madrid: Ministerio de Sanidad, Servicios Sociales e Igualdad.
- Raes, E., & Verstraete, A. (2009). Drug-impaired driving. In A. Jamieson & A. Moenssens (Eds.), *Wiley encyclopedia of forensic science* (pp. 877–885). Chichester: Wiley.
- Ruiz-Olivares, R., Lucena, V., Pino, M. J., Raya, A., & Herruzo, J. (2010). El consumo de cannabis y la percepción del riesgo en jóvenes universitarios. *Behavioral Psychology/Psicología Conductual*:

- Revista Internacional Clínica y De La Salud*, 18(3), 579–590. Retrieved from <http://search.proquest.com/docview/861789421?accountid=14520>.
- Sabel, J. C., Bensley, L. S., & van Eenwyk, J. (2004). Associations between adolescent drinking and driving involvement and self-reported risk and protective factors in students in public schools in Washington State. *Journal of Studies on Alcohol and Drugs*, 65(2), 213.
- Sánchez, F. (2008). Actitudes frente al riesgo vial. *Psychosocial Intervention*, 17(1), 45–59.
- Schlehofer, M. M., Thompson, S. C., Ting, S., Ostermann, S., Nierman, A., & Skendarian, J. (2010). Psychological predictors of college students' cell phone use while driving. *Accident Analysis and Prevention*, 42, 1107–1112.
- Scott-Parker, B., Watson, B., King, M. J., & Hyde, M. K. (2013). A further exploration of sensation seeking propensity, reward sensitivity, depression, anxiety, and the risky behaviour of young novice drivers in a structural equation model. *Accident Analysis and Prevention*, 50, 465–471. doi:10.1016/j.aap.2012.05.027.
- Seymour, A., & Oliver, J. S. (1999). Role of drugs and alcohol in impaired drivers and fatally injured drivers in the Strathclyde police region of Scotland, 1995–1998. *Forensic Science International*, 103, 89–100.
- Uribe, J. I., Verdugo, J. C., & Zacarías, X. (2011). Relación entre percepción de riesgo y consumo de drogas en estudiantes de bachillerato. *Psicología y Salud*, 21(1), 47–55. <http://www.uv.mx/psicysalud/psicysalud-21-1/index.html>.
- Veldstra, J. L., Brookhuis, K. A., de Waard, D., Molmans, B. H., Verstraete, A. G., Skopp, G., & Jantos, R. (2012). Effects of alcohol (BAC 0.5‰) and ecstasy (MDMA 100 mg) on simulated driving performance and traffic safety. *Psychopharmacology (Berl)*, 222, 377–390. doi:10.1007/s00213-011-2537-4.
- Williams, A. F., West, B. A., & Shults, R. A. (2011). Fatal crashes of 16–17-year-old drivers involving alcohol, nighttime driving, and passengers. *Traffic Injury Prevention*, 13(1), 1–6.
- World Health Organization. (2013). *Global status report on road safety 2013*. Ginebra: World Health Organization.