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Drinking and driving: pre-driving attitudes and perceptions among Brazilian youth☆

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Abstract

The aim of this study was to investigate driving under the influence of alcohol (DUI) risk profiles and predictors in a sample of pre-driving Brazilian youth, in the context of Brazil's new Traffic Code. Data were obtained in the Traffic Department in São Paulo from a sample of 2166 individuals. Subjects displayed a low level of knowledge about the laws and few believed the penalties would actually be enforced for those engaging in DUI. Findings suggest that changes in DUI laws in Brazil and elsewhere should be accompanied by enforcement and education in order to enhance levels of knowledge and credibility of the sanctions.

Keywords: Drinking and driving; Alcohol abuse; Alcohol consumption; Traffic accidents; Social problems

1. Introduction

Data about alcohol drinking and driving in Brazil are sparse, but a few recent studies point to the seriousness of the situation in the country. Oliveira and Melcop (1997) studied all victims of motor vehicle accidents during Carnival festivities in Recife, a city located in the northeast of the country. They found that 119 (80.7%) out of 147 victims of those accidents tested positive for the presence of alcohol. Among the fatal victims (27 people), 88.2% were alcohol positive. In a related study, the authors found that 23% of people drinking in bars and 13.2% of people driving inside of Recife (not during Carnival) had blood alcohol concentrations (BAC) above 0.08%. In a multi-site accident study in four Brazilian capitals, it was found that, among 865 people involved in traffic accidents, 61% were alcohol positive and, in 27.2% of the cases, the BAC was above the new legal limit in Brazil of 0.06% (Nery Filho et al., 1997). In accordance with other literature, young adults up to 29 years old were those presenting the highest levels of BAC. In the only found paper with data on driving under the influence (DUI) in São Paulo city, Carlini-Cotrim and Chasin (2000) studied BACs in victims of externally caused deaths aged 13 years old or older that occurred in 1994. It was possible to investigate the BACs of 71.5% of all pedestrians hit by cars and 32% of other victims of motor vehicle accidents. Positive results for BAC were found in 53.2% of the pedestrians and 50.6% of all other victims of car accidents. In addition to those epidemiological studies, the level of problems caused by alcohol-impaired driving in Brazil can be inferred from rates of alcohol abuse and crashes (Fatos e Estatísticas de Trânsito, 1992, 1993; Galduróz et al., 1997; Pinsky and Laranjeira, 1998; Vasconcellos, 1999).

Beginning in January 1998, with the adoption of the new National Traffic Code, the allowable Brazilian BAC was reduced from 0.08 to 0.06%, lower than in the US and some European countries. In fact, the new Traffic Code is much stricter than the older one in relation to alcohol-impaired driving. Besides lowering the legal BAC, DUI, previously considered an infrac-

☆ The full text of the questionnaire is available at the journal website at http://www.elsevier.com/locate/drugalcdep under 'Supplementary Materials'.

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tion, is now viewed as a crime. Therefore, the offender is subjected not only to fines (the highest in the new Code) and to license suspension or revocation, but also to at least 6 months of imprisonment. Moreover, an individual who allows an alcohol-impaired person to drive may be subjected to 6–12 months in jail (Novo Código de Trânsito Brasileiro, 1998).

The implementation of the new Traffic Code brought renewed attention to the subject of drinking and driving, including more coverage by the Brazilian media. With tougher laws and media attention, Brazil has an opportunity to reduce the levels of drinking and driving. In order to develop and enforce measures that prevent alcohol-impaired driving, it is important to assess the population's perceptions, knowledge and attitudes on this subject.

The variables in the present study were largely chosen based on the theoretical framework of general deterrence and general prevention applied by Snortum, Berger and colleagues in a succession of studies (Snortum et al., 1988; Snortum and Berger, 1989; Berger et al., 1990; Loxley et al., 1992; Berger and Marelich, 1997). While general deterrence concerns the effects of fear of punishment, general prevention relates to a more encompassing situation, one including moral attachment and socializing of preventive habits. In the sense that general deterrence and general prevention are considered measures of control, higher levels on those measures should be associated with reduced levels of DUI. In fact, in their series of studies that analyzed differences among countries, over several years in California and over 11 years in the US, Berger and colleagues consistently found that higher levels of informal social control, citizen agreement with and belief in the credibility of the law, and the use of strategies to avoid DUI, such as higher indices of general deterrence and general prevention, were related to a lower report of alcohol-impaired driving. The authors also suggested that the credibility of the law may be the key factor in DUI reduction and that, to be effective, the laws have to be perceived as fair and strongly enforced.

The aim of the present survey is to examine, for the first time, DUI risk profiles of young Brazilians who are about to obtain their driver's licenses. This population is a particularly important one to investigate because, although they still do not (or should not) have any personal experience of driving under the influence of alcohol, they will be driving soon and, due to their age and status as new drivers, constitute a high-risk group for engaging in drinking and driving. In particular, we are interested in assessing the level of formal (legal enforcement) and informal (social environment, habits, personal attitudes) control in this population. In addition, we will investigate the measures predicting expectancies to drive after drinking using multiple regression analyses.

2. Methods

2.1. Subjects and procedure

Subjects in this study were candidates for a driver's license taking their written exam in DETRAN-SP (São Paulo Traffic Department). DETRAN-SP is the only department responsible for, among other things, administering the written and practical tests to residents of São Paulo city and parts of the metropolitan area. Five days a week, an average of 1200 people, distributed across four concurrent classes at each of five time periods, take their written exam. The exams, which take about 20 min to complete, are administered by police officers (who also screen, at the exam entry, for misrepresentation and false identification). The candidates study for the written exam using a manual prepared by the driving-schools, which presents the traffic laws and signs in a summarized fashion.

The sample consisted of 2166 subjects, 18–25 years old, taking the written exam in DETRAN over a 1-month period from mid-October to mid-November 1998. The questionnaire, anonymous and voluntary, was administered in groups after the subjects had completed the written driver's license exam. In order to encourage honest responses, it was stressed to the subjects that the study was developed by researchers from the University Federal of São Paulo and that the questionnaires would not, at any time, be handled by the DETRAN-SP. In addition, during the administration of the questionnaires, the police officers responsible for the written exam were not present. Candidates in our age range were divided by sex (see rationale later) into two classes, where they received information about the study and were handed the questionnaires. No subjects refused participation, but 162 out of 2166 youngsters returned incomplete questionnaires. We believe that those 162 candidates did not finish the task because of literacy problems. In fact, the mean level of education was significantly lower ($P < 0.0001$) for those subjects than for the rest of the sample. Thus, the sample for the main analyses consisted of 2004 subjects.

2.2. Materials

A questionnaire[1] was utilized to obtain the data for the study. This instrument was mainly based on that developed by Berger et al. (1990). Some questions were extracted from Jones and Boyle (1996), and the alcohol consumption questions were drawn from two questionnaires developed by the Rutgers Health and Human Development Project (alcohol and drug use and experience questionnaires). It was field tested to improve comprehension and time efficiency.

[1] The full text of the questionnaire is available at the journal website: http://www.elsevier.nl/sab/drugalcdep/supmat.htm.

The final questionnaire was divided into seven parts. We realized while carrying out the pilot study that most of the subjects did not know the legal BAC and/or the amount of drinks to reach it. As many of the items in the questionnaire specifically asked about driving under or above the legal limit, we decided to specify the amount of drinks. In addition, we found that questions about consequences, levels of safe/legal driving after drinking and opinions about penalties presented some difficulty to participants when directly addressed to them. Because we wanted the respondents to think about themselves when answering the questionnaire, we formulated those questions asking about a person of the participant's same gender and weight. The next section presents a brief description of the main variables used in the analyses.

2.3. Measures

2.3.1. Demographics and alcohol use

Demographics included gender, age, weight, marital status, level of education, total household income and occupation. Also in this section, subjects were asked if they, or someone that lived with them, owned a car and if it was the first time they were taking the written exam. Age, education and income were used as continuous variables. Alcohol consumption was assessed in terms of quantity and frequency of regular alcohol use, using no specific time frame. In addition, we included a question about frequency of going to parties.

2.3.2. General deterrence

Knowledge of DUI laws was assessed by seven questions on traffic laws about driving while impaired (i.e. legal BAC in Brazil, number of drinks to be above the legal limit, whether an alcohol-impaired driver would be subjected to financial penalties, etc.). Correct answers to the questions were added into a single score (alpha = 0.32). Since the knowledge questions were about different domains, it was not expected they would have a high degree of internal consistency.

Credibility of the law was assessed by nine items measuring subjects' perception of the enforcement of the DUI law in Brazil. Four dichotomous variables asking if subjects personally knew someone who had been stopped by the police or suffered some punishment for alcohol-impaired driving were added, creating a four-point scale (alpha = 0.74). Another variable was created by averaging four items assessing how likely it would be that an alcohol-impaired person of the subjects' sex and weight is caught by the police and receives punishment (alpha = 0.85). Finally, one question measured the perception about the probability of a convicted drunk driver actually receiving the penalties as required by law.

2.3.3. General prevention

Personal attitudes towards DUI were assessed by six items about opinions on the topic and two questions on the probability of being involved in a traffic accident after alcohol consumption. It included a question about the maximum amount of drinks to drink and drive, another about the relationship of drinks and being a dangerous driver, and a measure of moral awareness. Three five-point scale items were averaged, creating a variable about opinions on which penalties should be applied to alcohol-impaired drivers (alpha = 0.76). Finally, two variables that measured the probability that a light or a severe accident would result from a person driving after drinking were measured (alpha = 0.80).

Social controls were measured by six items assessing subjects' perceptions about reactions towards DUI in their social environment. The quantity of friends disapproving of the subjects' alcohol-impaired driving was measured by averaging two items (alpha = 0.85). To assess perceived DUI behavior of friends and people, the same age as the subjects, two items were averaged (alpha = 0.65). The last social control variable was constructed by averaging two questions asking about designated driver decisions by subjects' peers (alpha = 0.53).

2.3.4. DUI expectancies and riding experiences

This section comprised four items that measured experience with riding and alcohol-impaired driving expectations. Two variables measured experience with riding and with refusing to ride with a drunk driver. The variable that measures expectancies of drinking and driving was created by averaging the questions about expectancies of DUI above and under the legal limit in the next year (alpha = 0.62).

2.4. Data analyses

Because of the relatively large number of predictors, the analyses were carried out in three steps. First, we checked for multicollinearity by examining the tolerances of all predictor variables. The only variables that yielded tolerances under 0.5 were frequency and quantity of alcohol use. Given the high correlation between these two variables ($r = 0.62$), they were averaged into a single score for each subject. Second, we used simultaneous least-squares regression to examine the relationships of the predictors to DUI expectancies in the total sample. Third, to investigate whether the difference between 'no' versus 'any' expectancy of DUI represents a threshold phenomenon that is qualitatively different from quantitative differences in the level of DUI expectancies, we conducted two additional regression analyses. First, the regression analysis in step 2 was replicated for the subsample of individuals who indicated at least some degree of DUI expectancy ($N = 1095$). Second, a logistic regression analysis was

computed using a dichotomized DUI expectancy measure (0 = no chance of DUI, 1 = some chance of DUI) as the dependent variable.

3. Results

3.1. Descriptive findings

The majority of the subjects in the sample were males (62.1%), single people (86.4%), those taking the written test for the first time (91.8%) and individuals working part or full time (70.8%). Although most of the subjects had at least begun high school, 8.5% of them had not completed 5 years of education and 15.8% reported only 5–8 years in school. One-half of the sample had a monthly household income up to US$1000, with 28% of the subjects mentioning household incomes of US$500 or less. More than one-half of the subjects were 19 years old or younger, not surprisingly because this is the minimum driving age in Brazil, and almost half the sample was 18 years old (40.4%). Cars were owned by the vast majority of households in the sample (77.7%). The subjects' alcohol consumption level was somewhat low, with over 75% of the sample reporting drinking less than once a week and almost the same percentage usually drinking two or less alcoholic drinks per occasion. On the other hand, a little over 50% of the subjects admitted going to parties or bars where alcohol was served at least two to three times a month.

Over one-half of the sample (52.7%) admitted at least a small chance of driving after drinking one or two drinks in a 2-h period during the coming year, with about 14% of these individuals mentioning that they would definitely drink and drive. Twenty-nine percent of the subjects specified at least a small chance of driving after drinking three to four or more drinks in a 2-h period during the subsequent year, with 9% of those reporting they were absolutely sure they would engage in the behavior. The majority of the sample (55.7%) had ridden, at least once in the past year, with a driver who had had too much to drink. Conversely, in the same period of time, almost the same percentage of individuals had decided at least once not to be a passenger of a drunk driver.

Indices of general deterrence are presented in Table 1. Most individuals did not show good knowledge of drinking and driving laws, despite the fact that they were taking the driver's license written exam. The only exception was the question about number of points added to the driver's record, which is a recent strategy to deal with traffic violations added in the New Traffic Code. In general, many subjects simply admitted not knowing the answers for the questions. It is important to point out, however, that when the individuals guessed wrong, they generally displayed conservative views, i.e. they estimated the penalties to be more severe than they actually were or the maximum amount of drinks to reach the legal BAC to be lower than it actually was.

In agreement with anecdotal evidence, Table 1 shows that the majority of individuals view the law as only weakly enforced. Most of the individuals did not know anybody subjected to financial penalties, license suspension or prison as a result of DUI. By the same token, a majority of the subjects thought that the possibility of a drunk driver being caught or sentenced was low. Moreover, if caught and sentenced, the individuals considered that almost no driver would actually receive the proper legal punishment.

Table 2 displays indices of general prevention. Most of the individuals seemed to perceive quantities of alcohol that would take the driver above the legal limit as unsafe. In addition, more than 60% of the subjects

Table 1
Survey responses on knowledge of DUI laws and perceptions of the credibility of enforcement among a sample ($N = 2004$) of pre-driving Brazilian youth

Knowledge	
Give three answers right out of seven	87.5%
Know number of points in driver's license	78.2%
Know Brazilian legal BAC	30.4%
Know personal maximum amount of drinks to reach legal BAC	11.3%
Credibility of the law	
Do not know anybody subjected to penalties for drinking and driving	85.2%
Think that almost nobody really receive the legal punishment	73.6%
Think that the chance of being stopped by police or subjected to penalties is none or small	63.6%

Table 2
Survey responses on personal attitudes and perceptions of social controls among a sample ($N = 2004$) of pre-driving Brazilian youth

Personal attitudes	
Think three drinks or more are safe for driving	18.3%
Think no/few people driving above legal BAC are dangerous drivers	27.0%
Think that driving above legal BAC is always wrong	61.1%
Consider there is no/small chance of severe DUI accident	29.3%
Are favorable to the jail time imposed in most cases	33.3%
Are favorable to license suspension imposed in most cases	50.2%
Are favorable to financial penalties imposed in most cases	63.9%
Social controls	
No/few friends would disapprove of driving above legal BAC	44.1%
No/few friends drive after drinking above legal BAC	57.9%
Most/all groups designate a sober driver	17.0%

Table 3
Summary of multiple regression analyses: significant predictors of driving after drinking expectancies in the following year[a]

Predictor	Total sample		Subsample with DUI>Ø		Dichotomous DUI
	B	SE	B	SE	OR
Gender	−0.13*	0.05	n.s.	n.s.	n.s.
Usual alcohol consumption	0.17***	0.01	0.08**	0.02	1.78***
Maximum amount of drinks to drive safely	0.09***	0.02	0.10***	0.02	n.s
Friend's disapproval	−0.07***	0.02	−0.11***	0.03	0.88*
Friend's drinking and driving	0.15***	0.02	0.14***	0.03	1.50***
Riding with a drunk driver	0.07***	0.02	0.02***	0.02	n.s.
R^2	0.35		0.22		0.32

* $P<0.01$ ** $P<0.001$ *** $P<0.0001$. OR, Odds ratio. B = understandardized. SE = standard error.

considered driving above the legal limit as an undesirable behavior in any situation. On the other hand, subjects were divided in their support for existing penalties, with much more support given to the less 'strict' legal consequence of financial penalties and much less backing for jail time. Interestingly, over one-quarter of the sample considered that none or only few drivers with BACs above the legal limit were dangerous. Finally, a substantial minority of 30% of the subjects expressed little concern about the relationship between alcohol consumption and severe accidents.

Measures of social control indicate that, although more than 40% of the individuals report that several to all of their friends drive above the legal BAC, traditional designated driving strategies do not seem to be popular. Over one-half of the sample reported that most of their friends would disapprove of the subject's DUI, but about 16% of the subjects mentioned that none of their friends would disapprove of their driving above the legal BAC.

3.2. Regression analyses

Table 3 shows significant predictors of expectancy to drive after drinking during the following year. When analyses were performed on the total sample, expectation of driving after drinking was significantly predicted by alcohol consumption, riding experience, three general prevention indices (maximum amount to drink and drive safely, friend's disapproval, and friends DUI) and gender. None of the general deterrence measures were significant in the model.

The other two models, also shown in Table 3, yielded similar results. Alcohol consumption and the two social variables (friend's disapproval and friends DUI) were highly significant in both models. The maximum safe amount of drinks to drive was also highly significant for the multiple regression and marginally significant for the logistic regression. The main difference between the models was that riding with a drunk driver was highly significant for the multiple regression, but not significant in the logistic model.

4. Discussion

The present paper aimed to examine drinking and driving attitudes and perceptions related to general deterrence (effect of fear of punishment) and general prevention (encompassing situation, including moral attachment and socializing of preventive habits) among young people about to receive their drivers' licenses in Brazil.

Drinking and driving expectation was predicted by higher current use of alcohol, more experience riding with a drunk driver, and general prevention measures (having more friends that drive under the influence, having less friends that disapprove of DUI, considering higher amounts of alcohol intake as safe to drive). Demographics were generally not significant, with only sex contributing marginally to one of the models. Measures of general deterrence, including knowledge and credibility of the law, were not significant in any of the models tested.

The fact that alcohol use variables were significant predictors in our models is not surprising, for they are mentioned as predictors of drinking and driving behavior in virtually all studies that examine this behavior (MacDonald and Mann, 1996; Karlsson and Romelsjö, 1997). Worth discussing briefly, however, is the fact that the quantity and frequency reported by participants in the present study seemed low when compared with national data available, as well as the international literature (Galduróz et al., 1997; Finken et al., 1998; Johnston et al., 1999). This finding may be the result of at least two factors. First, the setting where the investigation was carried out may have influenced the participants to purposely lower their reported consumption levels (even though we took steps to ensure participants' confidentiality). Second, it may be related to the extremely easy access to alcohol beverages that make it easy for very young people to drink. It is possible, therefore, that the peak of alcohol consumption in Brazil may be prior to the age of 18, when individuals are still high-school students and do not have other life

responsibilities. This hypothesis is tentative and requires empirical validation. The actual reason resides probably in a combination of factors.

Social variables were highly significant in all our three regression models. In fact, perceptions of social control are particularly important measures because of their often mentioned influence on drinking and driving behavior (Turrisi and Jaccard, 1992; Gibbons et al., 1998). The trends depicted in our study seem somewhat worrisome, however, when compared with the literature (Berger and Marelich, 1997; Finken et al., 1998; Labouvie, personal communication). In fact, the evidence for weaker levels of social control on drunk driving in Brazil is consistent with the still timid acknowledgement of the topic as a public problem in the countries' policy agenda as well as the poor enforcement. It is important to keep in mind that research examining the deterrent aspects of the law has found that the law and moral values about a specific behavior affect each other in a reciprocal fashion (Andenaes, 1977). Therefore, the recent upgrading of drunk driving to a crime in Brazil may affect, particularly if appropriate educational and enforcement efforts take place, the social environment values, the individuals' moral awareness and its influence on the behavior in the long run.

Over 55% of the subjects referred to having ridden, in the prior year, with a driver that they considered had had too much to drink; almost one-quarter of those individuals doing so six or more times. In an American national survey, individuals 19–29 years old reported a much lower rate, with less than 20% of them being a passenger of a driver that had drank too much (Jones and Boyle, 1996). The relationship between riding with a drunk driver and engaging in drinking and driving is confirmed by the literature (Finken et al., 1998; Yu and Shacket, 1999) and points to the importance of including this variable when elaborating prevention programs or media campaigns. According to the new Brazilian Traffic Code, a person that allows another to drive under the influence of alcohol is subjected to penalties that include jail time, but the law is not clear concerning the individual riding with the drunk driver. Educational campaigns would benefit from a more straightforward message.

The participants' knowledge about DUI laws was low, especially considering they were taking the driver's written exam. The development by the driving schools of new manuals containing more detailed and in depth information could cover part of this knowledge gap. More importantly, however, is the fact that knowledge of the law was not a significant predictor of drinking and driving expectation. This finding may be a result of the attenuated range in knowledge scores, most individuals having answered the majority of the questions incorrectly. In addition, individuals generally perceived the possibility of being caught or suffering a punishment for alcohol-impaired driving in Brazil as very low. Therefore, the possibility of losing one's license or going to prison are not credible threats for individuals who believe that the chance of the law being enforced is small in the first place.

The fact that knowledge and credibility of the law variables were comparatively low in level and not significant predictors of expectations to drive after drinking during the following year suggests a lack of formal control towards this behavior in Brazil. Previous research investigating traffic accidents in Brazil, while recommending urgent improvement in enforcement and punishment, conveys that a result of this situation is: '… a socialization of the feeling of impunity (that) reinforces poor traffic behavior' (Vasconcellos, 1996, 1999). Although relying exclusively on simple deterrence as an efficient method for dealing with drinking and driving has long been disputed in the literature, its impact on reducing levels of engaging in the behavior is endorsed widely (Blomberg et al., 1987; Berger and Marelich, 1997; Bolen et al., 1997). On the other hand, it is a fact that even in countries, like the US, where alcohol-impaired driving enforcement is more organized, the actual probability of being caught is not high (Liu et al., 1997). Media campaigns and national coverage of law enforcement are particularly important to increase the perceived probability of being caught or suffering punishments, which is what actually influences the credibility of sanctions (Turrisi and Jaccard, 1992). Thus, it would seem critical that enforcement of the more stringent laws in Brazil is paired with mass media campaigns and news coverage in order to decrease the widespread perception of impunity and, thereby, to reduce the level of alcohol-impaired driving. Besides the campaigns, steps should also be taken in order for authorities charged with enforcing the law to do so in a proper way (e.g. not accepting bribes, not selectively focusing on groups of lower economic status).

In conclusion, among Brazilian youth about to obtain their drivers' licenses, drinking habits and general prevention indices predicted drinking and driving expectation, while general deterrence measures did not. Preventive efforts should take into account that most individuals already agree that driving above the legal limit is wrong behavior and that they are supportive of penalties towards drinking and driving behavior. However, our findings specifically suggest that the individuals' perception of law enforcement as badly flawed is probably compromising their law abiding behavior and the whole purpose of upgrading the severity of drunk driving behavior in the new Traffic Code. These aspects are of special interest because the international literature points to the efficacy of bringing together supportive social climate, educational campaigns and a combination of sanctions enforced in a certain and swift manner in order to prevent and reduce drunk

driving behavior (Ross, 1993; Deshapriya and Iwase, 1996).

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