



## Full length article

## Drivers with alcohol use disorders and their risks of crash involvement

Jie Yao<sup>a,\*</sup>, Robert B. Voas<sup>b</sup>, John H. Lacey<sup>b</sup><sup>a</sup> College of Humanities and Social Sciences, Harbin Institute of Technology (Shenzhen), Xili University Town Nanshan District, Shenzhen, Guangdong, 518055, PR China<sup>b</sup> Pacific Institute for Research and Evaluation, 11720 Beltsville Dr., Suite 900, Calverton, MD, 20705-3111, USA

## ARTICLE INFO

## Keywords:

Alcohol use disorder  
Heavy drinking  
Crash involvement

## ABSTRACT

**Background:** The relationship between driver blood alcohol concentration (BAC) and crash involvement is well understood. However, the role of alcohol use disorders (AUDs) (i.e., dependence or abuse) in crash occurrence, as distinguished from non-clinical heavy alcohol consumption, has not been adequately explored.

**Methods:** Data from the 2010–2011 Crash Risk Study conducted in Virginia Beach, VA, were used in this study. Drivers involved in crashes were compared with control drivers, and four drinker groups were examined: alcohol dependent, alcohol abusers, heavy drinkers, and all other current (i.e., normative) drinkers. Logistic regression analyses were conducted on two outcomes: having a moderate BAC ( $\geq 0.05$  g/dl), and crash involvement.

**Results:** Overall, 2411 crash-involved and 5514 control drivers provided useable data, 52.4% of which were men and 70.8% Whites. The prevalence of drivers with AUDs was lower for the crash-involved drivers (8.7%) than for the control drivers (12.7%). Only heavy drinkers, but not abusive or dependent drinkers, were over four times more likely to drive with moderate BACs at nighttime. More important, at nighttime, the odds of crash involvement for dependent drinkers were only one third of those for normative drinkers. Daytime crashes, however, were more likely to involve normative drinkers than any of the other three drinker types.

**Conclusions:** Drivers with AUDs are not more likely than normative drinkers to drive with moderate BACs at night. After accounting for the influence of BAC, dependent drinkers have a lower risk of being involved in a crash, at any time of the day.

## 1. Introduction

It is well known that alcohol impairs driving skills and endangers drivers in motor vehicle crashes across the world. Prior studies have proved that higher blood alcohol concentrations (BACs) can significantly elevate drivers' likelihood of crashing (e.g., Blomberg et al., 2009; Borkenstein et al., 1974; Moskowitz and Fiorentino, 2000; Zador et al., 2000). For drivers under the influence of alcohol (DUI) and thus at a higher risk of crash involvement, their drinking characteristics have been the focus of an ongoing debate among researchers and policy makers, i.e., whether drivers with drinking problems contribute more to crash occurrence than other types of drinkers. The answer to this question is critical for DUI policy decisions regarding the allocation of increasingly scarce resources, either to programs on “problem drinkers”, or to general deterrence programs aimed at the much larger number of drivers in the general drinking public, or both.

Among US drivers arrested for DUI, many of them were found to have alcohol-related problems (Cavaola and Wuth, 2002; Fell, 2014; Fell et al., 2010; Jones and Lacey, 2002; Lapham et al., 2004; Robertson et al., 2008). As measured in different ways across studies, such

“problem drinkers” could have characteristics like heavy and frequent alcohol consumption, life problems related to drinking, or even diagnoses of alcohol use disorders (AUDs) (i.e., alcohol abuse or dependence meeting the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition [DSM-IV] criteria). Research evidence from other countries also supports that about a third or more of the first-time DUI offenders have drinking problems including AUDs (Bergman et al., 2005; Okamura et al., 2014; Wickens et al., 2016; Zhao et al., 2017). The proportion is even higher among repeat offenders (Jones and Lacey, 2000; Perrine, 1990). Meanwhile, problem drinking was also prevalent among alcohol-impaired drivers in fatal crashes (Baker and Chen, 2001; Baker et al., 2002; Voas et al., 2006; Wundersitz and Raftery, 2017). For example, Baker et al. (2002) found that 21% to 61% of drivers in fatal crashes were “problem drinkers” among those with blood alcohol concentrations (BACs)  $\geq .15$  g/dl.

In comparison, the prevalence of alcohol problems (particularly AUDs) among the general driving public is much lower. A recent study on a national sample of weekend nighttime drivers on U.S. roads found that 14% of all current drinkers who drive could be classified as either alcohol dependent or abusive (Furr-Holden et al., 2011). Findings from

\* Corresponding author.

E-mail address: [julie\\_j\\_yao@163.com](mailto:julie_j_yao@163.com) (J. Yao).

studies in other countries are also similar, or suggest even lower proportions (Faller et al., 2012; Hubicka et al., 2007; Peltzer et al., 2010; Rio et al., 2001).

Therefore, drivers with problem drinking may seem to have a higher crash risk than normative social drinkers, as some researchers believed (Cavaioia and Wuth, 2002; Simpson et al., 1996). Other authors (e.g., Hedlund and Fell, 1995;), however, argued that “problem drinkers” only accounted for a small proportion of all fatal crashes. Largely, the lack of progress in this debate is caused by incomplete data on drinking characteristics of both drivers in crashes and not involved in crashes. To date, the risk of crash involvement for drivers with drinking problems has not been assessed through a theoretically sound study design, such as a case-control design employed in famous studies on alcohol-related crash risks (Blomberg et al., 2009; Borkenstein et al., 1974).

In order to conduct such needed research, it is first necessary to categorize drivers into different drinker types based on sound instruments. As mentioned earlier, many existing studies of drivers examined “problem drinkers” as one group, which could include drivers with heavy alcohol consumption only and those with clinical signs of AUDs instead. Such within-group variation made it impossible to distinguish the contribution to crashes of those who cannot control their drinking, from that of those with manageable heavy drinking. In fact, aggregate analyses at the state level by Voas et al. (2006) have shown an association between a state’s population of heavy drinkers or abusive drinkers (but not dependent drinkers) and the ratio of drivers in fatal crashes with high BACs ( $\geq 0.15$  g/dl). Furr-Holden et al. (2011) also found that only heavy drinking, but not alcohol abuse or dependence, were related to the presence of an illegal BAC ( $\geq 0.08$  g/dl). Therefore, it is necessary to separate drivers with AUDs from heavy drinkers, both of whom to be compared against normative drinking drivers.

Another limitation in prior research is the lack of data on drivers in non-fatal crashes. Given the challenge of making diagnoses of AUDs on fatal drivers, current understanding about drivers with AUDs will benefit from studies of drivers in crashes of all severity levels. In addition, more information on drivers at risk for crashes, matched with crash-involved drivers, is also needed for crash risk estimation. The Furr-Holden et al. study (2011) was the first one to collect AUD and heavy drinking data as well as actual BACs from drivers on the road (but not involved in crashes), followed by a similar roadside study in Brazil (Faller et al., 2012). Such detailed drinker characteristics data must be gathered from both crash-involved drivers and their comparisons, in order to quantify the relationship between drinker type and crash involvement.

### 1.1. Objectives

This study took advantage of the case-control alcohol and drug crash risk study in Virginia Beach, VA, sponsored by the National Highway Traffic Safety Administration (NHTSA) and the National Institute on Alcohol Abuse and Alcoholism (2004). It examined the BACs and crash involvement of different drinker types among drivers, as measured by the same valid and reliable instrument adopted in the Furr-Holden et al. study (2011). The first research objective was to compare the relationship between driver BACs on the road and drinker types—drinkers with alcohol dependence, drinkers with alcohol abuse, heavy drinkers, and all other current (i.e., normative) drinkers. Crash-involved and non-crash-involved drivers were examined separately. The second objective was to understand the relative crash risks of drivers with AUDs, as compared to heavy drinkers and normative drinkers, taking into account the influence of BAC.

## 2. Methods

### 2.1. The crash risk study procedures

The crash risk study collected data from more than 3000 crash-

**Table 1**  
Attempts to collect data from crash-involved drivers in hospitals, fatalities, in jail/arrested, and hit-and-runs.

Crash-Involved Drivers		
Drivers transported to hospital	729	
Eligible	393	
Consented (percentage of eligible)	362	92.1%
Fatalities	18	
Drivers transported to jail/arrested	205	
Eligible	120	
Consented (percentage of eligible)	109	90.8%
Hit and run	84	
Hit and run (caught)	42	
Eligible	27	
Consented (percentage of eligible)	24	88.9%

involved drivers and 6000 control drivers (i.e., drivers not involved in a crash) in Virginia Beach, VA, over a 20-month period (2010–2011). A more detailed description of the methodology is available from NHTSA (Compton and Berning, 2015; Lacey et al., 2016). Research teams responded 24 h a day, 7 days a week to crashes that were reported to the police. They travelled to crash sites to interview and collect biological samples (i.e., breath, oral fluid, or blood samples) from crash-involved drivers. Procedures were also developed for collecting data from drivers who were more seriously injured or who died and were transported to a hospital or morgue and those who were arrested for DUI and taken to a police station, as well as hit-and-runs. Overall, 33.6% of the crashes involved an injury (N = 886) or fatality (N = 15). Distributions of drivers in hospitals, fatalities, in jail/arrested, and hit-and-runs are displayed in Table 1. For comparison with each crash-involved driver who provided data for the study, the team returned to the crash site one week after each crash to randomly select and interview two non-crash-involved drivers on the same day of the week, at the same time of day, and in the same direction of travel as the original crash. Breath samples were used for measuring BACs for most of the drivers. BACs of those who did not provide breath samples were determined by oral fluid and/or blood samples, if provided. The procedures for the study were approved by the Pacific Institute for Research and Evaluation’s Institutional Review Board.

### 2.2. Administration of the AUD survey

Respondents who completed a general survey questionnaire were offered a \$10 incentive to provide an oral fluid sample, and an additional \$5 incentive to complete the 15-item AUD questionnaire while the oral fluid sample was collected. Only participants who were current drinkers and reported consuming alcohol in the past year were eligible for the AUD survey. The instrument combined the Alcohol Use Disorders Identification Test (AUDIT) consumption scale that measures heavy alcohol consumption, and the Alcohol Use Disorder and Associated Disabilities Interview Schedule (AUDADIS) instrument that diagnoses alcohol abuse and dependence. It should be noted that we used the AUDIT only to screen for non-clinical heavy drinking but not clinical AUDs, the latter being diagnosed by the AUDADIS instead. Both instruments have been proven to have high construct and criterion validity and test-retest reliability (Allen et al., 1997; Babor et al., 1992; Üstün et al., 1997). The details of the scales and categorization of drinkers are borrowed from the Furr-Holden et al. (2011) article as in Table 2 and explained below.

#### 2.2.1. The AUDIT

The 10-item AUDIT has a brief three-item consumption scale (AUDIT-C) that is approximately equal in accuracy to the full AUDIT (Reinert and Allen, 2007).

##### 2.2.1.1. Heavy drinkers. The first three items on our survey instrument

Download English Version:

<https://daneshyari.com/en/article/7503369>

Download Persian Version:

<https://daneshyari.com/article/7503369>

[Daneshyari.com](https://daneshyari.com)