

RELATIONSHIPS BETWEEN DRINKING PROBLEMS AND DRINKING LOCATIONS AMONG CONVICTED DRINKING DRIVERS

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ABSTRACT

This study examines relationships between drinking problems and the frequency of drinking in eight types of places within a sample of convicted drinking drivers. Drinking problems were measured by two instruments, the Mortimer-Filkins Questionnaire (MFQ) and the Alcohol Use Disorders Identification Test (AUDIT) Core Questionnaire. Data were collected from convicted drinking drivers who were ordered by the court to attend the Mississippi Alcohol Safety Education Program (MASEP). Both the MFQ and the AUDIT were found to be more strongly related to the frequency of drinking in moving automobiles than to the frequency of drinking in any other type of place. This suggests that drinking drivers with severe drinking problems are more likely to drink in moving automobiles than are those with less severe problems. The strong linkage between severe alcohol problems and drinking in automobiles has important implications with respect to highway safety.

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For 20 years, organizations such as Mothers Against Drunk Driving (MADD) have been trying to change public attitudes toward drinking and driving—to convince the public that drinking and driving is unacceptable behavior. These efforts, along with other driving under the influence (DUI) countermeasures such as more stringent enforcement and tougher sanctions, have resulted in a decline in the proportion of highway fatalities in the United States that are alcohol related—from 57% in 1982 to 38% in 1998 (1). Despite this impressive improvement, drinking and driving remains a very serious public safety problem in the United States. It may be that the easy gains with respect to reducing alcohol-related fatalities have already been made as a result of our efforts over the past 20 years and that changing the behaviors of the smaller proportion of our population that continues to drink and drive might be more difficult. It is likely that many of these people constitute what has been referred to as the “hard-core drinking driver” (2), that is, those with antisocial personality traits and/or very serious drinking problems.

Snow and Anderson (3) pointed out that a comprehensive understanding of the drinking driving problem cannot be limited to the drinking aspects of the problem, but must address issues related to driving as well. A better understanding of the sequencing of alcohol consumption and driving, including where high-risk drivers drink, would be useful in the development of countermeasures that target the hard-core group. For example, recent analyses have suggested that remedial interventions—especially those combining psychotherapy, education, and follow-up—can reduce recidivism and crashes, even for relatively high-risk drivers (4). Development of DUI avoidance plans is usually an important feature of these interventions. Recent research suggests that most arrested offenders acknowledge that their drinking and their drinking driving behaviors need to be changed, but they also believe that they are taking appropriate steps to change those behaviors even at entry into intervention (5, 6). Their plans, however, are often unrealistic and fail to account for factors that could influence relapse and recidivism, such as drinking in locations that are likely to require driving. The development of more effective and realistic plans for avoiding future DUI behavior, as well as other DUI countermeasures, would be enhanced by identification of high-risk drinking locations (i.e., those that are likely to involve driving) that are frequented by high-risk drinking drivers (i.e., those with severe drinking problems).

Previous research related to such issues includes the literature on drinking contexts, much of which has focused on how factors such as the decor, lighting, entertainment, and the like of drinking places influence drinking rates and the

amount of alcohol consumed (e.g., 7, 8); a few studies have focused on drinking locations or types of drinking places among DUI offenders (9–13). This body of literature suggests that there are linkages between drinking problems and certain types of drinking places, but well-validated screening instruments have not been used to measure relationships between alcohol problems and drinking places.

The present study examined, within a sample of convicted Mississippi DUI offenders, relationships between the frequency of drinking in eight types of places and alcohol problems as measured by two thoroughly tested problem drinker screening instruments. The objective was to identify those types of drinking places most strongly linked to alcohol abuse or drinking problems.

ALCOHOL ABUSE SCREENING INSTRUMENTS

Over the years, numerous screening instruments have been developed for the purpose of identifying people with alcohol problems. Among the most widely used are the Michigan Alcoholism Screening Test (MAST) (14), the CAGE (15), the MacAndrew Scale of the Minnesota Multiphasic Personality Inventory (MMPI) (16), and the Alcohol Use Inventory (AUI) (17).

The present study used two instruments that employ very different methods to identify problem drinkers. The first is the Mortimer-Filkins Questionnaire (MFQ), which was developed by researchers at the Highway Safety Research Institute at the University of Michigan for the National Highway Traffic Safety Administration (18). (The full Mortimer-Filkins Test is composed of a questionnaire and an interview that are used together to calculate a total Mortimer-Filkins score. Only the questionnaire component was used in the present analysis.) The Mortimer-Filkins was designed specifically to identify problem drinkers among DUI offenders and therefore has been widely used in DUI education and treatment programs.

The MFQ contains 54 scored questions, 4 nonscored questions, and a rather complicated scoring procedure. For the most part, the test uses indirect means to identify problem drinkers. That is, most of the questions address issues that are highly correlated with problem drinking rather than direct questions about the use of alcohol. Only 9 questions are directly related to drinking. This makes it more difficult for a DUI offender to know why a particular question is being asked; therefore, it is more difficult to disguise a drinking problem. The test has been found to be highly stable and a reliable tool for the detection of problem drinkers (19, 20), and recent analyses have shown it to be a reasonable instrument for identification of DUI offenders at elevated risk of DUI recidivism (21).

The second instrument used in this study is the Alcohol Use Disorders Identification Test (AUDIT) Core Questionnaire, which was developed by a re-

search group affiliated with the World Health Organization (22, 23). The goal of this research group was to develop a brief screening method capable of identifying early-stage problem drinkers, as well as alcoholics, that could be easily incorporated into a general health inventory by physicians or other health care workers. In contrast to the MFQ, the AUDIT is a short, simple, straightforward measure. It consists of 10 questions, all of which are directly related to drinking. The AUDIT has been found to be superior to the MAST in identifying persons with current alcohol problems (24, 25) and has become a widely used screening instrument in general medical settings in both developed and developing countries (26–30).

METHOD

Data were collected from convicted DUI offenders who attended selected Mississippi Alcohol Safety Education Program (MASEP) schools between January 1996 and February 1999. MASEP is the statewide intervention/rehabilitation program for first-offender DUIs. Mississippi law requires all convicted first-time DUI offenders to attend MASEP. As part of the program, all MASEP participants are required to complete the MASEP Registration/Intake Form. This is a machine-scored instrument that contains the MFQ and collects information on socio-demographic characteristics. A paper-and-pencil questionnaire was also administered that contained the AUDIT and asked questions about the frequency of drinking in various types of places.

During the data collection period, 5512 DUI offenders gave written informed consent to allow the data collected by these two instruments to be used for research purposes. The sociodemographic characteristics of these offenders were as follows: (a) race 64.4% white, 33.9% black, 1.7% other races; (b) gender 85.8% male, 14.2% female; (c) age mean 35.4 years (± 12.6), median 34 years; (d) education mean 11.8 years (± 2.5), median 12 years. Low reading skills among some offenders resulted in a considerable amount of missing data, especially with regard to scores on the two screening instruments. Valid MFQ scores were available for 4963 of the offenders (90.0%), and valid AUDIT scores were available for 5133 offenders (93.1%). MFQ scores ranged from -6 to $+48$ (mean 18.6 ± 8.4 , median 18), and AUDIT scores ranged from 0 to 40 (mean 10.0 ± 6.5 , median 9). A correlation coefficient of 0.4323 was found between the MFQ scores and the AUDIT scores ($N = 4653$, $p < .001$).

Statistics on the offenders' frequency of drinking in eight types of places are shown in Table 1. The respondents indicated that they drink most frequently in their own homes and outdoors and least frequently in parking lots or parked cars. Relatively strong intercorrelations exist among the eight types of places (i.e., bivariate correlation coefficients ranged from 0.1372 to 0.5469), reflecting

Table 1. Frequency of Drinking in Types of Places

Types of Drinking Places	Mean Frequency Score ^a	Standard Deviation	At Least Once a Week ^b (%)	<i>N</i>
Own home	3.844	1.515	46.3	5485
Outdoors	3.569	1.440	32.4	5454
Someone else's home	3.237	1.362	18.7	5467
At a party	3.009	1.290	13.4	5425
Bar, lounge, or tavern	2.929	1.490	18.0	5451
While riding in or driving a car	2.805	1.462	15.9	5435
Restaurant	2.194	1.312	5.1	5431
Parking lot or parked car	1.786	1.269	6.1	5455

^a Mean score on the following six-point scale: 1 = never; 2 = less than once a year; 3 = not every month, but at least once a year; 4 = not every week, but at least once a month; 5 = not every day, but at least once a week; 6 = every day.

^b Percentage who specified 5 or 6 on the above scale.

the obvious relationship between overall drinking frequency and the frequency of drinking in various places. Multiple regression analysis was used to control for these interrelationships to identify more accurately the linkages between alcohol problems and drinking places. Race, age, gender, and education were also included in the regression analyses to control for the possible confounding effects of sociodemographic characteristics. Since the data set contained a significant amount of missing data, separate analyses were conducted for the MFQ and the AUDIT to ensure that identified relationships were based on the maximum number of cases available.

RESULTS

Of the 12 variables used to predict the offenders' MFQ scores, the strongest predictors were (a) education, (b) the frequency of drinking while riding in or driving a car, (c) frequency of drinking in a parking lot or parked car, and (d) frequency of drinking in a restaurant (Table 2). The negative relationship found between MFQ score and education is consistent with previous MASEP studies that found DUI offenders with higher levels of education tend to receive lower Mortimer-Filkins scores (31). The relationship with restaurants is also negative, indicating that DUI offenders with high MFQ scores drink in restaurants less often than those with lower scores. On the other hand, the results suggest that DUI offenders who score high on the MFQ are more likely than others to drink in automobiles—especially moving automobiles.

Table 2. Multiple Regression: Dependent Variable = Mortimer-Filkins Questionnaire Score ($N = 4157$)

Predictor Variables	Zero-Order Correlation Coefficients	Standardized Regression Coefficients	Unique Variance ^a	<i>t</i>
Sociodemographic variables				
Race ^b	-.0099	.0334	.0012	2.143
Age	.0392	.0460	.0014	2.775
Gender ^c	-.0317	.0145	.0007	0.964
Education	-.1890	-.1644	.0242	-10.469 ^d
Types of drinking places				
Own home	.0830	.0152	.0003	0.851
Someone else's home	.0895	.0145	.0000	0.730
Bar, lounge, tavern	.0144	.0128	.0000	0.679
Restaurant	-.0628	-.0877	.0061	-4.671 ^d
Party	.0301	-.0343	.0016	-1.667
While riding in or driving a car	.2157	.1641	.0169	8.671 ^d
Parking lot or parked car	.1916	.1181	.0103	6.983 ^d
Outdoors	.1612	.0575	.0018	2.862
$R = 0.3265$				
$R^2 = 0.1066$				
Adjusted $R^2 = 0.1040$				
$F = 41.206^d$				
$df = 12/4144$				
R^2 added by sociodemographic variables = 0.0297 ^e				
R^2 added by types of drinking places = 0.0701 ^f				

^a The variance contributed by a particular predictor variable after all other predictor variables are entered into the regression equation (i.e., the change in R^2 accounted for by a variable when it is entered last).

^b Non-white = 0; white = 1.

^c Male = 0; female = 1.

^d $p < .0001$.

^e The increase in R^2 contributed by race, age, gender, and education after controlling for the frequency of drinking in the eight types of places.

^f The increase in R^2 contributed by the frequency of drinking in the eight types of places after controlling for race, age, gender, and education.

The variables that best predicted the offenders' scores on the AUDIT were (a) the frequency of drinking while riding in or driving a car, (b) race, (c) frequency of drinking in a parking lot or parked car, (d) frequency of drinking at home, and (e) frequency of drinking outdoors (Table 3). The relationship with race indicates that whites tended to receive higher AUDIT scores than non-whites. Frequency of drinking in a moving car was by far the strongest predictor

Table 3. Multiple Regression: Dependent Variable = AUDIT Score (*N* = 4266)

Predictor Variables	Zero-Order Correlation Coefficients	Standardized Regression Coefficients	Unique Variance ^a	<i>t</i>
Sociodemographic variables				
Race ^b	.1685	.1546	.0209	10.957 ^c
Age	-.1201	-.0391	.0005	-2.596
Gender ^d	-.0206	.0155	.0008	1.150
Education	.0284	-.0302	.0029	-2.109
Types of drinking places				
Own home	.2389	.1058	.0075	6.788 ^c
Someone else's home	.3053	.0675	.0039	3.921
Bar, lounge, tavern	.1967	.0145	.0000	0.872
Restaurant	.1897	.0089	.0000	0.531
Party	.2218	-.0229	.0008	-1.274
While riding in or driving a car	.4328	.2552	.0416	15.293 ^c
Parking lot or parked car	.3220	.1536	.0181	10.197 ^c
Outdoors	.3323	.0799	.0043	4.589 ^c
<i>R</i> = 0.5112				
<i>R</i> ² = 0.2613				
Adjusted <i>R</i> ² = 0.2593				
<i>F</i> = 125.393 ^c				
<i>df</i> = 12/4253				
<i>R</i> ² added by sociodemographic variables = 0.0270 ^e				
<i>R</i> ² added by types of drinking places = 0.2226 ^f				

^a The variance contributed by a particular predictor variable after all other predictor variables are entered into the regression equation (i.e., the change in *R*² accounted for by a variable when it is entered last).

^b Non-white = 0; white = 1.

^c *p* < .0001.

^d Male = 0; female = 1.

^e The increase in *R*² contributed by race, age, gender, and education after controlling for the frequency of drinking in the eight types of places.

^f The increase in *R*² contributed by the frequency of drinking in the eight types of places after controlling for race, age, gender, and education.

of scores on the AUDIT. These results suggest a strong linkage between alcohol problems and drinking in automobiles.

DISCUSSION

This study used two thoroughly validated problem drinker screening instruments, the MFQ and the AUDIT, to examine linkages between drinking problems and drinking locations. The analysis found only a moderate correlation between the two measures ($r = 0.4323$), but other studies have also found relatively low correlations among the scores of various alcohol abuse screening instruments (32). Barry and Fleming (25) found a correlation of only 0.25 between the AUDIT and the SMAST-13. It is likely that alcohol abuse is not a unitary concept, and that different instruments measure different aspects of alcohol abuse.

The two instruments used in this study employ very different methods to identify problem drinking. Nevertheless, both of these measures were more strongly related to the frequency of drinking in moving automobiles than to any of the other types of places examined. Both measures were also related to drinking in parked cars or parking lots, but in the multiple regression analyses, no significant positive relationships were found between either measure and the frequency of drinking in public establishments such as bars, lounges, taverns, or restaurants.

In a study in Perth, Australia, Lang and Stockwell (9) found that drinking drivers who had their last drink in an unlicensed drinking location such as a private residence or a public park had a higher probability of being involved in a traffic accident than those who had their last drink at a licensed establishment such as a hotel, tavern, nightclub, or restaurant. A study in western New York State found that DUI offenders who drank at more than one location prior to their arrest had more severe alcohol problems than those who confined their drinking to a single location (13). A previous study in Mississippi found that the self-reported frequency of drunkenness among DUI offenders was more strongly linked to drinking in cars than to any other type of place (11).

These studies suggest that many people with serious alcohol problems, and perhaps those most at risk of involvement in a traffic crash, may be highly mobile while drinking—moving from place to place and drinking while driving or riding in a car. There has been very little research on this aspect of the DUI problem. Much more attention has been paid to drinking in licensed establishments. Such establishments have also been the targets of various DUI countermeasures. DUI law enforcement is often more intense in areas near bars and nightclubs. Such establishments have been the focus of server intervention programs that train bartenders to identify and refuse service to intoxicated persons; in some places, laws have been passed that allow prosecution of establishments that serve intoxicated patrons. Such efforts may have reduced the frequency of drinking in licensed establishments. In 1982, 27.0% of MASEP participants reported that they

drank in a bar or lounge at least once a week (11, p. 392). In the current study, only 18.0% reported drinking in bars, lounges, or taverns this often (Table 1). Lang and Stockwell (9) reported that the Australian liquor industry claims random breath testing resulted in a dramatic decrease in licensed establishment patronage.

Further progress in reducing alcohol-related fatalities may be more difficult to achieve among people who drink in unlicensed places, particularly in automobiles. The frequency of drinking in automobiles among DUI offenders in 1982 (11) was virtually identical to that found in the current study. Previous studies suggest that people who drink in automobiles may be more likely than others to drink for “escapism” reasons (12), to choose a drinking location where they can be alone (3), and to be at higher risk of accident involvement (33). Such research suggests that the automobile may be an important drinking location for the hard-core drinking driver. About 16% of the offenders in this study reported drinking in a moving automobile at least once a week—nearly as many as reported drinking in bars this often (Table 1).

It may be that the strong linkage between alcohol problems and drinking in automobiles is found because people with severe alcohol problems tend to drink anywhere and everywhere, including automobiles, while those who do not have alcohol problems may not drink in cars. Whatever the reason, from a highway safety perspective, a moving automobile would seem to be an especially inappropriate place to drink.

Several implications are suggested by these findings. The association between alcohol problems and drinking in automobiles needs to be considered explicitly in the development of interventions such as DUI avoidance plans, treatment approaches, and conditions for probation. Such countermeasures need to focus more attention on better ways to separate driving and alcohol consumption. For example, the findings suggest that people with severe alcohol problems may consume a significant amount of alcohol *after* driving has been initiated. This has significant implications for countermeasures that employ interlock devices to prevent the automobile from starting if the driver has been drinking (34) and suggests that more attention needs to be devoted to finding ways to prevent the driver from drinking after the car has started. The findings also suggest the need for vigorous enforcement of open container laws to reduce in-car consumption of alcohol. Such enforcement may be an appropriate way to target the hard-core drinking driver (2).

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