Predictors of Impaired Driving

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1. Introduction

There continues to be great interest in developing methods for the early detection of persons at increased risk of driving after drinking alcohol. Although certain demographic characteristics, such as sex and age, are useful in the effort to predict which individuals are more likely to engage in this risky behavior, demographic characteristics alone do not allow very precise prediction. Several studies during the past decade have attempted to obtain additional information of a more psychological nature that would add to the precision with which drinking-driving behavior can be predicted (Anderson, Perrine, Meyers, & Fortini, in press; Fortini & Perrine, 1990; Jonah & Wilson, 1986; Perrine, 1989, 1990; Wilson, 1992). One of the more extensive studies found that amount of alcohol consumed during the past seven days was, by far, the strongest predictor of having received a traffic citation for driving under the influence (Jonah & Wilson, 1986).

Most research on drinking drivers, including that designed to identify risk factors, relies on data obtained from either of two sources: (1) Official statistics based on information obtained about persons involved in fatal crashes, or those who have been convicted for driving under the influence (DUI), or (2) Self-report surveys of the general driving population or of convicted DUI offenders. The former typically involve a minimum of demographic information and little if any sociopsychological data; they also represent only those persons who, for some reason, have come to the attention of the legal or medical community. Self-report surveys, although able to obtain an abundance of information from a representative sample of the population, often are unable to obtain any objective indicator of impaired driving. For a recent review, see Perrine (1990).

In order to extend what has been learned from earlier studies, we used information obtained from both extensive personal interviews and 15-minute telephone interviews, in conjunction with measured breath alcohol concentration (BAC) obtained from these same respondents in nocturnal roadside surveys.
2. Method

2.1 Roadside Survey. Between May and October of 1990 and 1991, voluntary roadside interviews were conducted on Friday and Saturday nights in a four-county region of northeastern Ohio. Between the hours of 10 p.m. and 3 a.m., vehicles were sampled from the traffic stream in an essentially random fashion, and their drivers were briefly interviewed while seated in their vehicles. At the conclusion of the interview, a breath sample was obtained using a passive alcohol sensor. For persons who produced a positive reading for alcohol and a 6% random sample of persons who registered no alcohol, a second measurement was taken with a hand-held evidential-quality device (Alco-Sensor III). Following the collection of some additional data from persons in this group, individuals were recruited to participate in a subsequent interview. For more detailed description of research procedures during the roadside surveys, see Perrine, Foss, Voas, and Meyers (in press) and Meyers, Perrine, and Foss (in press).

2.2 Telephone Survey. During 1990, a 4.5% sample of drivers interviewed and breath tested in the roadside survey participated in a subsequent telephone interview (N = 282), allowing the collection of more extensive data than has previously been available from roadside survey participants. These interviews were conducted by trained staff using a Computer Aided Telephone Interviewing (CATI) system.

For participation in the follow-up interview, individuals were disproportionately sampled from the full spectrum of BACs detected at the roadside: 44% had BACs below 50 mg/dl, 27% were between 50 and 99 mg/dl, and 29% were at or above the legal limit in Ohio (100 mg/dl).

2.3 Personal Interviews. During 1991, a similar 4.7% sample of roadside survey respondents (N=352) participated in extensive personal interviews that lasted approximately 90 minutes. These interviews were conducted by trained interviewers using an automated questionnaire (the Health Attitudes and Practices [HAP] Survey) implemented on laptop computers. Interviews were conducted either in the Ohio office of the Vermont Alcohol Research Center, or at a location more convenient to respondents (such as a local church or public library) where privacy and confidentiality of responses could be assured.

Drivers were sampled in the same fashion as during 1990, and the BAC distribution of participants was quite similar: 40% had BACs below 50 mg/dl, 29% were between 50 and 99 mg/dl, and the remaining 32% were at or above 100 mg/dl.

Data for all completed interviews were merged with the roadside survey data, enabling us to examine a number of variables as predictors of drinking-driving behavior from a representative sample of the nighttime driving population. Although
the majority of the telephone interview questions were similar to items in the more extensive personal interview questionnaire, wording and response options often had been modified to make the questions suitable for telephone interviewing. Hence, data from the two sets of interviews are presented separately.

3. Results

3.1 Telephone Interviews. For purposes of the present analysis, the BAC distribution was divided into two groups: Drivers with BACs at or above 50 mg/dl when contacted at the roadside, and those with BACs below 50 mg/dl. That is, impaired driving is operationalized in the present study as having been driving on a public roadway with a BAC of 50 mg/dl or greater, an alcohol concentration that is generally considered to produce measurable impairment in a variety of functions central to the driving task.

Table 1 summarizes variables that were found to predict whether the respondent had a BAC above or below 50 mg/dl at the time of the roadside interview. Persons whose measured BAC was 50 mg/dl or higher indicated both that they drink somewhat more and are able to tolerate the effects of alcohol better than their friends. They were more likely to have had their driver’s license suspended and to have received more traffic citations than persons with lower BACs. Although neither their incomes nor employment status differed, they were more likely to assess their financial situation during the past year as having been poorer than persons with lower BACs. The vast majority of respondents (89%) were employed. Among the small number of unemployed drivers interviewed, BACs were more likely to have been below 50 mg/dl than among employed respondents (44% vs. 60%, p < .10).

Drivers with varying BACs at the roadside did not differ in terms of religion, marital status, education, or job satisfaction, nor did they differ in early exposure to alcohol by having parents who drank, by beginning to drink at an earlier age themselves, or by drinking excessively before age 21. Males were somewhat more likely than females to have had BACs above 50 mg/dl, but this difference is not statistically significant. Divorced persons were more likely to have higher BACs than married or single respondents, though again not significantly so.
### Table 1

Variables that predict having driven with BAC at or above 50 mg/dl

<table>
<thead>
<tr>
<th>Variable</th>
<th>Test Statistic</th>
<th>Prob.</th>
</tr>
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<tbody>
<tr>
<td>Typical number of drinks at one sitting</td>
<td>$\chi^2 = 13.74$</td>
<td>&lt; .005</td>
</tr>
<tr>
<td>Number of times drink per week†</td>
<td>$\chi^2 = 9.13$</td>
<td>&lt; .05</td>
</tr>
<tr>
<td>How often get very intoxicated when drinking†</td>
<td>$\chi^2 = 25.18$</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Amount of drinking compared to friends‡</td>
<td>$\chi^2 = 5.91$</td>
<td>&lt; .06</td>
</tr>
<tr>
<td>Amount of beer can drink, still drive safely†</td>
<td>$\chi^2 = 11.73$</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>How well drive after drinking usual amount</td>
<td>$\chi^2 = 8.22$</td>
<td>&lt; .005</td>
</tr>
<tr>
<td>Perceived seriousness of drinking-driving problem</td>
<td>$\chi^2 = 7.02$</td>
<td>&lt; .05</td>
</tr>
<tr>
<td>Perceived appropriateness of DUI laws</td>
<td>$\chi^2 = 16.09$</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Number traffic citations, past year</td>
<td>$t = 2.37$</td>
<td>&lt; .05</td>
</tr>
<tr>
<td>Driver’s license ever suspended</td>
<td>$\chi^2 = 4.49$</td>
<td>&lt; .05</td>
</tr>
<tr>
<td>Subjective rating of financial condition</td>
<td>$t = 2.22$</td>
<td>&lt; .05</td>
</tr>
</tbody>
</table>

† These questions were asked only during the personal interviews.
‡ Finding from telephone interview reported. Similar result from personal interviews.

3.2 **Personal Interviews.** The number of bottles of beer the driver believed he/she could drink and still drive safely was strongly related to having a BAC in excess of 50 mg/dl ($p < .001$), as was the reported proportion of the time the driver gets very intoxicated when he/she drinks ($p < .001$). Drivers whose BACs were above 50 mg/dl also reported that they drink more than their friends ($p < .0001$). Although perceived ability to drive safely after drinking was found to predict BAC during the 1990 survey, no significant difference in perceived ability to drive safely after drinking a typical amount was found between 1991 drivers above and below 50 mg/dl. Further, sex, income, education, job satisfaction, and number of lifetime driving citations did not differ between persons with BACs above or below 50 mg/dl.
4. Discussion

The results presented here are based on preliminary analyses of this extremely rich data set. It has only been possible to consider a small number of the more obvious variables as potential predictors of impaired driving. Subsequent analyses will undertake a more sophisticated examination of the data, using multivariate techniques to search for complex combinations of multiple variables that may predict driving after drinking. These future analyses will benefit from the availability of an additional set of personal interview data currently being collected during the third roadside survey season (1992).

Despite the preliminary nature of the present findings, it is clear that heavy drinking behavior is a predictor of driving with an elevated BAC. This relation confirms the findings of earlier studies that did not have the advantage of being able to examine a representative sample of drivers actually using the roadways, i.e., those who had not necessarily come to attention of the authorities by virtue of a crash or arrest.

Not surprisingly, drivers whose BACs were above 50 mg/dl at the roadside survey site were less inclined to think that DUI laws are not strict enough. In addition, persons who rated their financial condition better during the past year were more, rather than less, likely to have BACs in excess of 50 mg/dl. In a somewhat unexpected finding, a number of conditions that might be expected to give rise to the abuse of alcohol were unrelated to measured BAC.

Several variables point to drinking pattern as a consistent and often strong predictor of having an elevated BAC when interviewed at the roadside. In particular, an elevated BAC was predicted by drinking frequently, drinking greater amounts, and getting intoxicated more often when drinking. These drinking characteristics were accompanied by a perception of being a heavier drinker than one’s friends, compared to those with lower BACs. Motorists with higher BACs also believed that their driving was less affected by alcohol. They were more likely to believe that they could drive as well after drinking as before, and that they could drink greater amounts of beer (but not wine or liquor) and still drive safely. Finally, in a predictably self-serving fashion, motorists whose BACs were above 50 mg/dl believe both that drinking and driving was less serious a problem, and that DUI laws are too strict.

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5. References


