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AN EXPLORATORY STUDY OF YOUNG CONVICTED DRINKING DRIVERS: PRELIMINARY IDENTIFICATION OF PROBLEM DRINKERS WITH IMPLICATIONS FOR REEDUCATION

Michigan State University PH.D. 1985

AN EXPLORATORY STUDY OF YOUNG CONVICTED DRINKING DRIVERS: PRELIMINARY IDENTIFICATION OF PROBLEM DRINKERS WITH IMPLICATIONS FOR REEDUCATION

By

Frank Peter Ciloski

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ABSTRACT

AN EXPLORATORY STUDY OF YOUNG CONVICTED DRINKING DRIVERS: PRELIMINARY IDENTIFICATION OF PROBLEM DRINKERS WITH IMPLICATIONS FOR REEDUCATION

By

Frank Peter Ciloski

Statement of the Problem

As of April 1, 1983, Michigan statutes (MCLA 257.625) requires the assessment of all individuals convicted of operating under the influence of intoxicating liquor (OUIL) in order to identify the level of alcohol-related problems in the individual by approved personnel. This assessment process requires a lengthy time period for both the assessor and the individual. A search for a cost-effective means to reduce this time period is essential.

The purpose of this study was to determine the feasibility of establishing a prediction model by use of regression analysis of the pre-selected descriptive variables which provides significant predictability of problem behavior to be cost effective in its application. Additionally, this study may provide information on the characteristics of young OUIL offenders which may have application to the reeducation of these offenders to prevent subsequent similar violations or enhance intervention techniques prior to

initial violations. The pre-selected variables used in this study were: the global score on the Mortimer-Filkins Test which acted as the dependent variable with respect to the independent variables 1) age; 2) blood alcohol concentration; 3) number of alcohol drinking years; 4) alcohol drinking days in the previous thirty days prior to assessment; 5) moving violations; 6) alcohol-related violations; 7) reckless driving violations; and 8) reported motor vehicle accidents.

Description of the Methods, Techniques and Data Used

Data on a selected sample of 126 young (ages 25 or less) convicted OUIL offenders was obtained from the Michigan 54th B district Court, East Lansing, Michigan who met qualifications for inclusion in the sample.

The data were arranged, interpreted, and coded for analysis. For the purposes of statistical analysis the global score on the Mortimer-Filkins Test acted as dependent variable while the remaining data acted as the independent variable.

The following analysis of the data were conducted:

1. An analysis of variance for the differences of mean scores for the independent variables and level of problem classification.

2. The relationship of the dependent variable to each of the eight independent variables.

3. A multiple linear regression analysis of the dependent variable to the eight independent variables.

The Major Findings

The findings of this study are many. A limited number of these findings follows:

A significant difference in the mean scores for the independent variables motor vehicle accidents, alcohol-related violations, number of alcohol drinking days in the previous thirty days prior to assessment existed for the level of problem classification.

A significant relationship existed between the dependent variable and these independent variables: motor vehicle accidents, alcohol-related violations, age, number of alcohol drinking years, and alcohol drinking days in the previous thirty days prior to assessment.

A prediction model for the dependent variable was derived using the following independent variables: Motor vehicle accidents, Alcohol-related violations, Age, and Number of alcohol drinking years.

Blood alcohol concentration at the time of arrest did not significantly influence the dependent variable, nor was there a significant relationship with any of the other variables.

Previous descriptive behaviors are related to the global score on the Mortimer-Filkins Test.

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Chapter I

Introduction

Each year young drivers under age twenty five are over represented in traffic fatalities, and all too often alcohol drinking is a suspected related cause. While this group represents 22 percent of the licensed drivers, they account for 38 percent of all fatal accidents.[1] If the percent of vehicle miles traveled is paired with the percent of alcohol involved accidents for this age group, the statistics reveal that drivers under age twenty-five account for nearly 20 percent of the vehicle miles and slightly more than 42 percent of the alcohol involved accidents. The phenomenon is often explained as the young person's inexperience with driving and a concurrent inexperience with drinking alcohol.

Since alcohol involved accidents are investigated ex post facto, any supposition about the role of alcohol in traffic accidents remain hypothetical. However, this need not be a deterrent to the development of early identification-prevention models directed at "high-risk" young drivers. At present there is a clear need for assessment processes which aid in the reliable identification of high-risk drivers likely to continue to have problems controlling alcohol use as it impacts on highway traffic safety.

As of April 1, 1983, the State of Michigan revised the statues pertaining to operationg under the influence of intoxicating liquor (OUIL). An important change in the

structure of the law was the mandating of a pre-sentencing assessment of all individuals convicted of OUIL. The purpose of the assessment is to establish the degree of alcohol-related problems with the offender. Assessments are conducted by state approved agencies only, typically court probation offices or substance abuse agencies. These agencies have been instructed by the Michigan Department of Public Health's Office of Substance Abuse Services to utilize an approved assessment protocol in making a determination of alcohol-related problems. One such approved protocol is the Mortimer-Filkins Test.[2]

The Mortimer-Filkins Test has been recommended because of its high degree of reliability and validity. The authors of the Mortimer-Filkins Test reported a reliability coefficient of 0.98 and a validity coefficient of 0.92. Additionally, they reported that 98.5 percent of the alcoholics, but no more than 1.5 percent of the non-alcoholics would be identified as problem drinkers by use of their cut-off score.[3] Other studies have likewise reported on the efficiency, reliability, and validity of the Mortimer-Filkins Test in identifying alcohol-related problems, and for this reason the Mortimer-Filkins Test was the criterion measure of this study.[4]

Two limitations of the Mortimer-Filkins Test are the amount of time required to complete the assessment by the assessment officer, and the test may discriminate less sharply among younger offenders. With this in mind, a search for selected variables that are readily available

to assessment personnel and related to problem drinking among younger OUIL offenders is necessary. For this purpose a review of the literature yielded eight (8) descriptive variables which could be appropriately used to assess problem drinking in these young offenders. They are:

1) Age
2) Blood Alcohol Concentration at the Time of Arrest
3) Moving Violations
4) Alcohol Related Violations
5) Reckless Driving Violations
6) Reported Motor Vehicle Accidents
7) Reported Number of Alcohol Drinking Years
8) Reported Number of Drinking Days in the Previous Thirty (30) Days Prior to Assessment.

Numerous authors have identified the first six variables: age, blood alcohol concentration, and the driving record elements (moving violations, alcohol-related violations, reckless driving violations, and accidents) as being appropriate to the evaluation of drinking drivers.[5] The remaining two variables are by nature the result of self-reported data from the individual drinking driver. The reliability of self-reported data has been discussed by McKnight, as well as by Wendling and Kolody, who found it invaluable to their work on the impact of alcohol use on highway traffic safety.[6] In addition, the importance of when individual alcohol drinking begins as a factor in determining problem drinking has been established by several researchers.[7] The relationship of quantity-frequency to problem drinking has likewise been

established by numerous authors.[8] Thus all pre-selected variables have been utilized in other research studies; however, these eight independent variables have not been utilized in a study of young convicted OUIL offenders when the criterion measure was the Mortimer-Filkins Test.

Purpose of the Study

The purpose of the study was to determine the feasibility of establishing a prediction model by use of a regression analysis of the pre-selected descriptive variables which provide significant predictability of problem behavior to be cost effective in its application. Additionally, this study may provide information on the characteristics of young OUIL offenders which may have application to the reeducation of these offenders in order to prevent subsequent similar violations, or to enhance intervention techniques prior to initial violations.

Statement of Research Problem

This study was to determine if eight (8) pre-selected descriptive variables: age, blood alcohol concentration, reported first year of alcohol drinking, reported number of alcohol drinking days in the previous thirty days prior to assessment, moving violations, alcohol-related violations, reckless driving violations, and reported motor vehicle accidents of a specific convicted drinking driver have a relationship to the assessment of the level of problem classification

as reflected by the driver's global score on the Mortimer-Filkins Test.

Delimitations

1. Only those drivers who were convicted of operating under the influence of intoxicating liquor (OUIL) by the 54th-B District Court of Michigan, East Lansing, Michigan, and subsequently ordered to undergo substance abuse assessment at the court probation office were eligible for inclusion in the sample.

2. Only drivers convicted of OUIL age twenty-five (25) years old and under were included in eligibility for inclusion in the sample.

3. Only those drivers arrested and convicted of OUIL after April 1, 1983, but before May 1, 1984 were eligible for inclusion in the sample.

4. Only those drivers convicted of OUIL drawn from the sample who had available all preselected descriptive variables were used in the statistical analysis.

5. The conclusions reached by this study are representative of this selected sample only, and as such cannot be generalized to the population of drinking drivers as a whole.

Limitations

1. The qualifications of the assessing probation officer and the quality of the assessment process were not

the subject of investigation in this study.

2. Due to the Michigan 54th-B District Court restrictions on client confidentiality, contact with the individual offenders was not permitted.

3. There is some natural police selectivity in arrest situations which varies by department and individual police officer, and this selectivity may be extended to the judicial systems in its processing of each individual subject. Thus while this bias is recognized, it is not dealt with in this study.

4. Due to the limited number of subjects available in the selected sample, no attempt was made to analyze the data for variations on the basis of sex of the subject, although it is recognized that such information could be valuable.

5. The availability of subjects was limited to the agency capable of providing information from organizational records without undue violation of client confindentiality. However, it is recognized that the use of multiple agency records could have strengthened the representativeness of the sample. By limiting the data to one agency so as to avoid the introduction of a new variable associated with the assessment interview technique, a variable difficult to measure was avoided.

6. Due to limitations on the availability of subjects it was not practical to establish a control population which would have strengthened the interpretation of the data.

7. Due to limitations on data collection, the influence of drugs other than alcohol or drug interactions with alcohol on driving behavior was not a focus of this study.

Basic Assumptions

1. It is assumed that responses to questions of a self-report nature by the subjects were truthful and unbiased as has been established by other research studies.

2. It is assumed that all analysis of blood alcohol concentrations of those drivers arrested and subsequently convicted of OUIL was conducted by trained personnel using equipment meeting standard requirements for proper use.

3. It is assumed that all information available from the Michigan Secretary of State's driver's record file was as accurate and up to date as feasible for each driver included in the sample drawn for statistical analysis.

4. It is assumed that although the Mortimer-Filkins Test asks specific questions referring to prior arrests for both driving under the influence of intoxicating liquor and reckless driving (Interview questions 39 and 45) for the purpose of scoring toward a classification of problem drinking behavior, that these two items do not alone contribute significantly to the total score anymore than any other item used in the behavior classification.

Operational Definitions

1. Mortimer-Filkins Test - also known as the Highway Safety Research Institute, University of Michigan, Court Procedures for Identifying Problem Drinkers, is a test used to identify problem drinkers.[9]

2. Global Score - refers here to the sum of all values to all responses to the questions of the Mortimer-Filkins Test.[10]

3. Subgroups as defined by the global score on the Mortimer-Filkins Test according to the level of problem classification.

a) Social Drinker - a drinker with a score of less than 60 on the Mortimer-Filkins Test.[11]

b) Excessive Drinker - a drinker with a score of 60 to 85 on the Mortimer-Filkins Test.[12]

c) Problem Drinker - a drinker with a score of 85 and above on the Mortimer-Filkins test.[13]

4. Blood Alcohol Concentration - used by most states refers to a standardized measuring system which measures the weight of alcohol per volume of blood. The blood alcohol per 100 milliliters of blood known as "percentage by weight."[14] Michigan uses grams of alcohol per 100 ml.

Examples: 120 mg. alcohol/100 ml. blood

.120 g/100 ml.

Results in 12% blood alcohol concentration weight/volume

5. Driving Record - the official record as maintained by the Michigan Department of the Secretary of State.

Organization of the Study

In Chapter I an introduction to the problem is discussed.

Chapter II is a review of the literature related to both drinking drivers and characteristics of youthful drinking behavior important to the study, as well as the Mortimer-Filkins Test.

Chapter III defines the population, sampling design, and methodology.

Chapter IV presents the analysis of the major hypotheses by use of appropriate statistical tests.

Chapter V contains the summary, findings, conclusions, recommendations, and discussion for further research.

Footnotes

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[9]M.W. Kerlan, et al., Court Procedures for Identifying Problem Drinkers Volume I: Manual, National Highway Traffic Safety Administration (Washington, D.C., 1971) p i.

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[11]J. S. Lower, R. G. Mortimer, and L. D. Filkins, Court Procedures for Identifying Problem Drinkers Volume 3: Scoring Keys, National Highway Traffic Safety Administration (Washington, D.C., 1971), 7.

[12]Ibid

[13]Ibid

[14]Committee on Medicolegal Problems, American Medical Association, Alcohol and the Impaired Driver: A Manual on the Medicolegal Aspects of Chemical Tests for Intoxication (American Medical Association, Chicago, IL, 1968) p. XIII.

Chapter II

Literature Review

Introduction

Studies concerned with effectiveness of highway traffic safety problems have been hampered by the lack of well designed evaluation methods. As in other disciplines studying human behavior, highway traffic safety specialists observing driving behavior find that it cannot be easily manipulated into experimental-control groups. Further complicating the evaluation of highway traffic safety programs has been the recognition that more than one set of variables may be confounding the outcome at any given time. Consequently, the degree of confidence in the results is often limited.

Furthermore, highway traffic safety evaluation methods commonly utilize traffic accidents and traffic violations as criteria for outcome measures. However, the detection of traffic violations by law enforcement personnel are infrequent, and a traffic accident represents an even more rare event. Studies have shown that not all accidents and traffic violations appear on official traffic records. Quite often, only those of a more serious nature are reported.[1] Consequently, these criteria are not the best suited for the detection of any subtle change that may result from an effective or ineffective program. In addition, evaluation methods are effected by a driving environment which is not

static, but rather represents a dynamic, ever-changing environment for which exact experimental conditions cannot be replicated.

Therefore, it has been difficult to find agreement on the conclusions reached by highway traffic safety studies because they have often lacked sufficient evaluative designs to provide confidence in the results. At most these studies should be viewed as preliminary investigations in need of further refinement.

The studies reviewed in this chapter represent those considered to have contributed to highway traffic safety by their findings, and those that have been conducted by individuals recognized for their qualifications and research abilities.

A comprehensive review of the literature on the drinking driver as a traffic problem and drinking behavior of the general population yielded several studies of a pertinent nature to this investigation. These related studies and surveys have been categorized according to the following subject areas: 1) studies of the effect alcohol use has on the traffic problem 2) studies on the drinking behavior of the general population, in particular individuals age twenty-five and under 3) studies of the Mortimer-Filkins Test.

Studies of the Effect Alcohol Has on the Traffic Problem

Investigations of Alcohol-Related Accidents

Various studies have reported that alcohol has been evidenced in approximately 50 percent of the traffic fatalities each year. The United States Department of Transportation's National Highway Traffic Safety Administration (NHTSA) reported through its Fatal Accident Reporting System (FARS) that there were 51,091 persons fatally injured in 45,284 traffic accidents in 1980.[2] The FARS data reported that in approximately 40 percent of the accidents, evidence of alcohol involvement was found in at least one driver (positive results were determined through either chemical testing or a statement by the investigating officer). In a study investigating pedestrian accidents in New Orleans, researchers found that 50 percent of the pedestrians had been drinking prior to the accident.[3] A Roberts' review of studies found these statistics:

1. A Vermont study in the late 1960s showed that 13 percent of the drivers stopped at checkpoints had some detectable blood alcohol concentration (BAC).

2. A California study determined that 74 percent of the drivers who died in single vehicle accidents had been drinking and had an average BAC of 0.19 percent.

3. A 1959 study of single vehicle crash fatalities found 49 percent of the drivers had a BAC between 0.15 percent

and 0.05 percent, and 49 percent of the drivers had a BAC of 0.15 percent or higher.

4. A California study of 1,251 consecutive highway fatalities found these results: 58 percent of the drivers, 47 percent of the passengers, and 36 percent of the pedestrians had a detectable BAC often in excess of 0.15 percent.[4]

Yaksich in his review of the FARS data for 1980 found that of all of the drivers involved in fatal accidents, only 36.7 percent of the drivers were tested for blood alcohol levels. He went on to state the findings showed that from the tested drivers it was established that 68 percent had positive blood alcohol levels with over 51.7 percent having a BAC of 0.11 percent or higher.[5]

Additional studies in California, Vermont, and Michigan have established the high representation of alcohol involvement by drivers in fatal crashes. These studies demonstrated that in 40 to 55 percent of the fatalities the driver had a BAC of 0.10 percent or higher, and additionally that a large number of these drivers (29 to 43 percent) had a BAC of 0.15 percent or higher.[6]

Single Vehicle Accidents

Data pertaining to fatalities in single vehicle accidents from numerous studies seems to clearly establish alcohol involvement as a contributing factor. Research studies have found that 55 to 65 percent of the drivers had a positive

BAC of 0.10 percent or higher, and of this group 35 to 54 percent exceeded a BAC of 0.15 percent.[7]

In a recent article, Dr. Sidney Cohen discussed the role of alcohol in single vehicle accidents. Cohen reported that various studies have found that 18 percent to 51 percent of the drivers involved in multiple vehicle fatalities were found to have a BAC of 0.10 percent or higher. However, in single vehicle accidents involving fatalities, 41 percent to 72 percent of the drivers have been found to have a BAC of 0.10 percent or higher.[8]

Furthermore, Reed has personally estimated that 61 percent to 78 percent of fatally injured persons in alcohol involved accidents are the drivers themselves. This estimate would seem to be in accord with previous data, especially those studying single vehicle accidents. The data strongly suggests that alcohol plays a significant role in traffic fatalities, but it would be wise to point out that the data may actually underrepresent the true role of alcohol in traffic fatalities.[9] Yaksich found that states do not uniformly test for positive alcohol levels in drivers involved in fatalities, and that those states that test often show a higher involvement than those states that test less frequently.[10]

Consumption Patterns

There is evidence to support the position that alcohol involvement has a significant role in traffic fatalities;

however, it is appropriate to identify whether these incidents are randomly distributed in the population or whether particular elements of society are overrepresented by their involvement.

Studies over the last quarter century have established that alcohol plays an active role, at least on occasion, in the lives of a majority of Americans. Roberts reported that surveys of the American population showed that 40 percent drank beer once a week, while 25 percent drank whiskey at least once a week. A 1958 survey found 71 percent of New York households served some form of alcoholic beverage during the month studied, while a 1960 national poll determined that 62 percent of the population sampled drank alcohol in some form.[11] Cahalan reports on drinking behavior among adults by comparing the years 1967 and 1979. He found that in 1967 approximately 71 percent of adults surveyed between the ages 21 to 59 reported drinking at least occasionally, while in 1979 approximately 67 percent of adults 18 or older surveyed reported at least occasional drinking.[12] The weekly publication Education Week on March 3, 1982, published National Institute of Drug Abuse (NIDA) data of drug use among high school seniors for the years 1975 to 1981. Among those drugs reported was alcohol, and the results indicated that in 1975 90 percent of the seniors reported using alcohol at least once. For 1981, 93 percent of the seniors reported some familiarity with alcohol. The same NIDA data reported on daily use among high school seniors

which was found to be 5.7 percent in 1975 and 6.0 percent in 1981. The survey concluded that the figures represent virtually little change in drinking behavior for high school seniors.[13]

While consumption rates have not changed drastically in the recent past, there are a number of relative implications that can be made to the drinking driver problem. Reed cited one study in the United States Department of Transportation that found 75 percent of the drivers surveyed reported driving after drinking.[14] Yaksich cited Fatal Accident Reporting System data on the distribution of BAC among tested drivers.[15] (See Table 1, page 19).

Studies of Young Driver and Alcohol-Related Driving

The data suggests that young drivers are overrepresented in fatal crashes where a low BAC was involved according to Yaksich. The data further demonstrates that 77.7 percent of the BAC above 0.20 belonged to drivers aged 20 to 49. The data also suggests that drivers 50 years old or more have the least involvement with alcohol in fatal crashes.[16]

Cohen, reporting on single vehicle accidents, suggests that youthful drivers between the ages of 14 to 24 are at the greatest risk of involvement and goes on to imply that this is due to lack of familiarity with the driving task when combined with drinking behavior. Cohen also reports that drivers 25 to 50 have the lowest rate of single vehicle accidents, and drivers 40 to 60 years old have the highest

Table 1

BAC Levels of Tested Drivers - 1980

AGE GROUPS	% of all Licensed Drivers	All Drivers in Fatal Accidents	Fatal Accident Drivers Tested for BAC					
			% of all Tested	% Blood Alcohol Content (BAC)				
				.00	.01-.05	.06-.10	.11-.20	.20+
Under 20	9.8	16.4	17.2	17.8	22.5	25.6	18.0	9.0
20 - 24	11.9	21.6	24.8	18.4	28.7	32.4	29.6	21.0
25 - 49	48.8	44.5	43.7	38.8	38.4	34.6	44.3	56.7
50+	29.5	17.5	14.3	25.0	10.4	7.4	8.1	13.3
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

BACs but few single vehicle accidents.[17]

In a review of alcohol and highway safety studies, Jones and Joscelyn cite results of several studies demonstrating the scope and age-distribution of alcohol involvement among traffic fatalities. The results are as follows:

1. Eighteen percent of fatally injured drivers under 20 years old had a BAC of 0.10 percent or more.

2. Fifty percent of the fatally injured drivers over 20 years old were legally intoxicated.

3. The percentage of legally intoxicated drivers over 60 years old who were fatally injured was less than those under 60 who were fatally injured.[18]

Similarily, surveys of drivers randomly stopped and checked for positive blood alcohol levels were reported by Jones and Joscelyn. The results from a Vermont study of drivers stopped at locations where fatal crashes occurred found that 9 percent of drivers under 20 years old had been drinking, while 14 percent of those over 20 years old had been drinking. A similar Huntsville, Alabama, study found 4 percent of the drivers under 20 years old had a BAC of 0.03 percent or more, and 11 percent of the drivers 20 years or older had been drinking. Surveys conducted by the National Highway Transportation Safety Administration during an Alcohol Safety Action Project arrived at similar conclusions with 6 percent of the under 20 years old drivers having a positive BAC of 0.05 percent or more, and of those 20 years or older, 14 percent had a BAC of 0.05 percent or more.[19] Such studies

have led the NHTSA to conclude that on any given weekend night, one out of ten drivers on the highway are legally intoxicated.[20]

Jones and Joscelyn summarized their review of studies in the following manner:

> If in 1975 only drivers with a BAC of 0.10 percent or more are considered, they would account for 47 percent of all fatal crashes, 11 percent of all personal injury accidents, and 5 percent of all property damage accidents. The cost of all alcohol involved accidents in the U.S. represents a substantial share of the 15.5 billion dollars lost in 1977 through all types of traffic accidents.[21]

Demographic Studies of Drinking-Drivers

A number of studies have focused on whether drunken driving is randomly distributed in the driving population, or whether certain subgroups are more evidenced in their representation. In a study of drivers arrested for driving under the influence of liquor (DUIL) for the Oregon Department of Transportation, Kaestner reached these conclusions about DUIL offenders:

1. Sixty-six percent were laborers or skilled trades.

2. Thirty-four percent had no license on themselves; 25 percent of which were either suspended or had no license whatsoever.

3. The largest share of offenders came from towns under 10,000.

4. The average BAC was 0.23 percent.

5. Seventy-three percent reported having been drinking in either a bar or public drinking location.

6. Ninety-three percent of the drivers reported being on their way home.

7. Fifty percent of the arrests occurred on weekend nights.

8. Thirty-five percent had one or more prior DUIL arrests; 16 percent had one or more reckless driving arrests.

9. Forty-one percent had non-driving arrests.

10. For any type of drinking arrest, 58 percent had one or more driving or non-driving drinking convictions; 40 percent had their first drinking arrest five or more years ago.[22]

The Jones and Joscelyn study prepared for the NHTSA arrived at these conclusions regarding frequency in alcohol related crashes:

1. male sex
2. age of 20 to 60 years
3. heavy drinking and severe drinking problem
4. preference for beer over alcoholic beverages
5. weekend driving habits
6. prior history of drunk driving arrests.

The authors further described drivers with a higher than average crash risk after drinking:

1. female sex
2. youth (under 20 years old)
3. old age (over 60 years old)

4. light drinking habits.[23]

In a study of DUIL offenders arrested in three mid-Michigan counties Smith found these data among the sample:

1. Seventy-four percent of the drivers demonstrated symptoms of a severe drinking problem.

2. The average BAC of severe problem drinkers was greater than that of temporary problem drinkers.

3. Only drinkers having the symptoms of severe problem drinking had a BAC in excess of 0.25 percent, but none were found with a BAC of less than 0.12 percent.

4. Lower aged groups had lower BACs than did middle aged and older drinkers.

5. Higher BAC levels were positively related to an increase in the number of arrests for DUIL and disorderly conduct and hospitalization for alcohol dependence.[24]

A 1978 report to the legislature by the California DMV points out that estimates ranging from 36 percent to as high as 50 percent have been made of the alcoholic's involvement in traffic fatalities.[25] The report cites a number of significant research studies that seem to substantiate the alcoholic's role in traffic deaths. A few studies are summarized as follows:

1. A 1962 New York City study of fatal crashes found 46 percent of the drivers had a BAC of 0.25 percent.

2. A 1966 study of 72 crashes in Michigan that resulted in 87 fatalities found half of the sample to be pre-alcoholic or alcoholic.

3. A 1966 San Francisco study of 208 consecutive traffic deaths reported that 37 percent of the sample had been drinking before death. Of this group 71 percent had a BAC of 0.15 percent or more.

4. A 1968 California study reported that 6.5 percent of the drivers were alcoholic, and they were responsible for 56 percent of alcohol-related accidents.[26]

Landstreet reviewed one early 1970's Alcohol Safety Action Project (ASAP) conducted in Fairfax County, Virginia. The project screened drivers by levels of alcohol impairment with the intent of improving rehabilitative treatment. The ASAP for Fairfax, Virginia, found 20 percent of the screened DUIL offenders were classified as social drinkers, 50 percent as preproblem drinkers, and 30 percent as problem drinkers or chronic alcoholics. The rate of recidivism (rearrest) for DUIL also rises as the offender moves through the classification system.[27]

High-Risk Driver Studies

A few highway traffic safety studies have attempted to identify subgroups from the driving population as a whole believed to be at high-risk of having alcohol-related crashes. One such effort was a study conducted by the University of North Carolina Highway Safety Research Center. The goals of the study were to develop a prediction model which could identify high-risk drivers before a crash and

to identify appropriate cost-effective countermeasures for use with high-risk subgroups.[28]

After a review of the literature, six subgroups from the general driving population were identified as being at high-risk to have an alcohol-related crash. These subgroups were as follows:

1. Young males, 16-20 years old
2. Young males, 21-24 years old
3. Persons previously convicted of DUIL
4. Persons with 3 or more moving violations
5. Persons recently divorced
6. Persons recently released from prison.[29]

The complete statement of the rationale for the selection of these subgroups can be found in Chapter 2, Volume I of the Technical Report prepared by the University of North Carolina Highway Safety Research Center. However, suffice to say here that the selection was made on the basis of previously identified drinking-driving behavior of each subgroup which placed them at high-risk of an alcohol-related crash.

The data for the study was obtained from official driving records, divorce records, the criminal records of the North Carolina Department of Corrections, and a file of North Carolina traffic accidents. The data was merged by use of computer assistance to create one file containing all of the members of each subgroup. A prediction model for the likelihood of additional alcohol-related crashes within each subgroup was developed from the data file.[30]

The study reached these conclusions from an analysis of the data:

1. Predictive models can be developed using information available to alcohol and driver program administrators.

2. A benefit accrues in terms of higher predicted alcohol-related crash probabilities by developing several models for individual high-risk groups over developing just one model for the general population as a whole.

3. The models are reasonable predictors of alcohol-related crash experience in terms of ranking subgroups by risk, even when tested in a prospective sense of predicting a one-year crash experience.

4. Alcohol-related crashes are such low probability events in the general driving population that, even when a person is identified with a risk as much as 20 times greater than average, the probability of alcohol-related crash involvement in the next year is still less than .08.

5. Potential cost effectiveness for countermeasure programs with limited alcohol-related crash reduction ability can be demonstrated by applying them to the high risk subgroups identified in the models.

6. Currently, few sound evaluation documenting the true traffic safety benefits of alcohol countermeasures are available.[31]

The authors of the study concluded with several recommendations, two of which are cited below as a result of their significance to this dissertation study.

1. In application of the models, grouping of high-risk subgroups (e.g., the 25 percent highest risk subgroups) within a high-risk group should be used for countermeasure implementation. This increases the number of individuals affected beyond that which would occur when just a single high-risk subgroup is used.

2. Consideration should be given to developing models designed to be predictive of two year alcohol-related crash probabilities. It is likely that by using this approach, high-risk subgroups could be identified with predictor probabilities higher than those attained for the one-year period. A period longer than two years is probably not advisable because countermeasures which might be applied as a result of the modeling outputs characteristically do not have an estimated period of effectiveness longer than two years.[32]

Although this study has significantly contributed to the understanding of high-risk driving subgroups, it was the author's opinion that much yet needs to be done.

Additionally, Wilkins reports that alcoholics have 2.5 times as many traffic accidents and nine times the conviction rate of non-alcoholics.[33] Joscelyn, Maickel, and Goldenbaum in their Department of Transportation report summary reached this conclusion:

> The Drinking Driver Control System has two extra objectives in the case of the problem drinking driver. It must identify and screen the problem drinking driver from all other drinking drivers. And it must ensure that he receives a sanction which will be appropriate to his medical and psychological needs, if he is to be prevented from compulsively

repeating his alcohol impaired behavior.[34]

The need for intervention has lead to a significant research study by Lyle D. Filkins, et al. of alcohol abuse and traffic safety which sought to identify characteristics of alcohol abusers which could be useful to intervention action prior to fatal automobile accidents. The study was conducted in Wayne County, Michigan, from July, 1967, through August, 1969. Four distinct populations provided the data base for the study. They were: a sample of individuals who had been involved in a fatal automobile accident; a sample of alcoholics who had been in treatment in Flint, Michigan; a sample consisting of drivers convicted of driving under the influence of intoxicating liquor (DUIL); and a sample obtained from the Michigan Secretary of State's driving records identified as the Michigan Driver Profile.[35]

The sample of drivers involved in a fatal accident was compared to the other sample populations to identify any common characteristics, in particular the samples of known alcoholics and known DUIL offenders. The Michigan Driver Profile sample represented the driving behavior of the average Michigan driver which served as the control group.[36]

A major focus of the study was to search for the common characteristics which could be useful to court systems attempting to intervene in drinking-driving behavior. The data yielded a large number of significant findings; however, only those pertaining to this dissertation study are cited.

Those significant findings are summarized as follows:

1. Forty-five percent of the fatalities had a BAC of 0.10 percent or higher.

2. Ages 16-25 years old were over-represented in accidents.

3. Fifty percent of the drivers 16-19 years old had been drinking prior to the accident.

4. For fatalities, the ages 36-45 years old had evidence of the greatest drinking involvement.

5. The number of fatalities showed a significant increase over the week-end. Only 24 percent of week-end drivers had not been drinking as compared to 43 percent during the week.

6. Vehicular speed increased with an increase in blood alcohol concentration, and this was particularly evidenced at younger ages.

7. Over half of the fatalities sampled had committed a driving violation prior to the crash.

8. The number of driving violations on record was found to be significantly associated with BAC; persons with no violations were under-represented at a BAC of 0.10 percent or higher, while those with 4 or more violations were over-represented.

9. A relationship was established between prior DUIL convictions and BAC.

10. For a BAC of 0.15 percent or higher, the fatality sample was found to resemble the DUIL sample in prior driving

violations, while the lower BAC group of fatalities was less similar.

11. The DUIL sample had evidence of more traffic accidents than the fatality sample.

12. The higher BAC group, 0.15 percent or greater, had similar mean number of convictions for prior DUIL offenses as did the DUIL sample.

13. Crash rates for the sample of alcoholics were almost twice that of the Michigan Driver Profile sample.

14. More crashes and driving violations were found for younger alcoholics (under age 45); in addition, this group evidenced more DUIL convictions.

15. Only 25 percent of the alcoholic sample had no record of accidents or traffic violations.

16. Among alcoholics a traffic conviction or accident was followed by a similar such event.

17. Alcoholics who withdrew from group therapy within 3 days had the greatest number of traffic violations and accident rates.

18. A correlation between traffic convictions and behavioral deviancy was established.

19. Fatalities appear to peak between ages 20-25 years, although at a BAC of 0.15 percent or greater the peak occured between ages 26-35 years. While the DUIL and alcoholic sample fatalities peaked between ages 36-55 years.

20. The mean number of crashes was highest for the DUIL sample, with the alcoholics and high BAC group being

similar, while the Michigan Driver Profile and low BAC samples demonstrated the least mean number of accidents.[37]

The results of this study indicate that more serious drinking behaviors are associated with greater risk of traffic violations and accidents. The younger driver appears to be over-represented among traffic fatalities, but at lower BAC levels, and this group evidenced the highest rates of speeding violations at the time of the fatal accident. There is evidence that the rates for fatal crashes peak before a formal diagnosis of alcoholism is made, further emphasizing the need for early intervention. Additionally, those drivers with the highest crash and traffic violation rates appear to be the most likely to drop out of group therapy, a method often utilized in the rehabilitation of DUIL offenders. While numerous other conclusions were reached by the study, only those related to this dissertation study are cited; however, for a more complete analysis the reader is referred to the original document.

The overwhelming data demonstrating alcohol involvement in the traffic scene has generated three broad categories of countermeasures: enforcement, engineering, and education. A review of some enforcement countermeasures will be addressed first.

Enforcement Countermeasures

Enforcement countermeasures generally rely on increased law enforcement, greater judicial concern, and changes in the

law by the legislature to increase the severity of the sanction applied to convicted offenders. DUIL laws are classified as either the more traditional presumptive laws or the less common per se law. By way of an abbreviated comparison, presumptive laws place the burden of proof on demonstrating that the driver's manner of driving was indeed impaired by alcohol, while per se laws place the burden of proof on demonstrating that the driver did operate the vehicle at the prohibited BAC. Per se laws presumably remove the ability of the driver to argue that he possesses special abilities which allow him to operate in excess of the legally prescribed limit with no danger to society.

A number of states have changed their laws from presumptive to per se laws. Michigan has begun enforcing a per se law which sets the prohibitive BAC at 0.10 as of April 1, 1983. The sanctions include mandatory jail sentences, license suspension, and screening for alcoholism upon conviction; sanctions increase in severity with subsequent convictions.

There are problems in attempting to legislate away drinking drivers. The judicial system, and to some extent members of society are unwilling to mete out severe penalties, and the effects of the legislation seem to be transitory, evaporating with time.

Much has been made of two foreign attempts to reduce drunk driving through legislative effort; the British Road Safety Act of 1967 and the Scandinavian drunk-driving laws.

Scandinavian laws permit a BAC of 0.05 percent, half the amount permitted by most laws in the United States. They also permit random stopping of drivers to test for drunk driving violations and penalties and fines are severe (up to 10 percent of personal income). The Scandinavian effort has been a two fold approach: legal and educational. The results have been lauded by some and criticized by others. Waller points to the low rate of traffic fatalities, ten percent, related to alcohol as probably attributable to the attitude toward the problem.[38] Reed reports on a study which used a time series analysis of drunk driving and traffic accidents that could not substantiate any deterrent effect from Scandinavian laws.[39]

The European countermeasure often cited for its apparent success in at least temporarily reducing drunk driving is the British Road Safety Act of 1967. Reed attributes the success of the program to its wide publicity, which increased the publics' perception of the risk of apprehension. However, as that risk of being caught diminished, the effect disappeared and drunk driving returned to its previous level and eventually exceeded it. Similar results were also obtained in Canada during the same time period as a result of equivalent legislation. Reed describes the only U.S. countermeasure that produced the same effect; it was conducted at Lackland Air Force Base and produced statistically significant results in lowering accidents and injuries.[40]

Reed reported on Alcohol Safety Action Projects (ASAP) which placed their greatest emphasis on increased drinking-driver patrols. An evaluation of the King County, Washington, ASAP could not establish any significant change in the rate of accidents and injuries due to alcohol-related accidents. A Minnesota ASAP was able to establish a substantial decrease in alcohol-related fatalities during the three year operation of the program.[41]

Jones and Joscelyn reported on the results of 26 ASAPs conducted around the U.S. from 1972 to 1976. Evaluations have proven contradictory. One evaluator concluded that no significant effect of the projects can be demonstrated to be due to anything other than chance. In response, the NHTSA claimed that there was some evidence to support a claim of reduced fatalities, and it went on to state that evaluations may be insensitive to other subtle benefits to society.[42] Reed concluded that the cost-benefit derived from ASAP countermeasures does not warrant their continuation; he stated that the money was poorly spent.[43]

Effects of the Drinking Age on Traffic Fatalities

The one legal-enforcement countermeasure, aimed at reducing alcohol-involved traffic fatalities, that appears to have worked is the raising of the legal drinking age in those states that had previously lowered the drinking age. Three states, Maine, Michigan, and Vermont, have conducted extensive research studies which measured the effect

of the legal drinking age on traffic fatalities. The Highway Safety Research Institute of the University of Michigan has been involved in the evaluation of youthful alcohol-related crashes. Douglass, et al. conducted a study that noted an increase in auto crashes (4,600) and fatalities (89) during the sample period (1972-1975) to be attributable to alcohol consumption as a result of the lowering the legal drinking age to 18. The study also noted that there was a significant increase in consumption of draft beer.[44] In a later review Douglass found that between 10 percent and 26 percent of the increase in the traffic fatalities among young drivers in Michigan and Maine was directly attributable to a lowering of the legal drinking age. Studies have established a 2 percent increase in youth traffic fatalities in Vermont to be in response to a lowering of the legal drinking age.[45] Other comparative studies between states where the legal drinking age was lowered and states where the legal drinking age remained at status quo have produced statistically significant increases in traffic fatalities. Continuing investigation by the HSRI has further estimated that the level of alcohol-related traffic fatalities was 17 percent higher than expected during the four years following the change in the legal drinking age. Douglass concluded that:

> Scientific research on lower legal drinking ages in most places has concluded that young drivers are more likely to become involved in alcohol-related traffic collisions. Not all places responded

to lowering the drinking age in the same way.[46]

Other Variables and Youthful Traffic Accidents

As was reviewed earlier in this chapter, young drivers are in general overrepresented in traffic fatalities at lower BAC levels. The factors represented in the relationship between youthful drinking and traffic fatalities have been researched by numerous studies and have arrived at similar conclusions. Schuman and Pelz and others found many reasons that might have caused the mortality rate to be twice as high for 18 to 20 year olds as they are for 40 year olds. Among them are inexperience and driving after drinking.[47] Bishop, in a study for his doctoral thesis, found alcohol to be involved in a number of accidents he reviewed. Most often the young driver over-estimated the number of drinks it would take to impair ability.[48] A 1970 study of 31 fatal crashes by Boston University found that in 19 single car crashes, alcohol was involved in 16 of the deaths. The report concludes: "It is also unquestionable that the effect of low levels of alcohol are significant in young drivers and teenagers, such as those often involved in these cases."[49] Douglass reported on contradictory studies some of which suggest that academic ability, early full-time employment, and juvenile offenses are related to crash involvement, while other studies have refuted the claim. In addition, other studies claim subjects have experienced

personal and social problems and come from lower socioeconomic levels.[50]

Although evidence suggests that it is becoming increasingly possible to predict what subgroup of young drivers is most likely to become involved in an alcohol-related crash, the question remains as to what can be done to identify individuals and then alter the behavior pattern. Douglass reported that several studies advanced these conclusions:

1. A large number of young drivers with multiple driving violations score high on the Michigan Alcohol Screening Test (a screening procedure to determine the level of problem drinking behavior).

2. Youth increasingly derive information about alcohol from peers.

3. Warnings from alcoholics, celebrities, and professional drivers have little effect on youth.

4. The use of rational education on problem drinkers is likely to be ineffective.

5. Young drivers are likely to be underrepresented in arrests for DUIL.

6. Young drivers are more likely to drop out of alcohol education programs.[51]

Although the one legal countermeasure that seems to ensure a reduction in alcohol involvement among young drivers is raising the legal drinking age, there have been other proposals which limit the exposure of young drivers, such as: restricting the time permitted to drive, and raising

the age for first licensing all of which would probably result in a crash reduction, but at what inconvenience to young drivers and their families.[52]

Engineering Countermeasures

The broad category that has received the least amount of attention as a viable countermeasure is engineering. The cost of engineering changes and adaptations when initially viewed may appear high; however, the benefits represent a sizable savings in lives and costs incurred as a consequence of drunk-driving. The costs of engineering measures when pro-rated over many years would be an infinitisimally small amount to society.

In his book Roberts comments on the feasibility of using an alcohol-sensitive device to sniff the inside air of a vehicle to determine the degree of sobriety of the driver.[53] Roberts may have viewed the potential of such a device in a light-hearted manner, but Jones and Joscelyn reported on such a device with a more serious tone. Not only was a "breath sniffer" reported on, but so were other engineering devices such as: educational testers to be used by a driver to test for one's own sobriety, and drunk driving warning systems which flash lights or blow the horn when the driver is impaired by alcohol. Perhaps the most feasible system is an automatic interlock system which prevents the driver from starting the vehicle.[54]

Jones and Joscelyn also report on drugs that been tested as potential "sobering up" pills. The drug L-dopa, which is currently used to treat Parkinson's Disease, has the ability to improve performance by impaired individuals; unfortunately, it has unpleasant side effects including nausea and vomiting. For now, no such "sobering up" pill exists.[55]

There is little doubt by those individuals interested in highway traffic safety that the one countermeasure that would substantially reduce death and injury as a result of drunk-driving or any other cause is the use of occupant seat-belts (as of July 1, 1985 Michigan mandates front passenger seatbelt use). Williford, et al. report that the number of drivers and passengers currently using seatbelts is about 11 percent. If it could be increased to 20 percent, it is estimated that 4,000 lives per year could be saved. The authors also report that the cost of passive seatbelt interlock systems would add $200 to $300 per unit, an insignificant amount when considering total vehicle cost, but unnecessary if all operators chose to wear the presently installed seatbelts.[56]

Educational Countermeasures

Presently, great reliance has been placed on a large number of programs that fall into the broad category of education. Educational programs have used mass media approaches to counter-act the drinking-driver. They have also enlisted traditional academic, as well as non-traditional school settings, and they have developed remedial programs to counter the drinking-

driver after conviction. Most programs have met only limited success, or because of poor or inadequate evaluation can not be said to have provided any element of success.

In a paper presented to the National Conference of State Legislatures, Marshall stated that the purpose of education programs should be to create an atmosphere in which drinking-driving is a socially unacceptable form of behavior. Marshall went on to say that the sanctions to be imposed should be known by all members of society and accepted as a general deterrence. In addition, there is a need to develop appropriate referral procedures, as well as research to validate diagnostic criteria.[57]

Dunn stated the NHTSA's position on desirable counter-measures for drinking-driving. He emphasized the need for local community action programs through pursuit of six major points:

1. General deterrence aimed at the majority of drunk drivers who are never arrested (the chance of arrest lies somewhere between 1/500 and 1/2,000).

2. Community focus - local programs.

3. Systems approach which integrates and coordinates all interested agencies (i.e., prosecutor, enforcement, education, etc.).

4. Financial Self-Sufficiency - convicted offenders support.

5. Citizen Support - enlisting community/citizen support.

6. Education/Prevention (long term) changing attitudes by society toward drinking-driving.

Dunn further states:

> This approach to the drinking driver problem is intended to effect the heavy (problem) drinker and at the same time, have maximum impact in deterring the less heavy (social) drinker from driving intoxicated.[58]

Many states have instituted remedial programs for those convicted of drunk driving. One such program previously alluded to was the Fairfax County, Virginia ASAP. Landstreet pointed out the need to properly diagnose and treat the offender in order to obtain maximum impact. He states that the premise of the program was that social drinkers reacted positively to license suspension while Type II (pre-problem drinkers) and Type III (alcoholics) reacted negatively to license suspension and responded more positively to long term therapy. Social drinkers were treated with a series of eight weekly meetings dealing with alcohol and highway safety. The pre-problem drinker was dealt with in a series of ten weekly meetings which were partially didactic and partially encounter. The final type, the alcoholic, was found to respond most positively to the Alcoholics Anonymous approach.[59]

The state of California recently tried a new approach to confronting repeat DUIL offenders. A report to the legislature prepared by Hagen, et al. outlined the approach and evaluated the outcomes. The approach required drivers convicted of drunk driving more than once to participate in

a 12-month alcohol abuse treatment program. The program included four key elements:

1. The close supervision of the participants through personal interviews at least every other week.

2. The need for a variety of treatment services with capability of referral for treatment.

3. A driver may participate only once in four years.

4. Establish the ability to monitor all participants.[60]

While the program upon evaluation could not be shown to have proven any better than existing sanctions, the authors put forth several recommendations to improve diagnosis, selection, and assignment to treatment modalities were made by the authors. Drivers convicted of drunk driving for the first time were not included in the program, but were referred to the established Driver Improvement Course which includes alcohol and highway safety as a part of its curriculum.

Jones and Joscelyn in their summary and conclusions pointed out the ASAP programs sought to integrate the program into a systems approach which treated severe alcoholics as a different entity form social drinkers.[61] The writers refer to the lack of quality evaluation techniques as the largest drawback to arriving at any convincing conclusion about ASAP outcomes; furthermore, programs are generally evaluated for short term effects and not long term results.

A more recently reported on remedial program is the New York State drinking driver program (DDP) cited by Williford, et al. In 1982 approximately 60 percent of those convicted

of drunk driving in New York State participated in the program. The program serves a dual role of providing educational information and serving as a screening device and referral source for the more seriously impaired drivers. The program is voluntary on the part of the participants who are given information and insight into drinking-driving. The program has received strong support from many of the participants who have suggested its expansion into pre-licensing phases of highway safety education. The authors suggest that it is quite feasible that such a program can become part of standard high school health curriculum, as well as a part of driver education.[62]

A new approach to drinking driver education has evolved out of the NHTSA's sponsored Safe Performance Curriculum tested in Georgia. Designed to be an elite example of driver education,the program focused on violation and accident rates. One of the preliminary results reported on (although not conclusively as of yet) seems to demonstrate that among other differences, students receiving the most sophisticated instruction have had less drunk driving arrests. The final evaluation awaits complete tabulation of the data between the random groups, but it is hoped that the preliminary data will be verifiable.[63]

Studies on the Drinking Behavior of the General Population

A number of methods are used to determine the prevalence of drinking and its subsequent alcohol problems, among these methods are:

1. The Jellinek method which is based on mortality rates from liver cirrohosis.

2. The per capita method developed by Ledermann. This method is popular because of its simplicity.

3. Rates in clinical populations derived from agency and hospital records.

4. The community survey approach which is based on epidemiological methods; there is some advantage to this method.

Each method has its subsequent drawbacks, but these are not discussed here. The only concern is for identifying the different methodologies that do exist.

Recently Auth and Warheit reviewed studies on prevalence rates of problem drinking and alcoholism. The authors were concerned with three categories of drinkers; the abstainers, the heavy drinkers, and the problem drinkers. The problem drinkers represent 5-10 percent of American drinkers 18 years or older. The authors found general agreement that alcohol users high risk to become problem drinkers were males between 18 to 25 or females ages 30 to 40 who are single or divorced and had no religious ties.[68]

Cahalan and Room reported on the drinking problems of males age 21 to 59 and found problems were especially prevalent among the 21 to 24 year olds. They found low SES; unstable marital, home, and work histories to be of importance. In addition, other characteristics were identified from longitudinal studies of problem drinkers. These are: childhood unhappiness, father's heavy drinking, and youthful acting out. Cahalan and Room determined that there is a definite need for more longitudinal studies.[69]

The U.S. Department of Health and Human Services Statistical Compendium on Alcohol and Health summarized many studies and data gathering reports related to drinking in America. Reviewing drinking statistics for both male and females indicates that for males, heaviest drinking occurs between the ages of 21 to 50 years, while for females the heaviest drinking occurs between 31 to 50 years of age. The number of reported abstainers for males is lowest between the ages 18 to 20 years old, while for females the smallest percentage of abstainers is between ages 21 to 25 years old. The total sample percentages indicate that among males 25 percent are abstainers and 20 percent heavy drinkers, and for females 40 percent report being abstainers and 5 percent are classified as heavy drinkers.[70]

A review of eight national surveys covering the period 1971 through 1979 shows that the percentage of drinkers in the four drinking categories of abstainer, light, moderate, and heavier remained relatively stable over the sampling

period for the total sample of both male and females.[71]

Rachal and Associates found that among students, grade 10-12, over 32 percent could be considered as either moderate/heavier drinkers or heavier drinkers.[72] Their study defined drinking behavior in terms of quantity--frequency, that is the amount consumed per occasion and the number of occasions per month. Young drinkers in these categories consumed alcohol at least 3 or 4 times per month. The heavier drinkers averaged 1.85 ounces of pure ethanol (grain or beverage alcohol per day which translates into almost 4 drinks of 100 proof (50 percent pure alcohol) liquor per day.[73] Rachal and Associates compared their data to other cross-sectional studies and found comparable results. The data lends credence to the concept that a significantly large portion of high school students in the United States consume large quantities of alcoholic beverages on a routine basis.[74]

The Rachal studies support the belief that 80 percent of high school youth have some experience with alcohol, and that the rate has stabilized but at a higher percentage than previously found. Adolescent drinking increases rapidly between ages 13 to 15 and then slows down. Boys drink more than girls; however, 4 out of 5 tenth to twelfth grade girls do drink, and there is some evidence that girls are closing-in on boys in their drinking behavior.[75]

Noble reviewed several significant studies designed to establish drinking prevalence rates among young people.

The results are similar to those reported previously in this chapter. Drinking rates rose rapidly between 1936 and 1965 and then the rate of increase rose slowly.

They found more college drinkers than high school drinkers, but this difference has lessened. There are more drinkers in all parts of the country except the South. The percentage of youth reporting being drunk rose significantly between the years 1966 and 1975, as did the frequency of intoxication. The discrepancy between the number of college men and women who drink is small, with only a 4 percent difference. The frequency of drinking and intoxication among college students is higher than high school students and has risen over the past twenty-five years. There appears to be no difference between college and non-college young people of similar age in their drinking frequency. The exception is with military personnel who approach drinking rates of nearly 100 percent for both males and females. However, young people drink less regularly than older people, but do tend to consume a larger amount on a drinking occasion.[76]

Schuckit found that youthful drinking seems to have followed a similar pattern as adult drinkers. Where adults drank 2 gallons per capita in 1946, this rate had risen to 2.68 gallons per capita in 1976. He reports that 80-90 percent of the high school students have drank at least once before graduating, and that this rate increases with grade level, but is similar for boys and girls. Schuckit also found that youth have a preference for wine and beer

over hard liquor; and as for drinking frequency, he reports somewhere between 10-38 percent of the students drink once a week, and 10 percent of both boys and girls report drinking daily. The average teenager drinks low to moderate amounts approximately once a month to once a week.[77]

In summary, there seems to be little argument that young people ages 25 and under drink significant amounts of alcohol with a relatively high rate of frequency. However, knowing the quantity frequency does not define the level of dysfunction which is indicative of an abuse problem, although studies indicate that there are common characteristics of youth who might be identified as having an abuse problem.

Characteristics of Young Drinkers

Studies have found numerous factors appear to be involved in youthful drinking patterns. Among them are age of first drink, religious preference, religiousity, parental drinking behavior, parental attitude, and peer group drinking behavior.[78] Rachal and Associates report that ". . . religious involvement, deviance, and school achievement discriminated reliably among abstainers, users, and misusers."[79]

Other authors have reported on the settings within which young people are most likely to engage in drinking behavior. Harford and Spiegler report that the most frequent adolescent drinking setting is the situation in which no adult is present, such as at a party. These authors found frequent drinkers drink with their peers, while infrequent

drinkers engage in drinking behavior with others than peers.[80]

Rooney has studied the perceived differences of standards for alcohol use among American youth. His sample of nearly 5,000 high school seniors was drawn from public and Catholic schools in the northeast region of the United States. The results indicate that nearly two-thirds of the students who responded showed approval for the use of beer and saw nearly three-quarters of their closest friends and eighty percent of the students in school as similarily approving of the use of beer. In a series of questions regarding problems resulting from drinking almost 63 percent of the respondents reported having at least one of the problems. The largest percentage, 42.9 percent, occurred with drinking sprees, while the smallest percentage, 3.7 percent, was reported for being brought before school authorities. Other categories represented were: caused accident or injury, 15.7 percent; stopped by the police, 13.7 percent; and interfered with preparation for class, 13.5 percent.[81]

Using multiple regression techniques, Rooney was able to explain the following variances for the number of alcohol problems by perceived liberality of standards of self and references sources regarding beer use:[82]

	Total R^2
(1) close friends	0.140
(2) other friends	0.109
(3) father	0.110
(4) mother	0.108
(5) all independent variables	0.155

Rooney concludes that ". . . students perceived the greatest degree of similarity of standards for beer use with their close friends and experience an increase in alcohol-related problems beyond the physical effect of the beverage itself inasmuch as they depart from the standards of their friends." As to the nature of alcohol related problems, the most troublesome problems occur when the perceived distance increases between individual drinking behavior and the norms of friends. Rooney concludes that adolescents are subject to parental influences when long term decisions are to be made and influenced more by peers when there is a short term immediate decision to be made.[83]

Biddle, et al. reported on a survey of 149 midwestern students. Their results showed that students drank because they either liked drinking or refrained because they disliked drinking. Respondents also seemed less aware of the potential consequences of heavy drinking. Adolescents again demonstrated that they were more likely to drink if their friends drank and less likely to drink if their friends were nondrinkers. Individual drinking behavior is more influenced by one's own personal preferences and norms than by any other variable. The conclusions were that adolescent drinking is influenced by age, race, and social class, and most influenced by internalized parental and peer pressures.[84]

Early Drinking and Subsequent Alcohol Problems

Filstead, writing on adolescence and alcohol, discusses the etiology and prevalence of teenage alcohol use. About the problem of teenage alcoholism, Filstead had this to say:

> The etiology of alcoholism is not clearly established; consequently, the relationship between adolescent drinking and alcoholism is not clear. This has led to an ongoing debate as to the existence of adolescent alcoholism. Are there teenage alcoholics?
>
> While there is ample evidence concerning the psychological, social, and interpersonal disruption encountered by adolescents who misuse alcohol, the physical consequences of misuse are minimal. Even when there are physiological consequences, adolescents only rarely show physical dependence on alcohol.[85]

Filstead goes on to summarize some of the significant findings of Blane and Hewitt in their data collections. He states that they found:

1. There has been no change in consumption of teenagers between 1946-1975.

2. There are no more teenagers drinking than previously reported.

3. Boys drink earlier than girls and experience more problems.

4. The age of first drinking experience has remained stable, but there has been a trend toward earlier age of consumption.

5. There has been no shift in drunkeness or its consequences druing the period 1946-1975.[86]

Filstead's report on his surveys of teenage drinking found that 5 percent of high school students have drinking behavior similar to teenagers in treatment. Another 19 percent use alcohol in such a manner as to have encountered substantial problems. Filstead found that while 5 percent reported no use of alcohol, another 71 percent reported use but with no subsequent problems.[87]

Blane reported on his survey of the drinking behaviors of delinquent and nondelinquent adolescent males. From the results he was able to report that nonproblem drinkers drink less than problem drinkers disregarding delinquency status. More problem drinking delinquents perceive themselves as having a problem than problem drinking nondelinquents. Delinquent problem drinkers use more illicit drugs of all kinds, have fewer intact families, were less likely to be allowed to drink by parents, and have more social pathology than nondelinquents.

In addition, Blane reported that delinquent problem drinkers had wider social and familial pathology, drink more at one time and also drink more frequently, suffer more negative consequences, and achieve less in school (they are often one grade behind). Blane also determined that delinquent problem drinkers come from a non-traditional family setting.[88]

Gomberg has also studied the characteristics of young male alcoholics and has reported on the findings. The results are consistent with the findings of previous studies. Younger alcoholics seem to have started drinking and become intoxicated

at an early age. They have been more involved with illicit drugs other than alcohol. They report more patriarchal family structure, as well as more rebelliousness and anti-social behaviors. Young alcoholics will do more drinking in public places and in automobiles than older diagnosed alcoholics. The younger alcoholic also reported more childhood problems, such as hyperactivity and nailbiting, which is consistent with their aggressive behavior patterns.[89]

Wilsnack, et al. focused their study on characteristics of young women whose father had been alcoholic. The researchers were concerned with a number of specific behaviors. They found that daughters of alcoholics had higher quantity-frequency rates of drinking than the controls, and that this was particularily significant if beer consumption was the tested variable. Importantly, the alcoholic's daughters reported drinking, at least in part, in response to personal problems or pressures. However, there was no significant evidence to suggest that daughters of alcoholics differ from controls in levels of depression, sex-role identification, or sexuality.[90]

The Mortimer-Filkins Test

Introduction

The Mortimer-Filkins Test served as the criterion measure for this study. The Mortimer-Filkins Test was developed under contract from the United States Department

of Transportation National Highway Traffic Safety Administration to the University of Michigan Highway Safety Research Institute during the Alcohol Safety Action Programs. The test was intended to provide a means to diagnose problem drinking behavior in a population of OUIL offenders and be simplistic enough to be used with little prior training.

The Mortimer-Filkins Test consists of a questionaire and interview which can be used separately or together (see Appendix C). Each has its own set of cut-off scores for determining the level of problem classification. However, the procedure recommends the use of both the questionaire and interview during the assessment process. The questionaire can be employed directly by the assessor or in a self-report format. The interview is administered directly by the assessor to the subject. The scoring procedure combines the sum for both the questionaire and the interview to arrive at the total score used to determine the level of problem drinking.

Design and Statistical Analysis

Mortimer has discussed the methods by which the test was developed and the reliability-validity determined.[91] An initial literature review of studies related to the assessment of problem drinking was conducted. In addition to direct assessment procedures, other measures were identified for their applicability. From the literature review, 452

test items were developed. The 452 items were reduced to 135 items and then further reduced to the final 58 items as a result of pilot studies. The interview was developed along a similar format: 245 items were reduced to 66 items. The intent of the interview is to develop a composite picture of the subject. The final interview and questionaire was then submitted to statistical analysis.

A research study using an experimental group of known alcoholics and a control group were administered the test. The statistical analysis of the reliability utilized split-half correlation coefficients corrected by the Spearman-Brown formula. The results demonstrated that the total score reliability was 0.976. Validity was tested by use of point bi-serial correlation coefficients. The results demonstrated a total score coefficient of 0.917. A combined questionaire-interview weighted sum was 0.921.[92]

Allied Research Studies

Mortimer reported on field studies utilizing the Mortimer-Filkins Test. The external criteria used to determine the level of problem classification were blood alcohol concentration at the time of arrest, prior arrests for DUIL, and the number of prior alcohol-related offenses. While these criteria are recognized as being less than perfect, they are the best available. The studies indicated that the cut-off scores could be lowered, but at the cost of increasing

the number of false positives among the problem drinkers.[93] Mortimer states that the rationale for reducing the cut-off scores is based on the belief that 50 percent of the DUIL population are problem drinkers.[94]

Mortimer has reported on the limited response to the use of the Mortimer-Filkins Test. He states that there have been thousands of individuals who have undergone the assessment with satisfactory results. One major study compared blood alcohol concentration at the time of arrest, prior DUIL offenses, and total score on the test to determine the probability of a subsequent recidivism by the driver. Results demonstrated that prior DUIL offenses were as good as blood alcohol concentration and the total score on the test, or all three indicators taken together at predicting recidivism (rearrest). The study indicated that for individuals without prior DUIL offenses, the total score on the test was a sufficient predictor of recidivism. The study utilized 9,900 cases.[95]

Supplementary Information Presented for the Assessor

The procedure is constructed in a manner which assists in assessing the subject's relevant background. A tally sheet is provided to record blood alcohol concentration, various types of driving offenses, reckless driving offenses, motor vehicle accidents, as well as the criminal history. In addition, the questionaire and interview assess personality

traits and drinking behavior pertinent to the assessment. The data is meant as an adjunct to the total score to assist in developing a more complete subject profile.

As part of the contract to develop the Mortimer-Filkins Test, three instructional volumes were prepared. In Volume I, the Manual, the authors referred to the value of utilizing blood alcohol concentration during the assessment. They report that it would be difficult to obtain a blood alcohol concentration of 0.10 percent and be a moderate drinker, likewise blood alcohol concentrations of 0.25 percent or higher are indicative of problem drinking.[96]

Various factors known to influence blood alcohol concentration at any given time, as well as the effect of alcohol on driving are cited. The authors present a strong case to support the position that blood alcohol concentration is an indicator of problem drinking.[97]

Volume I reviews the rationale for utilizing the subject's driving record as part of the assessment of the level of problem drinking. The reasons are as follows:

1. Multiple arrests for DUIL are strong indicators of problem drinking behavior.

2. The number of motor vehicle accidents, although the number of minor accidents may not be included in the official record, indicates a problem with alcohol.

3. The number of moving violations may indicate poor driving behaviors resulting from the influence of alcohol.

Suspensions, revocations, and restricted licenses resulting from drinking-driving are indicative of problem drinking. The authors emphasize the value of the driving record as a good source of indicators of problem drinking.[98]

Volume II, Supplemental Readings, provides the rationale for the selection of questionaire items, as well as a review of the body's response to alcohol and alcohol abuse.

Volume III, Scoring Keys, provides the instruction for scoring and interpreting the results of the assessment. Mortimer has responded to reported difficulties in scoring the test with suggestions for simplifying the process. He also cautions against using a shortened version of the procedures without jeopardizing its validity and reliability.[99]

Regardless of its widespread application, the Mortimer-Filkins Test has not been without its critics. A study conducted by Wendling and Kolody strongly criticized the value of the test in predicting rates of recidivism among convicted alcohol-impaired drivers. A statistical analysis of 1,740 cases concluded that the rates of error in predicting recidivism from the total score on the test were unacceptable.

"Using the total score, for example, to predict recidivism one would incorrectly classify 19.3 percent of the non-recidivist in order to identify correctly only 29.3 percent of the recidivists."[100]

In addition, Wendling and Kolody have identified other predictors useful in developing a prediction model for recidivism. They used multiple regression to analyze twelve

variables. From this analysis the authors concluded that the first five variables were the most significant predictor variables. These variables were:

1. Number of prior suspensions or revocations.
2. Number of prior suspension or revocation violations.
3. Number of arrests for DUIL or impaired driving.
4. Number of prior DUIL offenses.
5. Number of non-alcohol related arrests.[101]

Wendling and Kolody state this conclusion. "On the basis of the data herein, there is no apparent reason, with the exception of general arrest history, to search beyond driving record variables for prediction of recidivism. In these data, past driving behavior clearly is the best predictor of future driving behavior."[102]

This conclusion is not inconsistent with recommendations of Mortimer, Filkins, et al. who have similarily suggested the inherent value of reviewing the driving record as a source of indicators of problem drinking.

Summary

With its inception at the beginnings of the ASAP years, the Mortimer-Filkins Test has proven to be a valuable assessment tool for court personnel charged with determining problem drinking among convicted DUIL offenders. Further credibility for the Mortimer-Filkins Test occured as it found its way into the repertoire of assessing agencies other than

those associated with the courts. The choice of this test is based on its demonstrated reliability and validity, an important factor to field personnel in their everyday application of the test. The test remains a significant contributor to highway traffic safety efforts in combating drinking-drivers.

Highway safety research studies have upheld the concept that alcohol plays a significant role in accident causation. Roberts in his book devotes an entire chapter to alcohol and accidents. He concludes that the alcohol-related accident problem is serious and medical knowledge can help, but for the alcoholic, cessation of drinking will not necessarily lower his accident risk immediately.[64]

A California Department of Motor Vehicle report concludes "The evidence . . . seems clear that alcoholism, i.e., excessive and continuous use of alcohol, contributes significantly to traffic accidents. Its relative contribution, moreover, seems to be greater for accidents of greater severity."[65]

The University of Michigan Highway Safety Research Institute's study of the effect of lowering the drinking age to eighteen in Michigan concluded that when 18 to 20 year olds could legally drink alcohol sales went up, and so did the rate of accidents among this group.[66]

After a review of a variety of Highway Safety approches, Waller found that, "It is clear that as of yet we have no silver bullet." Waller finds it unrealistic to submit all

alcoholics to some remedial traffic program since only a few will actually be involved in fatal accidents, and this would not warrant the overall cost; however, educational programs toward changing public attitude may be more productive.[67]

For those drivers involved in drunk driving arrests, it is reasonable to assume they will fall within one of the three types of classifications commonly used: social drinkers, excessive, or problem drinkers. The data suggests that of these groups the problem drinker is most represented in the statistics, especially for drivers over the age of 25 (this is not to imply that problem drinkers do not exist at a younger age). Yet, on the other hand, alcohol is often involved in single vehicle accidents which most often claims the lives of young drivers.

The one unquestionable statement that can be made about the drinking-driving problem is that it has failed to respond to even the most vigorous attempts to modify it for any sustained period of time to date. Elaborate attempts to control drinking-driving by increased enforcement have only served to drain large amounts of money from public funds, while providing marginal or little to no effect. This pessimism is not to deny that a drinking-driving problem exists, or to concede that it is unmanageable, but rather it serves as a stimulus to seek newer and more innovative efforts. Only a sustained effort can impact on drunk driving.

Footnotes

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Chapter III

Design and Methodology

During the development of this study it became apparent that a number of factors, difficult to control, would influence the sampling process and the strength of the analysis of the data. Limitations on the availability of subject for the sample made it impractical to establish a control population could be assumed to have strengthened the interpretation of the data. Additionally, it was not practical to obtain subjects from other agencies for a more representative sample. However, this selected sample, while it has the potential to be a unique population, fitted the defined purpose of this study as stated in Chapter I. Therefore, this study should be viewed as a preliminary effort to be used in the assessment of drinking-driving problems among young convicted OUIL offenders and is not meant to replace current practices in use by assessing agencies.

The Population

The population of this study did include all drivers who had been (1) arrested and subsequently convicted by the Michigan 54th-B District Court, East Lansing, Michigan, of operating under the influence of intoxicating liquor, and (2) did undergo pre-sentencing assessment for problem drinking by the probation office of said court, and (3) were of age twenty-five years old or less.

Sampling Design

Data Source

Data for this ex post facto study were collected from the organizational records of a selected sample of young drinking drivers arrested and convicted at East Lansing, Michigan, after April 1, 1983, but before May 1, 1984. The sample consisted of the first one hundred twenty-six individual drinking-drivers for whom all relevant information was available, and who met the age limitations of the study. The complete population from which the sample was drawn consisted of three hundred forty-eight OUIL offenders who had undergone assessment at the probation office of the 54th-B District Court of Michigan.

All information relative to each offender was obtained by one probation officer who had been assigned to perform all assessments on OUIL offenders. Data included the global score for the Mortimer-Filkins Test, a copy of the driving record of the offender at the time of assessment, the blood alcohol concentration at the time of arrest, the age of the offender. Other information included the reported first year of alcohol drinking, and the reported number of alcohol drinking days in the previous thirty days prior to assessment.

The global score on the Mortimer-Filkins Test served to divide the sample into three subgroups as defined by the level of problem classification, and acted as the dependent variable. The remaining data variables served as the

independent variables in the data analysis. The dependent variable was paired with the independent variables either singly or in combination for the purpose of statistical analysis.

Due to restrictions by the Michigan 54th-B District Court on client confidentiality, the court probation officer reviewed the organizational records and selected the first one hundred twenty-six individuals convicted as OUIL offenders who met the requirements for inclusion in the selected sample. The probation officer recorded all pertinent information related to the global score on the Mortimer-Filkins Test and the independent variables, including a copy of the offenders driving record at the time of assessment. When the first one hundred twenty-six records meeting the requirements were obtained, the probation officer turned over the records to the investigator for coding prior to analysis.

Data Interpretation

The driving records were examined by the investigator in order to record information relevant to the independent variables of moving violations, alcohol-related violations, reckless driving violations, and reported motor vehicle accidents. Violations for alcohol-related offenses or reckless driving offenses were not included under the independent variable moving violations, so as not to be counted more than once in the statistical analysis. Moving violations were simply counted with no attempt to assign a weighted

value to the type of offense. Motor vehicle accidents, likewise, were simply counted and summed for each individual offender as they occurred with no attempt to weight the nature or type of accident.

The remaining independent variables were recorded as they appear in the organizational records. The blood alcohol concentration was recorded as the percent of weight by volume reported at the time of arrest. For simplicity the age of the individual offender at the time of assessment was recorded without any reference to exact chronological age in terms of years and months. The self-reported year when drinking began was recorded in years without reference to exact number of months. The number of alcohol drinking days in the previous thirty days prior to the assessment was recorded as the number of self-reported days. These last two independent variables, were obtained from the Office of Substance Abuse Services Areawide Data Evaluation Systems (ADES) form which is completed as part of the total assessment process.

All information for both the dependent and independent variables was numerically coded in such a manner that it could be entered into the mainframe Cyber 750 computer at the Michigan State University's Computer Services Center for subsequent data analysis. The data analysis was conducted by use of the 1982 revised version of the Statistical Package for the Social Sciences as developed at Northwestern University, Evanston, Illinois.[1] A file was created to include all

values for the dependent and independent variables for each of the selected one hundred twenty-six individual OUIL offenders.

Due to the nature of the selected sample, the hypotheses tested could not be generalized to a larger population. Major sample biases exist for the manner in which the sample was drawn, as well as the nature of the type of individual arrested. The offenders made their law enforcement contact in a medium-sized college community with a greater emphasis on OUIL arrests than can be typically expected in other communities. In addition, the offender may be expected to be more representative of college students than non-college students due to the study having been conducted in East Lansing, Michigan, where Michigan State University is located. At the time of this study Michigan State University had an enrollment in excess of 40,000 students. Therefore, the conclusions of the study will be descriptive of this specific sample and not the population as a whole.

The Null Hypotheses

The following are statements of the three major hypotheses and their subhypotheses that will be studied in the null form; i.e., stating that no significant relationship exists between the stated variables for statistical purposes:

H_o1: There is no significant difference between the mean scores for each independent variable and the level of problem

classification as determined by the global score on the Mortimer-Filkins Test. These subhypotheses are:

a. Age of the individual.
b. Blood alcohol concentration at the time of arrest.
c. Reported number of alcohol drinking years.
d. The reported number of alcohol drinking days in the previous thirty days prior to assessment.
e. Moving violations.
f. Alcohol-related violations.
g. Reckless driving violations.
h. Reported number of motor vehicle accidents.

H_o2: There is no relationship between the global score on the Mortimer-Filkins Test and the following descriptive independent variables. These subhypotheses are:

a. Age of the individual.
b. Blood alcohol concentration at the time of arrest.
c. Reported number of alcohol drinking years.
d. The reported number of alcohol drinking days in the previous thirty days prior to assessment.
e. Moving violations.
f. Alcohol-related violations.
g. Reckless driving violations.
h. Reported number of motor vehicle accidents.

H_o3: The global score on the Mortimer-Filkins Test obtained during assessment can not be predicted by the following descriptive independent variables when taken either singly or in combination apriori. These subhypotheses are:

a. Age of the individual.
b. Blood alcohol concentration at the time of arrest.
c. Reported number of alcohol drinking years.
d. The reported number of alcohol drinking days in the previous thirty days prior to assement.
e. Moving violations.
f. Alcohol-related violations.
g. Reckless driving violations.
h. Reported number of motor vehicle accidents.

H_o1:

Symbolically

a. $\bar{X}_{1a} = \bar{X}_{2a} = \bar{X}_{3a}$
b. $\bar{X}_{1b} = \bar{X}_{2b} = \bar{X}_{3b}$
c. $\bar{X}_{1c} = \bar{X}_{2c} = \bar{X}_{3c}$
d. $\bar{X}_{1d} = \bar{X}_{2d} = \bar{X}_{3d}$
e. $\bar{X}_{1e} = \bar{X}_{2e} = \bar{X}_{3e}$
f. $\bar{X}_{1f} = \bar{X}_{2f} = \bar{X}_{3f}$
g. $\bar{X}_{1g} = \bar{X}_{2g} = \bar{X}_{3g}$
h. $\bar{X}_{1h} = \bar{X}_{2h} = \bar{X}_{3h}$

where

$\bar{X}_1$ independent = social drinkers variable

$\bar{X}_2$ independent = excessive drinker variable

$\bar{X}_3$ independent = problem drinker variable

H_o2:

$$r_{a,mf} = r_{b,mf} = r_{c,mf} = r_{d,mf} = r_{e,mf} = r_{f,mf} = r_{g,mf} = r_{h,mf}$$

where

r = the Pearson Correlation Coefficient

mf = global score on Mortimer-Filkins Test

a = age

b = blood alcohol concentration

c = reported number of alcohol drinking years

d = reported number of alcohol drinking days in the previous thirty days prior to assessment

e = moving violations

f = alcohol-related violations

g = reckless driving violations

h = reported humber of motor vehicle accidents

H_o3:

$$y = a + bx_a + bx_b + . . . + bx_h + e$$

where

y = predicted global score on Mortimer Filkins Test

a = intercept (constant)

b = slope

x = independent variable

e = error

Methods of Analysis

The data obtained were analyzed by using the following: a two-tailed analysis of variance, Pearson's correlation coefficient, and multiple regression analyses.

H_o1: A two tailed analysis of variance was employed to determine the significance of the difference between the means for all independent variables and the classification level of a social drinker, excessive drinker, and problem drinker. A .05 level of significance was used to determine the acceptance or rejection of this hypothesis.

H_o2: A Pearson's correlation coefficient was employed to determine the relationship between the global score on the Mortimer-Filkins Test and each of the descriptive independent variables. No level of significance was attached to the relationship; however, the descriptive independent variables were rank ordered by the strength of their relationship to the global score on the Mortimer-Filkins Test.

H_o3: Multiple regression analysis was employed to determine the regression coefficient used to predict the global score on the Mortimer-Filkins Test. The descriptive independent variables were entered into the equation on the basis of their ability to explain the variance in the global score. Only those descriptive independent variables that were able to maintain a .05 significance level for

the regression coefficient remained in the equation.

Report of Analysis

The results of the analysis of the data are presented in Chapter IV in written and tabular form. Each hypothesis was analyzed independently in order to generate the various data. The tables represent the analysis of variance for the dependent variable, or level of problem classification, and each of the independent variables, the relationship of the independent variables to the dependent variable, and the results of a multiple regression analysis. Additional data generated during the analysis, but not the subject of the various hypotheses, are presented in the appendices A and B of the study.

Footnotes

[1]Norman H. Nie, Hadlai C. Hull, and Marija Norusis, SPSS Introductory Guide: Basic Statistics and Operations, (McGraw-Hill Book Company, Chicago, IL., 1982), pp. 1-167.

Chapter IV

Analysis of the Data

The results of the analysis of data are presented in this chapter. The analysis of the following statistics are presented and discussed: 1) the difference in the mean scores for each of the independent variables and the level of problem classification as determined by the global score on the Mortimer-Filkins Test, 2) the relationship of the global score on the Mortimer-Filkins Test to each of the eight (8) independent variables, 3) the ability of each of the eight (8) independent variables to explain the variance in the global score on the Mortimer-Filkins Test. In addition, other derived relationships are presented to describe the sample population.

All of the original 126 individual convicted OUIL offenders met the requirements for inclusion in the study and were used in the collection and analysis of the data. Table 2 presents the composition of the selected sample by level of problem classification as determined by the global score on the Mortimer-Filkins Test.

Difference in the Mean Scores for Each Independent Variable and the Level of Problem Classification

The following independent variables of the null hypothesis H_o1 were tested for the difference in the computed mean

Table 2

Composition of the selected sample by level of problem classification as determined by the global score on the Mortimer-Filkins Test

	Social Drinkers	Excessive Drinkers	Problem Drinkers	Total
Number of Cases	113	10	3	126
% Relative Frequency	89.7	7.9	2.4	100.0
% Cumulative Frequency	89.7	97.6	100.0	

score for each of the eight (8) independent variables and the level of problem classification by using a two-tailed analysis of variance method. The independent variables were examined with respect to three levels of problem classification and the mean scores obtained for each of the eight (8) independent variables. The results are:

A. Age--In comparing the mean score of ages for each level of problem classification a 2.05 F-statistic was obtained with an associated significance level of .13. This value was not sufficient to demonstrate significance at the .05 level. The null hypothesis of no significant difference in the mean age level of problem classification was sustained. The results are presented in Table 3 under the heading: An analysis of variance of the mean age for each level of problem classification.

B. Blood Alcohol Concentration--In comparing the mean score of blood alcohol concentration at the time of arrest for each level of problem classification a .48 F-statistic was obtained with an associated significance level of .62. This value was not sufficient to demonstrate significance at the .05 level. The null hypothesis of no significant difference in the mean blood alcohol concentration of each level of problem classification was sustained. The results are presented in Table 4 under the heading: An analysis of variance of the mean blood alcohol concentration for each level of problem classification.

Table 3

An analysis of variance of the mean age for each level of problem classification

Level of Problem Classification	Sum of Squares	Degrees of Freedom	Mean Squares	F Ratio	Significance
Between Groups	15.79	2	7.90		
Social Drinkers	426.04				
Excessive Drinkers	38.50			2.06	.13
Problem Drinkers	8.0				
Within Groups	472.54	123	3.84		

Note: F=2.72 for a significance level of .05

Table 4

An analysis of variance of the mean blood alcohol concentration for each level of problem classification

Level of Problem Classification	Sum of Squares	Degrees of Freedom	Mean Squares	*F* Ratio	Significance
Between Groups	8.31	2	4.16		
Social Drinkers	960.92				
Excessive Drinkers	86.90			.48	.62
Problem Drinkers	8.67				
Within Groups	1056.49	123	8.59		

Note: F=2.72 for a significance level of .05

C. The Reported Number of Alcohol Drinking Years--In comparing the mean score of the reported number of alcohol drinking years for each level of problem classification a 3.92 F-statistic was obtained with an associated significance level of .02. This value was sufficient to demonstrate significance at the .05 level. The null hypothesis of no significant difference in the means for each level of problem classification was rejected. The results are presented in Table 5 under the heading: An analysis of variance of the means for the reported number of years of alcohol drinking for each level of problem classification.

D. The Number of Alcohol Drinking Days in the Previous Thirty Days Prior to Assessment--In comparing the mean scores for the number of alcohol drinking days in the previous thirty days prior to assessment for each level of problem classification at 3.40 F-statistic was obtained with an associated significance level of .04. This value was sufficient to demonstrate significance of this independent variable at the .05 level. The null hypothesis of no significant difference in the means for each level of problem classification was rejected. The results are presented in Table 6 under the heading: An analysis of variance of the mean number of reported alcohol drinking days in the previous thirty days prior to assessment.

E. Moving Violations--When the mean number of moving violations for the three levels of problem classification was compared, a .71 F-statistic was obtained with an associated

Table 5

An Analysis of variance of the means for the reported number of years of alcohol drinking for each level of problem classification

Level of Problem Classification	Sum of Squares	Degrees of Freedom	Mean Squares	F Ratio	Significance
Between Groups	30.10	2	15.05		
Social Drinkers	368.99				
Excessive Drinkers	78.40			3.92	.02
Problem Drinkers	24.67				
Within Groups	472.06	123	3.84		

Note: F=2.72 for a significance level of .05

Table 6

An analysis of variance of the mean number of reported alcohol drinking days in the previous thirty days prior to assessment for each level of problem classification

Level of Problem Classification	Sum of Squares	Degrees of Freedom	Mean Squares	F Ratio	Significance
Between Groups	101.17	2	50.58		
Social Drinkers	1494.57				
Excessive Drinkers	192.40			3.40	.04
Problem Drinkers	140.67				
Within Groups	1827.63	123	14.86		

Note: F=2.72 for a significance level of .05

significance level of .49. This value was not sufficient to demonstrate significance at the .05 level. The null hypothesis of no significant difference in the mean number of moving violations for each level of problem classification was sustained. The results are presented in table 7 under the heading: An analysis of variance of the mean number of moving violations for each level of problem classification.

F. Alcohol-Related Violations--In comparing the mean number of alcohol-related violations for each level of problem classification a 20.36 F-statistic was obtained with an associated significance level of .01. This value was sufficient to demonstrate significance at the .05 level. The null hypothesis of no significant difference in the mean number of alcohol-related violations of each level of problem classification was rejected. The results are presented in Table 8 under the heading: An analysis of variance of the mean number of alcohol-related violations for each level of problem classification.

G. Reckless Driving Violations--When the mean number of reckless driving violations for each level of problem classification was compared, a 2.51 F-statistic was obtained with an associated significance level of .09. This value was not sufficient to demonstrate significance at the .05 level. The null hypothesis of no significant difference in mean number of reckless driving violation for each level of problem classification was sustained. The results are presented in Table 9 under the heading: An analysis of

Table 7

An analysis of variance of the mean number of moving violations for each level of problem classification

Level of Problem Classification	Sum of Squares	Degrees of Freedom	Mean Squares	*F* Ratio	Significance
Between Groups	8.63	2	4.31		
Social Drinkers	680.53				
Excessive Drinkers	62.50			.71	.49
Problem Drinkers	2.67				
Within Groups	745.70	123	6.06		

Note: F=2.72 for a significance level of .05

Table 8

An analysis of variance of the mean number of alcohol-related violations for each level of problem classification

Level of Problem Classification	Sum of Squares	Degrees of Freedom	Mean Squares	*F* Ratio	Significance
Between Groups	2.36	2	1.18		
Social Drinkers	1.96				
Excessive Drinkers	4.50			20.36	>.01
Problem Drinkers	.67				
Within Groups	7.13	123	.06		

Note: F=2.72 for a significance level of .05

Table 9

An analysis of variance of the mean number of reckless driving violations for each level of problem classification

Level of Problem Classification	Sum of Squares	Degrees of Freedom	Mean Squares	*F* Ratio	Significance
Between Groups	.08	2	.04		
Social Drinkers	.99				
Excessive Drinkers	.90			2.51	.09
Problem Drinkers	0.00				
Within Groups	1.89	123	.02		

Note: F=2.72 for a significance level of .05

variance of the mean number of reckless driving violations for each level of problem classification.

H. Reported Number of Motor Vehicle Accidents--In comparing the mean number of reported motor vehicle accidents for each level of problem classification a 10.13 F-statistic was obtained with an associated significance level of >.01. This value was sufficient to demonstrate significance at the .05 level. The null hypothesis of no difference in the mean number of reported motor vehicle accidents for each level of problem classification was rejected. The results are presented in Table 10 under the heading: An analysis of variance of the mean number of reported motor vehicle accidents for each level of problem classification.

The Relationship of the Dependent Variable, the Mortimer-Filkins Test, to the Eight Independent Variables

The following independent variables of the null hypotheis H_o2 were tested for their relationship to the global score on the Mortimer-Filkins Test.

A. Age

B. Blood Alcohol Concentration at the Time of Arrest

C. The Number of Reported Alcohol Drinking Years

D. The Reported Number of Alcohol Drinking Days in the Previous Thirty Days Prior to Assessment

E. Moving Violations

F. Alcohol-Related Violations

Table 10

An analysis of variance of the mean number of reported motor vehicle accidents for each level of problem classification

Level of Problem Classification	Sum Squares	Degrees of Freedom	Mean Squares	*F* Ratio	Significance
Between Groups	6.49	2	3.24		
Social Drinkers	28.32				
Excessive Drinkers	6.40			10.13	>.01
Problem Drinkers	4.67				
Within Groups	39.39	123	.32		

Note: F=2.72 for a significance level of .05

G. Reckless Driving Violations

H. Reported Number of Motor Vehicle Accidents.

To determine the relationship between the dependent variable, the Mortimer-Filkins Test, and each of the eight (8) independent variables the Pearson method of determing the correlation coefficient was employed. (See Appendix D for further discussion of the Pearson Correlation method).

The results of the Pearson Correlation Coefficient statistics are presented in Table 11 under the heading: The relationship of each of the eight (8) independent variables to the dependent variable, the Mortimer-Filkins Test, by rank order of realtionship.

The eight (8) independent variables are rank ordered according to their relationship to the dependent variable. In addition to the correlation coefficient (r), Table 11 also presents three other relevant statistics: 1) the significance of r, 2) the probability of obtaining that specific value of r, and 3) the r squared value.

Bloomers and Forsyth have cautioned against interpreting the r results too freely: 1) correlation coefficients represent relationships for a specific sample, 2) correlation coefficients should not be compared to each other, and 3) correlation coefficients do not clearly establish causal-effect relationships. With these caveats stated, the results of the Pearson Correlation test are reviewed.[1]

The largest value of r was obtained from the relationship of the global score on the Mortimer Filkins Test and

Table 11

The relationship of each of the eight (8) independent variables to the dependent variable, the Mortimer-Filkins Test, by rank order of relationship

Variable	Pearsons Correlation Coefficient r	Significance of r	Probability r	r Squared
Motor vehicle accidents	.36	>.01	>.01	.13
Alcohol-related violations	.33	>.01	>.01	.11
Number of reported alcohol drinking days in the previous thirty days prior to assessment	.24	>.01	>.01	.06
Reported number of alcohol drinking years	.15	.05	.10	.02
Blood alcohol concentration	.10	.14	.28	.01
Reckless driving violations	.10	.14	.29	.01
Number of moving violations	.04	.34	.68	>.01
Age	.20	.01	.03	.04

the number of motor vehicle accidents reported this value was .36 which represents 12.7 percent of the variance in the global score. The significance and probility of this r value are >.01 and >.01 respectively, indicating that the element of chance alone of obtaining this result was very small.

The second largest value of r obtained represents the relationship between the global score on the Mortimer-Filkins Test and the number of reported alcohol-related violations. This value was .33. The amount of variance in the Mortimer-Filkins Test global score explained by this relationship is 10.7 percent. The significance of this r value is >.01, with a probability for the r value of >.01, both statistics indicate that the influence of chance alone was small.

Three other relationships had a significance level for r of .05 or less. These were:

1. An r value of .24 for the relationship of the global score on the Mortimer-Filkins Test to the number of reported alcohol drinking days in the previous thirty days prior to assessment.

2. An r value of .15 for the relationship of the global score on the Mortimer-Filkins Test to the reported number of alcohol drinking years.

3. An r value of -.20 for the relationship of the global score on the Mortimer-Filkins Test and the age of the individual.

The remaining three independent variables had values of r with a significance level greater than .05, they were:

1. The relationship of the global score on the Mortimer-Filkins Test to blood alcohol concentration at the time of arrest produced an r value of .10.

2. The relationship of the global score on the Mortimer-Filkins Test to the number of reckless driving violations produced an r value of .10.

3. The relationship of the global score on the Mortimer-Filkins Test to the number of moving violations demonstrated and r value of .04.

The Pearson Correlation Coefficient not only provided for a determination of the relationship between the Mortimer-Filkins Test and each of the eight (8) independent variables, but in addition the method assisted in the testing of the third hypothesis. Knowing the rank order of the relationship was useful in developing a multiple regression model.

The Development of a Prediction Model by Use of Multiple Regression Technique

The remaining major statistical technique to be employed was the application of multiple regression technique to the data in order to obtain a prediction model for the dependent variable, the global score on the Mortimer-Filkins Test, from the eight (8) independent variables.

The following independent variables of the null hypothesis H_o3 were tested for their ability to form a prediction model

of the global score on the Mortimer-Filkins Test.

a. Age

b. Blood Alcohol Concentration at the Time of Arrest

c. Reported Number of Alcohol Drinking Years

d. The Reported Number of Alcohol Drinking Days in the Previous Thirty Days Prior to Assessment

e. Moving Violations

f. Alcohol-Related Violations

g. Reckless Driving Violations

h. Reported Number of Motor Vehicle Accidents.

To derive this model from multiple linear regression the procedures of the Statistical Package for the Social Sciences (SPSS) were employed. The method used least squares to minimize the distance between the observed data and the prediction line to generate the model. The SPSS procedure for developing the regression line requires the selection of a dependent variable. For this test it was the global score on the Mortimer-Filkins Test, and the rank ordering of the independent variables according to their relationship to the dependent variable. The selection of a method for which the independent variables were to be entered into the equation was chosen; to test this hypothesis in a multiple regression equation, a stepwise method of entry was selected. (See Appendix D for further discussion of multiple regression procedures).

The computer was programmed to identify the global score on the Mortimer-Filkins Test as the dependent variable

and to arrange the independent variables according to the rank order determined by the Pearson Correlation Coefficient. The order of relationship to the dependent variable was: motor vehicle accidents, alcohol-related violations, number of reported alcohol drinking days in the previous thirty days prior to assessment, reported number of alcohol drinking years, blood alcohol concentration, reckless driving violation, number of moving violations, and age. Table 12 presents the results of this statistical procedure under the heading: Multiple Regression Output--Variables in the Equation.

As can be observed in Table 12, the independent variables were entered into the equation on their ability to explain the variance in the global score on the Mortimer-Filkins Test. The first independent variable entered was the number of motor vehicle accidents. When this variable's effect was removed, the next independent variable to be entered was alcohol-related violations. As the effect of these variables was removed from the equation, the independent variable age was entered. When the effects of these three independent variables were removed, the final independent variable to be entered was the reported number of alcohol drinking years. The final independent variable entered caused the equation to reach the default limit, and the selection process stopped.

The remaining four independent variables: The number of reported alcohol drinking days in the previous thirty days prior to assessment, blood alcohol concentration, reckless

Table 12

Multiple linear regression output: variables in the equation
(Variables in the equation)

Multiple r = .54731
r square = .29955
Adjusted r square = .27639
Standard error = 16.58594

Variable	B	Standard Error of B	Beta	F	Significance of F
Reported Motor Vehicle Accidents	8.62	2.53	.27	11.60	>.01
Alcohol-related Violations	15.82	5.69	.22	7.73	>.01
Age	-4.01	.95	-.41	17.90	>.01
Reported Number of Alcohol Drinking Years	3.27	.95	.34	11.75	>.01
Constant	101.57	17.74		32.79	>.01

Where: 1) B represents the slope, 2) Beta represents the standardized value of B,
3) Constant represents the intercept of the predicted line.

driving violations, and moving violations could not significantly increase the explained variance in the global score on the Mortimer-Filkins Test given the default values of the F statistic at 3.84 with an associated probability of .05. Table 13 presents these variables under the heading: Variables Not in the Equation, along with their partial correlation coefficient, F statistic, and the significance of the F statistic.

As can be observed, none of the variables not in the equation demonstrated an F statistic large enough to meet or exceed the equation default limit. Also presented in Table 13 is the tolerance for the variables not in the equation representing the portion of the variability in the global score not explained by the other variables. The remaining table, Table 14, presents additional regression statistics associated with the development of the prediction model.

Further statistical procedures were utilized to test the appropriateness of the regression model, these techniques are presented in Appendix D as the analysis of the residuals.

Other Relationships Derived from the Analysis of the Data

In evaluating the data to establish the relationship of the variables to the three (3) major hypotheses of this study, other relationships were derived which are descriptive of the selected sample. These relationships are presented in the apppendices. Appendix A presents the variable mean

Table 13

Multiple linear regression output: variables not in the equation
(Variables not in the equation)

Variable	Beta In	Partial Correlation Coefficient	Minimum Tolerance	F	Significance of F
Number of Reported Alcohol Drinking Days in the Previous Thirty Days Prior to Assessment	.09	.10	.57	1.22	.27
Blood Alcohol Concentration	.84	.10	.60	1.17	.28
Reckless Driving Violations	.06	.08	.60	.69	.41
Moving Violations	-.13	-.14	.57	2.24	.14

Where:

1. Partial Correlation Coefficient represents the relationship between the dependent variable and the independent variable when all effects of other independent variables are removed.
2. Minimum Tolerance represents the smallest amount of unexplained variability in the equation when the independent variable is added to those independent variables in the equation.
3. Beta In represents the standardized regression coefficient if that independent variable were added to the equation.

Table 14

Additional Regression Statistics

Statistic	Value
Multiple r	.55
r Squared	.30
Adjusted r squared	.28
Standard error of Equation	16.59

scores for each level of problem classification, as well as the sample mean score and standard error for each variable. Appendix B presents the Pearson Correlation Coefficient obtained for the various combination of independent variables to each other. However, a limited number of the significant findings are discussed in this chapter. Independent variable combinations with a significance level of .05 or less are discussed below.

The following combinations of independent variables demonstrated a significance of .05 or less for the Pearson Correlation Coefficient:

1. Age and the reported number of alcohol drinking years.

2. Age and the number of moving violations.

3. The reported number of alcohol drinking years and the number of reported alcohol drinking days in the previous thirty days prior to assessment.

4. The reported number of alcohol drinking years and the number of moving violations.

5. The reported number of alcohol drinking years and the number of alcohol-related violations.

6. The reported number of alcohol drinking days in the previous thirty days prior to assessment and the number of moving violations.

7. The reported number of alcohol drinking days in the previous thirty days prior to assessment and the number of reported motor vehicle accidents.

8. The number of moving violations and the reported number of motor vehicle accidents.

9. The number of moving violations and the number of alcohol-related violations.

10. The number of alcohol-related violations and the number of reported motor vehicle accidents.

11. The number of reckless driving violations and the number of reported motor vehicle accidents.

Summary

The analysis of the data presented in this chapter provide both descriptive and predictive information on the selected sample of young convicted OUIL offenders. An analysis of variance of the mean scores of the eight (8) independent variables and the level of problem classification determined that the mean scores for the reported number of alcohol drinking years, the number of reported alcohol drinking days in the previous thirty days prior to assessment, the number of alcohol-related violations, and the number of reported motor vehicle accidents were significant at the .05 level or less. These subhypotheses of the null hypothesis 1 were rejected on the basis of the analysis of variance.

The Pearson Correlation Coefficient derived for the relationship of the global score on the Mortimer-Filkins Test and each of the eight independent variables demonstrated that the reported number of motor vehicle accidents, the number of alcohol-related violations, the number of reported

alcohol drinking days in the previous thirty days prior to assessment, age of the individual, and the number of reported alcohol drinking years were significant at the .05 level. The blood alcohol concentration at the time of arrest, the number of reckless driving violations, and the number of moving violations did not demonstrate significance at the .05 level. These subhypotheses of hypothesis 2 were sustained.

A prediction model for the global score on the Mortimer-Filkins Test was generated from the ability of four of the eight independent variables to predict the global score. The technique employed was multiple linear regression to develop the model. This method determined that the independent variables which could be utilized within the predetermined limit constraints were:

1. The reported number of motor vehicle accidents.
12. The number of alcohol-related violations.
3. The age of the individual.
4. The reported number of alcohol-drinking years.

The remaining four (4) variables could not significantly increase the amount of variance explained by the model. The amount of variance explained by the prediction model was determined to be approximately .30. An analysis of variance of the prediction model demonstrated a linear relationship between the independent variables and the global score on the Mortimer-Filkins Test at less than the .01 significance level.

The prediction model derived can be represented as follows:

$$Y = 101.57 + 8.62 \pm 2.53\ (X_1) + 15.82 \pm 5.69\ (X_2) +$$

$$- 4.01 \pm .95\ (X_3) + 3.27 \pm .95\ (X_4)$$

where

Y = global score on the Mortimer-Filkins Test

X_1 = the reported number of motor vehicle accidents

X_2 = the number of alcohol-related violations

X_3 = age

X_4 = the reported number of alcohol drinking years.

Other additional significant relationships were identified from the analysis of the data. The relationships of the independent variables to each other that were significant at the .05 level as determined by the Pearson Correlation Coefficient are:

1. Age to the reported number of alcohol drinking years and the number of moving violations.

2. The number of reported alcohol drinking years related to the reported number of alcohol drinking days in the previous thirty days prior to assessment, the number of moving violations, and the number of alcohol-related violations.

3. The number of reported alcohol drinking days in the previous thirty days prior to assessment to the number of moving violations, the number of alcohol-related violations, and the number of reported motor vehicle accidents.

4. The number of moving violations to the number of alcohol-related violations and the number of reported motor vehicle accidents.

5. The number of alcohol-related violations to the reported number of motor vehicle accidents.

6. Finally, the number of reckless driving violations to the reported number of motor vehicle accidents.

The analysis of the data presented in this chapter should only be considered applicable to this selected sample of young convicted OUIL offenders, and are not necessarily to be generalized to a larger population. The summary, conclusions, and recommendations are presented in the next chapter.

Footnotes

[1]Paul J. Bloomers and Robert A. Forsyth, Elementary Statistical Methods in Psychology and Education, 2nd ed. (Boston: Houghton-Mifflin Co., 1977). pp. 451-452.

Chapter V

Summary, Findings, Conclusions, Recommendations, and Discussion/Reflections

The primary purpose of this study was to determine the feasibility of establishing a prediction model by use of regression analysis of the pre-selected descriptive variables which could provide significant predictability of problematic drinking behavior to be cost effective in its application prior to the Mortimer-Filkins Test. Additionally, this study may provide information on the characteristics of young OUIL offenders which may have application to the re-education of these offenders to prevent subsequent similar violations, or enhance intervention techniques prior to initial violations.

To achieve this purpose, several investigations were made to determine whether or not a relationship existed between the following:

1. The mean scores for each of the independent variables and the level of problem classification.

2. The dependent variable, the global score on the Mortimer-Filkins Test, and each of the independent variables utilized in the study.

3. The dependent variable and independent variables in the form of a multiple linear regression.

A selected sample of 126 individuals convicted of operating under the influence of intoxicating liquor was obtained with the cooperation of the Michigan 54th-B District Court, East Lansing, Michigan. The court probation officer assigned to the assessment process interviewed and collected the data on the sample. Sample inclusion required that the assessment took place after April 1, 1983, but before May 1, 1984, and that all information on the variables was available. The sample data were coded and interpreted by the investigator upon receipt from the 54th-B District Court.

The major hypotheses were tested using a two-tailed analysis of variance, Pearson Correlation Coefficient, and multiple linear regression analysis.

Major Findings

The following are the major findings based upon the analysis of the data from this investigation:

1. A significant difference in the mean scores for the independent variables: reported number of motor vehicle accidents, alcohol-related violations, and reported number of alcohol drinking days in the previous thirty days prior to assessment existed for the level of problem classification.

2. A significant relationship existed between the dependent variable and these independent variables: reported number of motor vehicle accidents, alcohol-related violations, age, reported number of alcohol drinking years, and reported number of alcohol drinking days in the previous thirty days

prior to assessment.

3. A prediction model for the dependent variable was derived using the following independent variables: reported number of motor vehicle accidents, alcohol-related violations, age, and the reported number of alcohol drinking years.

4. The blood alcohol concentration at the time of arrest did not significantly influence the dependent variable, nor was there a significant relationship between the blood alcohol concentration at the time of arrest and any of the other variables.

Additional Findings

The following are the additional findings based upon the analysis of data from this investigation as presented by the independent variable:

Age

1. No significant difference in the mean age of each level of problem classification.

2. There was a significant relationship between age and the reported number of alcohol drinking years.

3. There was a significant relationship between age and the number of moving violations.

Blood Alcohol Concentration at the Time of Arrest

1. No significant difference in the mean blood alcohol concentration of each level of problem classification.

2. No significant relationship between the global score on the Mortimer-Filkins Test and the blood alcohol concentration at the time of arrest.

3. That blood alcohol concentration can not be used to significantly increase the predictability of the regression model.

Reported Number of Alcohol Drinking Years

1. There was a significant relationship between the reported number of alcohol drinking years and the number of reported alcohol drinking days in the previous thirty days prior to assessment.

2. There was a significant relationship between the reported number of alcohol drinking years and the number of moving violations.

3. There was a significant relationship between the reported number of alcohol drinking years and the number of alcohol-related violations.

Reported Number of Alcohol Drinking Days in the Previous Thirty Days Prior to Assessment

1. That the number of reported alcohol drinking days in the previous thirty days prior to assessment can not

be used to significantly increase the predictability of the regression model.

2. There was a significant relationship between the reported number of alcohol drinking days in the previous thirty days prior to assessment and the number of moving violations.

3. There was a significant relationship between the reported number of alcohol drinking days in the previous thirty days prior to assessment and the number of reported motor vehicle accidents.

Number of Moving Violations

1. That the number of moving violations can not be used to significantly increase the predictability of the regression model.

2. There was a significant relationship between the number of moving violations and the number of alcohol-related violations.

3. There is a significant relationship between the number of moving violations and the number of reported motor vehicle accidents.

Number of Alcohol-Related Violations

1. There was a significant relationship between the number of alcohol-related violations and the number of reported motor vehicle accidents.

Number of Reckless Driving Violations

1. No significant difference in the mean number of reckless driving violations and each level of problem classification.

2. No significant relationship between the global score on the Mortimer-Filkins Test and the number of reckless driving violations.

3. That the number of reckless driving violations can not be used to significantly increase the predictability of the regression model.

Conclusions

1. The data indicates that at the .05 level of significance individuals with a global score less than 59 differ from individuals scoring greater than 59 on both their drinking and driving behavior.

2. A score above 59 was associated with a greater number of years of alcohol drinking, more frequent drinking, more involvement in alcohol-related violations and a greater number of motor vehicle accidents. Together these describe a greater likelihood of problem drinking.

3. For a score of 59 or less there were lower reported values for number of years of alcohol drinking, less frequent drinking, less involvement in alcohol-related violations, and fewer numbers of motor vehicle accidents which indicates less problematic alcohol drinking behavior. It is proposed

that this subgroup's behavior is potentially amenable through more traditional didactic forms of intervention rather than group counseling reserved for more serious problem drinkers.

4. The analysis of the data for this investigation appears to have sustained the belief in the role of alcohol and accidents, as well as to relate this driving behavior to the level of problematic drinking behavior.

5. An interpretation of the analysis of data pertaining to the relationship of moving violations to accidents and alcohol-related violations suggests that a possible explanation is that as problems with driving behavior increase, so does the likelihood of problematic drinking behavior increase, although this generalization requires further investigation.

6. It is possible to state that for this selected sample the relationship of drinking behavior to problems with driving behavior does exist. Specifically the relationship of the length of the alcohol drinking experience and frequency of drinking are correlated to moving violations and alcohol-related violations. The exact nature of the relationship is unclear at this time.

7. The analysis of the data demonstrated age to be correlated to the number of alcohol drinking years, as well as moving violations. A possible explanation for the relationship is that it may be more the result of the older the individual the greater the likelihood that such violations are incurred.

8. The relationship of age to the global score on the Mortimer-Filkins Test appears to suggest that the younger the individual at the time of assessment, the greater the influence on problematic behavior.

9. A prediction model for the M/F score can be developed using the independent variables, and that the importance of driving behavior and drinking behavior are reflected in the model.

10. An important conclusion of this study was that the blood alcohol concentration at the time of arrest could not show a significant difference in the level of problem classification. Additionally, blood alcohol concentration failed to demonstrate a significant relationship to the global score on the Mortimer-Filkins Test, or any of the other seven (7) independent variables, nor was blood alcohol concentration able to significantly improve the amount of variance in the global score as explained by the prediction model.

The data appear to be at opposition to conclusions about the relationship of blood alcohol concentration at the time of arrest and the level of problematic drinking behavior reached by other investigators. Blount has stated that, "First, one can not predict who will or will not complete treatment on the basis of age, BAC, or M/F score, and second that the latter two are quite robust indicators of problems with alcohol."[1] Reis has also stated the importance of blood alcohol concentration in the identification of problem

drinkers.[2] As reported earlier in the review of literature, blood alcohol concentration at the time of arrest has been utilized in determining problematic drinking behavior. However, for this young (ages 25 or less) selected sample of convicted offenders this conclusion seems to be absent. A possible explanation for this observation may be the young person's inexperience with alcohol, and a concomitant inability of the individual to determine levels of impairing blood alcohol concentrations. If this explanation is correct, methods of educating individuals in the ability to meaningfully detect impairing levels of blood alcohol concentrations are essential.

Recommendations

General

1. The relationships between the eight (8) independent variables and the level of problem classification should be utilized to strengthen the assessment of young convicted OUIL offenders.

2. High school personnel, including not only driver education instructors and high school counselors, but all levels of school personnel should be made aware of the relationship of the eight independent variables to potential problematic behavior.

4. Assessment personnel from the various agencies and state court systems should be appraised of the relationship

of the eight independent variables to the assessment of young convicted OUIL offenders.

5. A needs assessment of state personnel responsible for the assessment of young OUIL offenders should be conducted with the purpose in mind of determining the need for either inservice education or formalized coursework in procedures for the assessment process to become more cost-effective.

6. Juvenile probation officers should be appraised of the relationship of the eight independent variables to the level of problem classification.

Research

1. A study should be conducted to include a much larger random sample of young (ages 25 or less) convicted OUIL offenders for the purpose of sustaining or improving the prediction model.

2. The feasibility of utilizing the eight independent variables in identifying potential young OUIL offenders should be investigated for the purpose of improving early intervention.

3. A search for other readily available independent variables should take place for the purpose of increasing the strength of the prediction model to make it more cost-effective in application.

4. Individuals classified according to their problematic drinking behavior should be included in a follow up investigation to determine if changes occur in that said

classification with time.

5. A quasi-experimental investigation should be conducted to determine if the cut off score of the level of problem classification as determined by the global score on the Mortimer-Filkins Test can be reduced while still maintaining a high degree of reliability and validity.

6. An investigation by factor analysis of the responses to the content of the Mortimer-Filkins Test should be made for the purpose of identifying significant behavioral items.

Discussion

Although there is a wealth of information on human use of ethanol as a matter of choice, perhaps tracable to the earliest of recorded historical times, much remains to be discovered about the interaction of the myriad of variables that affect the outcome of drinking behavior. The role of the particular society within which the individual lives will greatly influence whether alcohol is available in the first place, as well as contribute to the formation of the acceptable boundaries of the use of alcohol. Societies vary in their boundaries, and so the resultant impact of the use of alcohol on the society is generally only predictable in a very omnibus manner. While the norm boundaries lead to some predictable generalization about the population as a whole, no such prediction is available for any one specific individual.

Furthermore, the collection of information on individual characteristics of persons suffering negative consequences from their drinking behavior at present only provides a modest prediction of subsequent drinking behavior problems. This is not to discount the value of data collections on the characteristics of persons who are at high risk to encounter negative consequences from drinking, but the reliability of those data remains somewhat in question. The reliability of prediction models needs to be validated by appropriately designed quasi-experimental longitudinal studies based on some firmly founded theoretical models. Until such studies are conducted, the question of whether descriptive characteristics are contributory or ex post facto consequences of drinking behavior remains unanswered.

The lack of theoretical paradigms is not the problem; there is a sufficient supply of available models to choose from. Until recently these models were specific to some particular discipline from an appropriate natural or social science. Each discipline has been overly zealous in fostering its own theoretical position, often to the point of total exclusion of other paradigms. Such limited thinking has prevented the serious development of a unified multivariate theoretical model, explaining the phenomenology of alcohol use in the form of human consumption. Only recently have a few theoretical models been proposed that include the major identified influencers of drinking behavior. Although these models still lack the test of time, they are a beginning

in the correct direction, but still more refinement is needed.

While the idiosyncrosies of drinking behavior change with time, both in an individual and societal sense, the use of alcohol has been in existence for a lengthy time period and can reasonable be expected to continue for a like period. It should be the goal of all individuals concerned about the consequences of alcohol use to minimize the negative effects by working towards a unified model of the phenomenology of drinking which intervenes at the earliest possible stage of abuse. Although youthful drinkers have formed the specific subpopulation cited throughout these chapters, similar arguments could be made for early primary prevention with other subpopulations of drinkers. Primary prevention models are better suited to targeting smaller, more specific time points within the human life cycle. Concentrating on bringing about change in smaller subpopulations, such as drinking drivers, which reflect the needs of that point in the life cycle will offer management advantages. It is primary prevention that is more cost effective than secondary or tertiary programs.

Reflections

Having discussed long range goals within the preceding section, the author wishes to reflect upon some immediate applications that might be undertaken by those having influence with the young drinking driver problem.

Throughout the course of study in preparation for the completion of this terminal degree program several concerns relating to alcohol use and its sequalae of problems became evident. These concerns focused on the roles of the police, the school, the state and the family as agents in the primary prevention of alcohol problems among youth. These organizations have an opportunity early in the total development of an individual to influence drinking practices of moderation to prevent later alcohol abuse problems. However, while there have been attempts to strengthen the influence of these organizations on youthful drinking practices, much remains to be accomplished.

As an example, the police are in a position to have an immediate impact on youthful drinking, yet police officers frequently view drinking by those under the legal drinking age as harmless, perhaps as a reflection of their own youthful behavior. In addition, officers may be discouraged by the length of paperwork involved in citing an under age person for illegal drinking, especially if the individual has been "cooperative." Additional court time may discourage the officer to go beyond a harsh admonishment, while this is understandable it can only serve to positively reinforce the minor's conceptualization of a universal acceptability of youthful drinking. Police officers must be encouraged to legally intervene to assure that the offender clearly understands the seriousness of the behavior.

Furthermore, various state departmental organizations have been provided with the legal powers to act as agents in primary prevention. For example, the Liquor Control Commission (LCC) is vested with the authority to enforce laws regulating the control and distribution of alcoholic beverages. Their use of these powers can either increase or decrease the availability of alcoholic beverages to minors. By encouraging stricter enforcement of laws restricting the sale of alcoholic beverages and the employment of empowered sanctions, the LCC can reduce alcohol availability to minors, although it would be naive to see this action as the complete "cure" for the problem. Additionally, the LCC can encourage adherence to "Dram Shop" legislation by the various purveyors of alcoholic beverages.

Along with the LCC, the Department of the Secretary of State has the ability to identify potential drinking drivers through its driver licensing records. The utilization of current state of the art methods to identify potential problem drinking drivers, especially youthful drivers, prior to the occurence of serious consequences makes this agency suitable for a role in primary prevention. The application of research findings in early identification can provide for a forward impetus in efforts to reduce the number of youthful drinking drivers.

The school is in an advantageous position to influence youthful drinking practices. However, to date this position has either been ignored or given minimal compliance. The

effort of educational systems has been to segregate alcohol education into discrete units of instruction reserved for specialized times or courses, such as health or driver education. Most often the instruction is cognitive in nature, although in some instances attempts at affect modification are made. Rarely is there an effort to change existing behavior by formalized methods in an educational setting.

The school needs to assume an active role in primary prevention of alcohol abuse early on in the formal schooling of youth. This should begin no later than the fourth or fifth grade and emphasize decisions pertaining to the use of alcohol. However, it is unrealistic to view this effort as being one to cover a lifetime. Research suggests that drinking practices change over a lifetime. The focus of attention must be on the point in time when the schools can influence the youth.

The school is also presented with an opprotunity to identify and assist potential alcohol abusers among its students. Too often this opportunity is ignored, perhaps it is too easy to deny the existence of such problems among the students even though a small but significant portion show signs of alcohol abuse. Administrators, counselors, and teachers need to actively participate in reducing the risk of alcohol abuse among students.

The organization with the greatest opportunity to practice primary prevention is the family. No entity is closer to the problem than the family, and it begins with

parental drinking practices. Parental moderation of drinking behavior and an emphasis on the responsibilities of drinking can encourage an appropriate model for children. In addition, parents need to monitor the behavior of their children and exert parental authority when necessary.

Finally, it is necessary to be reminded that abstinence is a viable alternative. As a society abstinence should be encouraged for those who see it as an appropriate behavior, abstinence should not be viewed as anything but normal. Society sets the tone for its members behavior.

Education has a role in primary prevention as not only a vehicle of awareness but a means by which behavior can be changed in a positive direction. Education requires a commitment from all members of a society to be successful.

Footnotes

[1]William R. Blount, "The Effect of Drinking Driver Rehabilitation Efforts on Rearrests When Drinking Type is Controlled" DWI Reeducation and Rehabilitation Programs--Successful Results and the Future (Falls Church, AAA Foundation for Traffic Safety, 1983) p. 35.

[2]Ray Reis, "The Traffic Safety Impact of DUI education and Counseling Programs," DWI Reeducation and Rehabilitation Programs--Successful Results and the Future (Falls Church, AAA Foundation for Traffic Safety, 1983) p. 43.

APPENDICES

APPENDIX A

Means for All Variables by Level of Problem Classification Sample, and the Standard Error of the Sample Mean

APPENDIX A

Means for All Variables by Level of Problem Classification Sample, and the Standard Error of the Sample Mean

	Social Drinkers N=113	Excessive Drinkers N=10	Problem Drinkers N=3	Sample Mean N=126	Standard Error
Score on Mortimer-Filkins Test	31.48	69.10	115.33	36.46	1.74
Age	21.27	21.50	19.00	21.23	.18
Blood Alcohol Concentration	14.97	15.90	14.67	15.04	.26
Number of Reported Alcohol Drinking Years	5.17	5.01	6.60	5.18	.18
Number of Reported Alcohol Drinking Days in the Previous Thirty Days Prior to Assessment	4.94	6.40	10.33	5.18	.35
Number of Moving Violations	2.68	3.50	3.67	2.77	.22
Number of Alcohol Related Violations	.02	.50	.33	.06	.03
Number of Reckless Driving Violations	.01	.09	.00	.02	.01
Number of Motor Vehicle Accidents	.20	.40	1.67	.25	.05

APPENDIX B

Pearson Correlation Coefficient Values for Various Combinations of the Eight Independent Variables

APPENDIX B

Pearson Correlation Coefficient Values for Various Combinations of the Eight Independent Variables

Dependent Variable	Independent Variable	Pearson Correlation Coefficient	r squared	Significance of r
Age	Blood Alcohol Concentration	.11	.01	.10
	When Alcohol First Began	.61	.37	>.01
	The Number of Reported Alcohol Drinking Days in the Previous Thirty Days Prior to Assessment	.12	.01	.09
	Number of Moving Violations	.31	.09	>.01
	Number of Alcohol-Related Vilations	.09	>.01	.16
	Number of Reckess Driving Violations	.05	>.01	.29
	Number of Reported Motor Vehicle Accidents	-.63	>.01	.24
Blood Alcohol Concentration	When Alcohol Drinking First Began	.01	.01	.47

APPENDIX B--Continued

Dependent Variable	Independent Variable	Pearson Correlation Coefficient	r Squared	Significance of r
	The Number of Reported Alcohol Drinking Days in the Previous Thirty Days Prior to Assessment	>.01	>.01	.47
	The Number of Moving Violations	.08	>.01	.19
	The Number of Alcohol-Related Violations	.14	.02	.06
	The Number of Reckless Driving Violations	>.01	>.01	.49
	The Number of Reported Motor Vehicle Accidents	.11	>.01	.12
When Alcohol Drinking First Began	The Number of Reported Alcohol Drinking Days in the Previous Thirty Days Prior to Assessment	.29	.08	>.01
	The Number of Moving Violations	.38	.14	>.01
	The Number of Alcohol-Related Violations	.23	.05	>.01

APPENDIX B--Continued

Dependent Variable	Independent Variable	Pearson Correlation Coefficient	r Squared	Significance of r
	The Number of Reckless Driving Violations	.05	>.01	.28
	The Number of Reported Motor Vehicle Accidents	.03	>.01	.37
The Number of Reported Alcohol Drinking Days in the Previous Thirty Days Prior to Assessment	The Number of Moving Violations	.16	.02	.04
	The Number of Alcohol-Related Violations	.20	.04	.01
	The Number of Reckless Driving Violations	>.01	>.01	.40
	The Number of Reported Motor Vehicle Accidents	.26	.07	> .01
The Number of Moving Violations	The Number of Alcohol-Related Violations	.16	.03	.03
	The Number of Reckless Driving Violations	.01	>.01	.45
	The Number of Reported Motor Vehicle Accidents	.36	.13	.01

APPENDIX B--Continued

Dependent Variable	Independent Variable	Pearson Correlation Coefficient	r Squared	Significance of r
The Number of Alcohol-Related Violations	The Number of Reckless Driving Violations	>.01	>.01	.37
	The Number of Reported Motor Vehicle Accidents	.24	.06	>.01
The Number of Reckless Driving Violations	The Number of Reported Motor Vehicle Accidents	.16	.02	.04

APPENDIX C

The Mortimer-Filkins Test

APPENDIX D

The Pearson Correlation Method, Multiple Regression, and Residual Analysis

APPENDIX D

The Pearson Correlation Method

The Pearson method may be symbolically represented as follows:[1]

$$r_{x,y} = \frac{\Sigma x_i y_i}{N S_x S_y}$$

where

$X_i = X_i - \bar{X}$

$Y_i = Y_i - \bar{Y}$

S_x = standard deviation of X

S_y = standard deviation of Y

N = number of cases

The Importance of the r Squared Value

The r squared value is of particular importance since it represents the amount of variance in the dependent variable explained by the independent variable. The significance and probability values of r represent the behavior of a particular statistic if the value was drawn from a normal bivariate distribution in the population. Since the true population value can not be known exactly, the significance and probability values of the sample represent the result of hypothesis testing.

Multiple Regression

The multiple regression equation employed was developed from a model symbolically represented:

$$Y_i = a = b_1x_{1i} + b_2x_{2i} + \text{---} + b_hx_{hi}$$

where

y_i = dependent variable

a = intercept

b = slope of independent variable

x = value of independent variable

as found in Hays.[2]

Stepwise Method of Entry

Stepwise entry requires that the computer select the independent variable to be entered by their ability to explain the variance in the dependent variable until a predetermined limit is achieved. When this limit is achieved the selection process stops and any remaining independent variables are left out of the model. The limit selected for this model was the SPSS default limit, with a default value of the F-statistic at 3.84 and an associated probability value of .05.

Partial Correlation Coefficient, Squared and Multiple r Statistics

The partial correlation coefficient (r) of the variable not in the equation represents the square root of the relationship of that particular variable to the global score on the Mortimer-Filkins Test if the influence of all other variables are removed. Thus the r squared value for the variable represents the amount of variance in the global score explained by that variable.

The Multiple r is the square root of r squared. The r squared value represents the amount of variance in the global score on the Mortimer-Filkins Test explained by the multiple linear regression equation. The adjusted r squared value represents an attempt to fit the model to the general population. The standard error of the equation is also presented.

Analysis of Residuals

Residuals represent that portion of the variability in the dependent variable not explained by the regression model. Again the SPSS program was utilized in the residual analysis. The method selected was the stepwise procedure used in the development of the multiple linear regression equation. Table 15 presents the analysis of variance for the regression equation under the heading: Multiple Regression Equation Analysis of Variance. This statistic represents

whether there is a linear relationship between the dependent variable and the set of independent variable. As presented in Table 15 the F-statistic value is 12.25 with an associated significance of less that >.01 indicating a strong relationship between the dependent variable and the independent variables.

A further analysis of residual statistics involving the dependent variable, the global score on the Mortimer-Filkins Test is presented in Table 16 under the heading: Analysis of Residual Statistics of the Dependent Variable. The results demonstrate the amount of variability between the predicted value for the dependent variable from the multiple linear regression model and the actual observed values of the dependent variable. The various statistics presented represents the influence of unusual observations on the prediction model, as well as the estimate of the true errors involved with the regression model. The correlation of these true errors can be estimated by use of the Durbin-Watson test statistic. For this model the Durbin-Watson test statistic value was 1.95. This value does indicate that there is a tendency toward a serial correlation of the error terms in a positive direction.

Table 15

Multiple Regression Analysis of Variance

	Degrees of Freedom	Sum of Squares	Mean Square	F	Significance of F
Regression	3	11002.48	3667.49		
				12.25	>.01
Residuals	122	36518.82	299.33		

Table 16

Analysis of Residuals Statistics of the Dependent Variables

	Minimum	Maximum	Mean	Standard Deviation	Number of cases
Unstandardized Predicted values	11.77	83.03	36.46	10.67	126
Standardized Predicted Values	-2.31	4.36	.00	1.00	126
Standard Error of the Predicted Values	1.63	10.88	2.98	1.43	126
Adjusted Predicted Values	10.43	98.23	36.41	10.97	126
Mahalanobis Distance	.21	52.83	3.97	6.41	126
Cook's Distance	.00	1.07	.02	.11	126
Unstandardized Residuals	-27.65	70.01	.00	16.32	126
Standardized Residuals	-1.67	4.22	.00	.98	126
Studentized Residuals	-1.74	4.70	.00	1.03	126
Deleted Residuals	-38.23	86.88	.05	17.95	126
Studentized Deleted Residuals	-1.75	5.18	.01	1.05	126

Footnotes

[1]Paul J. Bloomers and Robert A. Forsyth, Elementary Statistical Methods in Psychology and Education, 2nd ed. (Boston: Houghton-Mifflin Co., 1977). p. 439.

[2]William L. Hays, Statistics, 3rd ed., (New York: Holt, Rinehart, and Winston, 1973). p. 475.

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