BLOOD ALCOHOL LEVEL AND OTHER SELECTED FACTORS AS INDICATORS OF THE PROBLEM DRINKING DRIVER

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ABSTRACT

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By

Floyd D. Smith

Statement of the Problem

Several studies have resulted in the use of social, medical, or psychological symptoms of alcoholism as identification tools in describing various levels of problem drinking. Interpretation and synthesis of the results of the studies is difficult. The authors in using different criteria have individually defined a varity of often overlapping subgroup classifications of drinking drivers.

The purpose of this study was to determine what relationship, if any, existed between blood alcohol levels, other evidence of problem drinking, and problem classifications. The classifications are: A) temporary problem drinkers, and B) problem oriented drinkers as operationally defined with respect to; 1) enforcement contacts, where alcohol was a factor; 2) job changes due to drinking difficulties; 3) job absenteeism due to drinking; 4) marital separation in part or solely caused by drinking problems; 5) alcohol blackout occurrence; 6) delirium tremens or hallucination occurrence; 7) hospitalization for addiction.

Description of the Methods, Techniques and Data Used

A sample of 100 individuals arrested in 1968 for driving under the influence of liquor in Ingham, Eaton, and Clinton counties was randomly selected from about 600 arrests made by Michigan State Police, county police agencies, and Lansing and East Lansing Police Departments. These departments have breath analysis instruments and officers trained and certified in instrument operation.

The interviewing of the arrested drivers and the surveying of state criminal records, driving records, and state hospital records was conducted in the spring of 1970. On the basis of this information, drinkers were classified into operationally defined, distinct categories of problem oriented drinkers and temporary problem drinkers.

Analysis of the data was made to determine whether or not a relationship existed between the following:

1. Blood alcohol level and the problem classifications.
2. Blood alcohol level and elements of identification of problem oriented drinking.
3. Blood alcohol level and various descriptional or situational variables.
4. Problem oriented drinking and various descriptional or situational variables.
5. Income and disposition of cases.

The Major Findings

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

> Seventy-four percent of the classified drinkers were shown to have demonstrated multiple symptoms of problem oriented drinking.

The mean blood alcohol level of those classified as problem oriented drinkers was shown to be significantly greater than the mean blood alcohol level of temporary problem drinkers.

Only those drinkers who were shown to have demonstrated multiple symptoms of problem oriented drinking were found possessing blood alcohol levels greater than .25%.

None of the drinkers who were shown to have demonstrated multiple symptoms of problem oriented drinking were found possessing blood alcohol levels below .12%.

The lower age groups had lower blood alcohol levels than did the middle aged and older drinkers.

As blood alcohol level reached higher levels, the number of drunk and disorderly convictions and the number of hospital alcohol addiction admissions increased.

Blood alcohol level was not significantly related to the number of elements of identification of problem oriented drinking.

Problem oriented drinking and increased blood alcohol levels were significantly related to those stating they had been ill around the time of arrest.

The income of arrested drinkers was not shown to be significantly related to the disposition of cases, however, problem oriented drinkers were shown to have significantly lower mean incomes than temporary problem drinkers.

Blood alcohol level is related to other well known evidences of problem drinking and, at extreme blood alcohol levels, appears to indicate the depth of problem drinking.

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By

Floyd Dale Smith

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CHAPTER I

THE PROBLEM

Introduction

One of our nation's most serious threats to man and his family is the loss of life that occurs in vehicle crashes. Research studies designed to examine the cause of fatal collisions have shown that the use of alcohol while driving constitutes a strong causal factor in a disproportionate number of these crashes. These studies also indicated that many of the individuals who were drinking, driving, and involved in fatal collisions had prior convictions for driving under the influence of liquor and in some cases had received medical treatment for alcohol addiction.

If preventive action is to be taken, early identification of the individual's drinking problem must be undertaken and effective treatment must be enacted. This treatment must attempt to deal with two factors: 1) that of the particular identifying violation or the symptom of drinking difficulty; 2) the individual's drinking problem.

Presently, one of the earliest identification possibilities of a drinking problem occurs as a result of an arrest for an alcohol related violation or disturbance. A major difficulty preventing problem identification in this contact is that often the individual is simply

"processed" for the particular violation and he is not examined for the drinking problem he may have.

A number of research studies have attempted to identify problem drinkers by the use of solely descriptive terms such as "alcoholic," "problem drinker," "excessive drinker," and "abusive drinker." Often individuals are subjectively placed into one of these categories. Attempts to analyze and synthesize these data are made difficult by overlapping definitions and generally result in confusion as to the distributions of alcohol problems in the population being studied.

The problems drinking drivers possess fall into a broad continuum of drinking induced difficulties. These problems range from youthful exploration with alcohol at low levels of intoxication and social drinkers who over imbibe, to the involvement of alcoholics in drinking and driving. Differentiation of these problems is not always an easy task. An examination of the individual's criminal and driving records may quickly indicate that the person has had previous alcohol related difficulties, however, information about the individual's ability to function socially in other areas is not easily obtainable. Alcohol related marital difficulties or separation, habitual job absenteeism due to drinking, and drinking blackouts are also indications of alcohol problems and should be used in identifying the problems of the individual.

The drinking driver might be classified into three basic categories: 1) Drivers who drink and drive with some regularity but do not come to the attention of police agencies and, therefore, are not identified as problem drinking drivers; 2) Temporary problem drinkers who may be

considered social or exploratory drinkers that do not have histories of social or medical problems created by habituated alcohol use; 3) Problem oriented drinkers whose basic problem is revealed by heavy or excessive drinking which may be shown by various symptomatic difficulties (see definitions).

Arrested drinking drivers in Michigan have been required to submit to a blood alcohol determination test since November 2, 1967. Failure to comply with this statute results in the suspension of the individual's license.[1] Berril and Goldberg et. al. have shown "problem" drinkers reach higher mean blood alcohol levels than do "social drinkers." This indicates that the problem drinkers must increase their intake during each drinking occasion to obtain the desired effects or conditions that alcohol induces. Intake, after a period of time, must reach quantities that the periodic social drinker could not reach without adverse affects. Since blood alcohol level is assumed to be an indication of the individual's drinking tolerance, it may prove to be of value in determining the depth of one's drinking problem.

This study was made to determine what identifiable relationship exists between blood alcohol level and other evidence of problem drinking.

In addition to investigating blood alcohol level as a problem classification tool, various other descriptive variables that were used to place individuals into problem categories were examined with respect to blood alcohol level and the problem drinking classification.

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[1] Michigan Statutes Annotated, 1968 Revision, Vol. 8 (Callaghan and Company: Mundeline, Illinois, 1968). pp. 352-7.

General Statement of the Problem

The purpose of this study was to determine what relationship, if any, exists between blood alcohol levels and problem classifications of A) temporary problem drinkers, and B) problem oriented drinkers as operationally defined with respect to: 1) enforcement contacts, where alcohol was a factor; 2) job changes due to drinking difficulties; 3) job absenteeism due to drinking; 4) marital separation in part or solely caused by drinking problems; 5) alcohol blackout occurrence; 6) delirium tremens or hallucination occurrence; 7) hospitalization for addiction.

The intent was to explore blood alcohol level and other variables as problem identification tools. This was accomplished by gathering and analyzing relevant personal history information concerning a sample of drivers who had been arrested for driving under the influence of liquor. Various situational and descriptive variables of personal history, drinking history and arrest incident information were examined for identifiable relationships with blood alcohol level and problem oriented drinking.

In addition to the above analysis, a description of problem drinkers was constructed from the following variables:

1. Age.
2. Sex.
3. Race.
4. Present and past marital status.
5. Income.
6. Expressed drinking tolerance.
7. Legal assistance.

Delimitations

1. This study was confined to a random sample of arrested drinking drivers in three Michigan counties.
2. Approximately 20 percent of the arrested drinking driving population refused to have their breath analyzed. These subjects were not included in this study.
3. It appeared that interview responders were open and honest, however, one can not be assured of the accuracy of responses to questions referring to non-verifiable personal conditions or situations. The interviewer found that often the subject was quite anxious to participate and appeared to find relief in talking about himself.
4. There is some natural police selectivity in arrest situations which varies by department and individual police officers. It should be noted, therefore, that driving and criminal records are somewhat limited as identification tools in classifying drinking difficulties. Some of those individuals classified as temporary problem drinkers might have been classified as problem oriented drinkers had it been possible to make the record systems more objective.

Operational Definitions

1. Temporary Problem Drinker -- is the drinker that is arrested for driving under the influence of liquor but who does not have a past history of alcohol related social agency contacts or physical or social alcohol related problems.

2. Problem Oriented Drinker -- is the drinker with a history of alcohol related medical and/or social problems. This drinker may be more objectively described as one who has been arrested for driving while under the influence of liquor and has had at least one of the following additional alcohol related experiences:

   a. Enforcement contacts resulting in the arrest for driving while under the influence of liquor, drunk and disorderly conduct, driving while impaired or enforcement reports of family disturbance where intoxication of subject is a primary cause of attention.

   b. Job pattern absenteeism as shown by self admission; i.e., work loss of two days per month as a result of drinking.

   c. Job change occurring as shown by self admission; i.e., loss of two positions in a five year period as a result of alcohol problems.

   d. Marital separation or divorce initiated in part or solely because of drinking difficulties.

   e. Blackout occurrence where other drugs were not used as shown by self admission.

   f. Delirium tremens or hallucination occurrence as shown by self admission.

   g. Hospitalization for addiction as shown by private and state hospital records.

3. Blood Alcohol Level -- refers to a standardized measuring system used by most states which measures the weight of alcohol per volume of blood. The blood alcohol per 100 milliliters of blood known as "percentage by weight."[2] Michigan used grams

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

of alcohol per 100 ml.

Example: 120 mg. alcohol/100 ml. blood
.120 g/100 ml.
Results in: .12% blood alcohol level w/v

4. Breathalyzer -- was developed by R.F. Borkenstein and is used to determine the blood alcohol level from a sample of "deep lung" or alveolar air of a subject. The measurement is based upon the principle that the alcohol contained in the breath sample will be exhausted through the process of reduction with a measured amount of a chemical reagent resulting in a color change which when compared with a sealed control solution by a photoelectric system of balancing light transmission results in the identification of a specific blood alcohol level.[3] The results of several studies where blood, urine and breath analysis results were compared have demonstrated the reliability of the Breathalyzer when tests were performed by well trained, competent operators.[4]

Rationale

It is hoped that the findings of this investigation will be of value in revealing additional means of identification so that problems of assisting and controlling the drinking driver might be more adequately understood. Such understanding should be useful in improving enforcement procedures and in prescribed treatments of problem oriented drinking.

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[3] Ibid., p. 110.

[4] Ibid., pp. 101-102.

early when treatment is most effective. In addition, improved understanding and action by educators and those involved in the cooperative traffic safety effort should promote public support to re-evaluate Michigan's facilities to deal with the drinking problems of individuals through well designed public information campaigns.

Organization of the Study

In Chapter II a review of literature related to the drinking driver research may be found.

Chapter III deals with the study design, definition of the universe, method of sampling, and the development of the interview questionnaire guide.

Chapter IV contains the relevant data on blood alcohol level driver classifications and the statistical test results.

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

CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

A comprehensive survey of literature dealing with the drinking driver and the traffic problem revealed no similar study specifically concerned with the current investigation. However, this review did reveal several studies of a pertinent nature. These related studies and surveys have been categorized according to the following subject areas: 1) studies of the effect alcohol use has on vehicle crashes; 2) studies of drinkers who drive and the nature of their problems.

Studies of Alcohol Use and Vehicle Crashes - have, for the most part, attempted to reveal the strength of the causal relationship which exists between the use of alcohol and highway crashes. These investigations are summarized as follows:

H.A. Heise analyzed 119 consecutive automobile personal injury collisions in the Uniontown, Pennsylvania area to determine what part alcohol was playing in personal injury vehicle collisions.[1] He found alcohol was prevalent in more than half of the collision situations

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[1] Herman A. Heise, "Alcohol and Automobile Accidents." Journal of the American Medical Association, Vol. 103 (September, 1934), p. 739.

and that there were higher than the average number of persons injured for each alcohol related collision. In "ran off the road" accidents resulting in injury, the average blood alcohol level was .15%. In the same type of accident resulting in fatalities, the average blood alcohol level was .24% (it is presumed the author is speaking of drivers.)[2]

Heise concluded "There is a direct relationship between the severity of the accident and the amount of alcohol."[3]

R.L. Holcomb, with the assistance of Heise, compared blood alcohol levels of 270 hospitalized drivers with 1,750 drivers found driving on Evanston, Illinois streets to determine if those who had been drinking and involved in collisions were proportionally representative of the driving population.[4] Of those found driving in Evanston, 12 per cent had been drinking and two per cent were found at .10% blood alcohol level or greater.[5] Hospitalized subjects with a blood alcohol level of .15% were involved in accidents 33 times more often than would be expected from the low percentage of drivers with the same blood alcohol level. At .13% blood alcohol level, the ratio was 10 hospitalized to one driving, and at the .05% blood alcohol level the ratio was one hospitalized to one driving.[6]

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[2] Ibid., p. 740.

[3] Ibid., p. 740.

[4] Richard L. Holcomb, "Alcohol in Relation to Traffic Accidents." Journal of the American Medical Association, Vol. III (September, 1938), p. 1078.

[5] Ibid., p. 1077.

[6] Ibid., p. 1081.

T.U. Marron and R.W. Morrissey's two-year study revealed average blood alcohol levels of .22% for Iowa drivers who were apprehended for driving while intoxicated and who submitted to blood tests.[7]

Unfortunately, the authors did not indicate what percentage of Iowa's arrested drivers were represented in their reports. It seems their results may have revealed more about the quality of enforcement than Iowa's drinking driving population.

H.W. Smith and R.E. Popham surveyed 919 Toronto drivers involved in personal injury accidents and independently assigned responsibility for the collision on the basis of a 10-point scale.[8] In comparing drinking and non-drinking drivers responsible for collisions, they found drivers at .15% blood alcohol level or higher responsible 43 times as often as non-drinking drivers.[9]

G.H. W. Lucas, W. Karlow, J.D. McColl, B.A. Griffith, and H.W. Smith examined the blood alcohol levels of 433 drivers involved in accidents and 2,015 "non-accident" drivers in the Toronto accident areas at approximately the same time in order to establish the degree of collision hazard at differing blood alcohol levels.[10] They reported that when

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[7] T.U. Marron and R.W. Morrissey, "Intoxication Tests - Third Year Report." Proceedings of the Iowa Academy of Science, Vol. 49 (1949), p.273.

[8] H. Ward Smith, and R.E. Popham, "Blood Alcohol Levels in Relation to Driving." Canadian Medical Association Journal, Vol. 65 (1951), p. 326.

[9] Ibid., p. 327.

[10] George H.W. Lucas, and others, "Quantitative Studies of the Relationship Between Alcohol Levels and Motor Vehicle Accidents." Proceedings of the Second International Conference on Alcohol and Road Traffic (Toronto: Toronto Garden City Press Cooperative, 1955), p. 141.

drivers reached .10% blood alcohol level the hazard was 0.5 greater than the control, at .10% up to .15% the hazard multiple was 2.7, and .15% and greater associated with 9.7 times the hazard of the control.[11]

A possible reason for the discrepancy of calculated hazards as compared to Heise's study might be found in the control group used, for the Toronto control group was not "alcohol free," but included those who were drinking and found at less than .05% blood alcohol levels.[12] In addition, since the severity of the crash is generally associated with higher blood alcohol levels, it is important that comparisons be made only when both studies examine similar accident situations.

A.T. Pearson found that 34.2 per cent of the fatally injured motor car drivers in Perth, Australia had .10% blood alcohol levels or greater.[13] This undoubtedly places alcohol as a strong causal factor in Australian fatal vehicle accidents; however, one must question what other contributing factors led to the deaths of these individuals. It must be noted that 20 per cent of the fatally injured drivers were not tested which may indicate they lived beyond the allowable time for accurate blood alcohol determination and that other factors such as exposure before discovery could have contributed to the deaths of those examined.

William Haddon, Jr., and V.A. Brandess analyzed the data of 240 single vehicle fatal accidents occurring in Westchester, County, New York,

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[11] Ibid., p. 14.

[12] Ibid., p. 14.

[13] A.T. Pearson, "Alcohol and Fatal Traffic Accidents." The Medical Journal of Australia (August, 1957), p. 166.

and found 69 per cent of the drivers at or above the .05 % blood alcohol level.[14] Forty-nine per cent of the drivers in the single vehicle collisions were found at .15% blood alcohol level or greater.[15]

H.C. Freimuth, S.R. Watts, and R.S. Fisher analyzed the conditions of the deaths of 500 consecutive fatally injured highway victims of Baltimore, Maryland, with respect to age, sex, and blood alcohol level.[16] The authors found that 61 per cent of the fatally injured drivers had .05% or greater blood alcohol levels; 37 per cent had .15% or greater blood alcohol levels; and that 67 per cent of those .15% or greater were under 40 years of age.[17]

A near linear inverse function of age and deaths of those drivers under the influence was shown with 20 deaths in the (20 to 29) year group to two in the (60 to 69) year age group. It is also interesting to note that there was marked similarity in the under the influence death rates for the youngest age group (10 to 19) and the (60 to 69) age group.[18]

In an attempt to control the mass analysis of fatally injured driver data, regardless of the driver's contribution, Haddon and J.R. McCarroll

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[14] William Haddon, Jr., and Victoria A. Brandess, "Alcohol in the Single Vehicle Fatal Accident." Journal of the American Medical Association, Vol. 169 (April, 1959), p. 1587.

[15] Ibid., p. 1587.

[16] Henry C. Freimuth, Spencer R. Watts, and Russel S. Fisher, "Alcohol and Highway Fatalities." Journal of Forensic Sciences, Vol. 3, No. 1 (January, 1958), p. 67.

[17] Ibid., p. 70.

[18] Ibid., p. 70.

compared 43 New York City drivers who contributed to their own fatal accidents to a sample control group of non-accident drivers found driving near the accident sites.[19] The responsible drivers were defined as those who were involved in collisions under the following circumstances:

1. Only one vehicle involved: its driver fatally injured.

2. More than one vehicle involved, but only one in motion: its driver fatally injured.

3. More than one vehicle involved and in motion: driver in responsible vehicle fatally injured.[20]

Great care was taken by the authors to specify cases in the third category where the drinking driver's action created the accident situation. The authors found that 46 per cent of the responsible driver fatals had blood alcohol levels of .25% or greater and that none of the control group were driving at these blood alcohol levels.[21]

In comparing drinking and non-drinking drivers who were considered responsible for fatal collisions, drinking drivers were found nearly three times as often as the control group drivers.[22]

The responsible drinking drivers were statistically less often married than the control group drivers.[23] Commenting on this, Haddon

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[19] James R. McCarroll and William Haddon, Jr., "A Controlled Study of Fatal Automobile Accidents in New York City." Journal of Chronic Diseases, Vol. 15 (1961), p. 811.

[20] Ibid., p. 812.

[21] Ibid., p. 816.

[22] Ibid., p. 824.

[23] Ibid., p. 817.

and McCarroll stated:

> "It is very possible that these case-control differences would have been augumented if it had been possible to measure the stability of the marital and other social adjustments of those in case and control groups."[24]

The authors summarize by stating:

> "Finally, it is suggested that alcoholism rather than merely social drinking was involved in cases of the drivers with high alcohol concentrations."[25]

R.F. Borkenstein, R.F. Crowther, R.D. Shumate, W.B. Ziel, and R. Zylman compared the strength of drinking as a causal relationship in collisions with various other independent causal relationships and their combination by analyzing the personal history and socio-economic conditions of drivers found in:

1. Accident non-drinking.
2. Accident drinking.
3. Non-accident drinking.
4. Non-accident non-drinking driving situations.[26]

This study revealed that alcohol became an "overriding" causal factor in all situations when the individual's blood alcohol level was .08% or greater. Other relationships of sex, age, annual mileage, etc., became less and less significant as alcohol intake increased.[27] A second part of the study dealt with alcohol and accident causation. The

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[24] Ibid., p. 822.

[25] Ibid., p. 824.

[26] R.F. Borkenstein, and others, The Role of the Drinking Driver in Traffic Accidents. Department of Police Administration (Indiana University, 1964), p. 25.

[27] Ibid., p. 119.

responsible drivers were compared with the control group combined with the non-responsible victim group to ascertain the probability of the driver causing the accident at different blood alcohol levels. The analysis indicated a geometric increase in probability of accident causation with increases in blood alcohol levels. At .04% blood alcohol level the relative probability was the same as the non-drinking driver; however, from this point on, the probability increased rapidly. At .10% blood alcohol level the relative probability of causing the accident was six times that of the non-drinking driver, and at .15% blood alcohol level and above, the relative probability of causation was 25 times greater.[28]

S.R. Gerber, the coroner of Cuyahoga County, Ohio, analyzed vehicle collision death records of his county for a 20-year period.[29] After categorizing cases of deaths in a manner similar to Haddon and McCarroll's, he found 65 per cent of the collision-responsible drivers that had survived less than one hour, had been drinking.[30] Of the cases where the drinking driver was responsible for fatal injury, blood alcohol levels of .20% or greater were associated with 53 per cent of the single vehicle accidents, 17 per cent of the multiple vehicle accidents (where the fatally injured driver's vehicle was the only one in motion), and

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[28] Ibid., p. 165.

[29] S.R. Gerber, "Vehicular Fatalities in Cuyahoga County, Ohio, U.S.A., Twenty Years Experience (1941-1960)." Proceedings of the Third International Conference on Alcohol and Road Traffic (London: B.M.A. House, 1962). p. 38.

[30] Ibid., p. 41.

57 per cent of the multiple vehicle accidents.[31] None of the fatally injured drinking drivers found in these types of accidents had blood alcohol levels less than .05%.[32] Gerber also found a higher proportion of the alcohol positive individuals dying within a six hour period.[33]

J.M. Kowalski, N.J. Ross, and F.F. Fiorese examined all individuals 15 years old or older who were fatally injured in vehicle crashes in Illinois during the 1966 calendar year.[34] They found 44 per cent of all drivers and 34 per cent of their occupants had been drinking.[35] For the 15 to 20 year age group, 33 per cent of the drivers and 38 per cent of their occupants had been drinking.[36]

It seems young people, possibly due to their strong gregarious nature, are less discriminate than their senior counterparts in selecting transportation after drinking. Undoubtedly, since Illinois law does not permit the sale of alcoholic beverages to those under 21 years of age, most young people attempt to disguise their drinking by doing so in vehicles with the supportive company of other young people.

One of the few studies concerned with drivers using drugs in combination with alcohol was accomplished by the Bureau of Criminal Identification of the California Department of Justice. Fatally injured

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[32] Ibid., p. 41.

[33] Ibid., p. 40.

[34] Julius M. Kowalski, Norman J. Ross, and Frank F. Fiorese, "Blood Alcohol Levels in Vehicular and Pedestrian Fatalities in Illinois." Illinois Medical Journal, Vol. 131 (May, 1967), p. 659.

[35] Ibid., p. 662.

[36] Ibid., p. 663.

drivers in single vehicle "accidents" that died within 15 minutes after the accident were examined for the presence of alcohol or alcohol and other drug combinations.[37] Seventy-eight per cent of all male drivers and 47 per cent of all female drivers had been drinking.[38] One hundred and two of the total 772 were taking drugs, and 62 per cent of these had .10% or greater blood alcohol levels.[39] Drug use increased as ages of the drivers increased.[40]

Summary

These studies have revealed what has become an axiom concerning contributing or causal factors and vehicle collisions; i.e., a simple, clear, all-encompassing statement which specifies an absolute causal relationship between alcohol use and vehicle collisions cannot be made. They also indicate, just as positively, that: 1) at higher blood alcohol levels (above .08% or greater), the contributing nature of factors other than alcohol seem to diminish, thereby revealing the strength of the alcohol contribution; 2) as the driver's blood alcohol level increases, responsible collision expectancy also increases at a geometric rate; 3) as the severity of crashes increase, the average blood alcohol level of drinking individuals involved are found to be higher.

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[37] Harold W. Sullivan, "A Study: Roles of Alcohol, Drugs and Organic Factors in Fatal Single Vehicle Accidents." The Police Chief (March, 1968), p. 16.

[38] Ibid., p. 20.

[39] Ibid., p. 20.

[40] Ibid., p. 22.

Studies of the Driving Drinker - have, in general, been based upon the premise that the drinking driver is not representative of the general driving population. These investigations more specifically were designed to identify and define the human problems that vehicle collisions and various other symptoms reveal.

Bjerver, Goldberg, and Linda analyzed the personal histories and accident situations of individuals involved in 71 personal injury vehicle accidents in Stockholm, Sweden.[41] Thirty-two per cent of the subjects had been drinking and 57 per cent of these had blood alcohol levels of .15% or greater.[42] In an attempt to analyze the drinking problems of these drivers, the authors grouped individuals as follows:

1. "Alcoholic Addicts" during the last 3 years (individuals taken care of according to S 1 of Swedish Alcohol Law).
2. "Alcohol Abusers" (several severe offenses for drunkenness during the last 10 years).
3. "Excessive Drinkers" (one or two offenses for drunkenness during the last 10 years).
4. "Moderate Users."
5. "Moderate Users" (small consumers).
6. Alcohol Habits Unkown (mostly abstainers).[43]

The authors classified the subjects into categories based on alcohol use, as noted above, and compared the occurrence of accident victims to expected frequencies for each of the alcohol use groups that were

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[41] K.B. Bjerver, L. Goldberg, and P. Linda, "Blood Alcohol Levels in Hospitalized Victims of Traffic Accidents." Proceedings of the Second International Conference on Alcohol and Road Traffic (Toronto: Toronto Garden City Press Cooperative, 1955), p. 93.

[42] Ibid., pp. 94-95

[43] Ibid., p. 97.

available from a previous study made by the Swedish Government of Sweden's general population and the distribution of differing alcohol use groups. The earlier study indicated there were higher frequencies of alcohol-problemed people in urban areas, such as Stockholm, than in the general population and these modified figures were used.[44]

The researchers found twice as many accident victims in the first three alcohol use categories as would be expected from the Stockholm population.[45] A comparison of drinking and non-drinking accident injured in these first three categories revealed five times as many drinking, alcohol-problemed people as non-drinking alcohol-problemed people involved in injury accidents.[46]

The last analysis was with respect to blood alcohol distributions among the alcohol use groups. It was found that of all accident injured that reached blood alcohol levels of .15% or better, 95 per cent fell in the first three alcohol use groups.[47]

It seems evident from the analysis above that Swedish problem drinkers involved in injury accidents are found with high blood alcohol levels. The converse of this; i.e., that those who achieve blood alcohol levels above .15%, are problem drinkers, also gains credence, for only five per cent of the moderate drinkers in accidents were found

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[44] Ibid., p. 95.

[45] Ibid., p. 97.

[46] Ibid., p. 99.

[47] Ibid., p. 101.

at these levels. It is feasible that higher blood alcohol levels; i.e., 25% or greater, would be even more discriminatory in revealing problem drinkers.

R.E. Popham examined the accident, arrest, and clinic records of 427 males charged with impaired or drunken driving in Toronto during 1954 in an attempt to discover the composition of this problem driver population.[48] He found 2.6 per cent of the charged group had been clinic patients for alcoholism. This frequency exceeded significantly the expected frequency on the basis of prevalence of alcoholic clinic patients in the drinking population.[49] An additional 3.7 per cent were identified as having two previous alcohol and driving enforcement contacts in the prior 16 months.[50] It was concluded:

> "... the drivers did not represent a random sample of the drinking population with respect to prevalence of alcoholism, and that the hypothesis should be entertained, for future research, that traffic accidents involving drivers who had been drinking are to a considerable extent a problem of alcoholism rather than largely a problem of the effects of alcohol on the casual drinker."[51]

W. Schmidt, R.G. Smart, and R.E. Popham, in a four-year "follow up" study of Popham's 1954 work, compared the clinical histories of the 437 Toronto drivers to determine how many additional drivers were admitted

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[48]Robert E. Popham, "Alcoholism and Traffic Accidents." Quarterly Journal of Studies on Alcohol, Vol. 17 (1959), p. 225-232.

[49]Ibid., p. 227.

[50]Ibid., p. 229.

[51]Ibid., p. 231.

for alcoholism treatment and whether or not this frequency surpassed the expected admissions on the basis of age.[52] The authors found that 6.3 per cent had been clinic patients and that this group was significantly younger than the clinic population.[53] It is interesting to note that the 6.3 per cent mentioned above is the exact sum of the percentages of alcoholics (2.6 per cent) and those with two previous alcohol and driving enforcement contacts (3.7 per cent) that Popham had found just four years earlier.

In examining the driving records of the alcoholics, it was found that the clinically identified alcoholic drivers were involved in a significantly larger number of accidents per year and per mile driven when compared to the general driving population; however, they did not have a significantly greater involvement in non-drinking accidents.[54]

> "It was concluded that traffic accidents involving the drinking driver are at least in part a problem of alcoholism, rather than largely or entirely a problem of the effects of alcohol on the casual drinker."[55]

T.A. Seals, in examining national arrest and accident records, concluded in speculative writings that the social drinker is the real problem in traffic safety. The author indicated that he considered the psychological effects as dangerous as the physiological effects that

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[52]Wolfgang Schmidt, Reginald G. Smart, and Robert E. Popham, "The Role of Alcoholism in Motor Vehicle Accidents." Traffic Safety Research Review, Vol. 6 (December, 1962), p. 22.

[53]Ibid., p. 23.

[54]Ibid., p. 25.

[55]Ibid., p. 27.

involve large amounts of imbibing.[56]

It should be noted that researchers have not focused upon the "one-time" problem drinker or social drinker for there seems to be some inherent difficulties in clearly identifying this condition.

J.A. Waller examined 319 drivers that had been diagnosed as chronic alcoholics or were members of Alcoholic Anonymous and who had come to the attention of the California Department of Motor Vehicles.[57] Analysis of the driver's personal and driving histories revealed the accident rates were twice those of a comparison sample and the violation rates were 1.8 times as high as a comparison group.[58] The mean age of the alcoholics was 46.7 years, and 27 per cent had been divorced or separated.[59] Waller noted:

> "... that 23% of these drivers [pathological drinkers] first came to the attention of the department [of Motor Vehicles] because of a drunk-driving conviction, but they were not recognized at that time as pathological drinkers."[60]

Waller and H.W. Turkel investigated the blood alcohol levels, liver conditions, and alcohol arrest histories of 208 driver and pedestrian

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[56]T.A. Seals, "Today's Traffic Safety Delinquent: The Drinking Driver." Traffic Safety Research Review, Vol. 1 (December, 1957), p. 82.

[57]Julian A. Waller, "Alcohol and Traffic Accidents: Can the Gordian Knot be Broken?" Traffic Safety Research Review, Vol. 10 (1966), p. 17

[58]Ibid., p. 19.

[59]Ibid., p. 17.

[60]Ibid., p. 17.

fatalities in San Francisco, California.[61] The intent was to find an objective criterion for identifying alcoholism, since up to this time, subjective evaluations had been used in placing drivers into operationally defined "alcoholic" and "problem drinker" categories.[62]

Cirrhosis of the liver did not prove to be significant indication when cirrhosis cases were compared to subjects' past arrest records.[63] Several observations were made which adds to information about the drinking driver.

> "The drinking and arrest patterns amoung younger persons in fatal accidents suggests two separate populations. Those dying with low blood alcohol levels which may well have been social drinkers making their initial or early experiments with the use of alcohol. In contrast, the young drivers with higher blood alcohol levels often had arrest and marital patterns suggesting a pre-alcoholic phase."[64]

> "... heavy drinking does not seem to be over-represented among negro fatalities."[65]

> "If the presence of prior arrests for public intoxication can be considered indicative of impaired social functioning the correlation between alcohol in the blood at time of death and prior arrest record also identifies a substantial proportion of the drinking fatalities as occurring in problem drinkers."[66]

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[61] Julian A. Waller and Henry W. Turkel, "Alcoholism and Traffic Deaths." New England Journal of Medicine, Vol. 275 (September, 1966), p. 532.

[62] Ibid., p. 532.

[63] Ibid., p. 533.

[64] Ibid., p. 535.

[65] Ibid., p. 535.

[66] Ibid., p. 536.

M.L. Selzer noted the similar psychological nature of the "accident prone" driver and the alcoholic and compared these symptoms in speculative writing in 1961.[67] He describes the groups as having common personality-functioning characteristics of parallel egocentricity, low frustration levels, poor control of hostility, and great dependency needs.[68]

M.L. Selzer, C.E. Payne, J.D. Gillford, and W.L. Kelly examined 67 convicted drinking drivers of Ann Arbor, Michigan.[69] They revealed, through interviews, that 78 per cent of these drivers had pathological drinking problems.[70] In using Keller's definition of alcoholism, 57 per cent of the examined group were considered alcoholics. Classifications of "pre-alcoholic," "probably alcoholic," and "non-alcoholic" were also used in an attempt to more clearly identify the drivers.[71]

The definition of "alcoholic" used in this study is subjective and dependent upon the authors clearly defining terms to be used. Although the authors' use of the definition is not being questioned, the use of such a multi-defined term is often meaningless, for its meaning is ascertained by the reader and this connotation is often far from the author's conceptual intent.

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[67]Melvin L. Selzer, "Personality Versus Intoxication as Critical Factors in Accidents Caused by Alcoholic Drivers." The Journal of Nervous and Mental Diseases, Vol. 132 (April, 1961), p. 299.

[68]Ibid., p. 299.

[69]Melvin L. Selzer, and others, "Alcoholism, Mental Illness and the 'Drunk Driver.'" The American Journal of Psychiatry, Vol. 120 (October, 1963), p. 327.

[70]Ibid., p. 327.

[71]Ibid., p. 327.

It should be noted that this study also was dependent upon the quality of enforcement contacts. During the time of this study a great amount of physical evidence was necessary to convict the driver of driving while under the influence of liquor. It seems evident that only the most flagrant violators would come to the researcher's attention.

Selzer and Weiss, in a 1966 study of fatalities occurring over a three year period, revealed some unusual facts about victims' ages.[72] They found 69 per cent of the classified alcoholics were between the ages of 22 and 40, and that 42 per cent of the non-alcoholics were between the ages of 16 and 21.[73]

These results seem to indicate that young people who drink and drive are generally more seriously affected but tend to complicate statistical analysis which deal with problem drinkers in crashes.

J.H.W. Birrell examined the blood alcohol levels of 1,715 drivers suspected of driving under the influence of intoxicating liquor; 250 charged with drunk and disorderly; and an unspecified number of individuals in various social drinking situations.[74] He found blood alcohol level means of those charged with drunk and disorderly behavior to be .198% and those suspected of driving under the influence to be

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[72]Melvin S. Selzer and Sue Weiss, "Alcoholism and Traffic Fatalities: Study in Futility." American Journal of Psychiatry, Vol. 122 (January, 1966), p. 762.

[73]Ibid., p. 763.

[74]J.H.W. Birrell, "Blood Alcohol Levels in Drunk Drivers, Drunk and Disorderly Subjects and Moderate Social Drinkers." The Medical Journal of Australia, Vol. 2 (December 4, 1965), p. 951.

.22%. The number of social drinkers and their blood alcohol level mean was not reported; however, the author explained that two or so social drinkers actually reached a maximum blood alcohol level of .15% in the interest of research. The maximum levels achieved by those charged with drunk and disorderly behavior and those suspected of driving under the influence was .35% and .46% respectively.[75] The authors stated:

> "The amounts of liquor represented by blood levels of 0.2% [.20%] and above are far greater than those consumed in normal social drinking, being of the order of something equivalent to a pint of whiskey in one hour. In ordinary social drinking situations, breath analysis of the subjects usually showed low alcohol levels of 0.02% to 0.08% and not higher than o.15%."[76]

Reginald Smart and Wolfgang Schmidt used data collected 17 years earlier by H.W. Smith and R.E. Popham on a sample of 919 drivers involved in personal injury accidents in Toronto, Canada. The "follow up" study was designed to examine changes in the criminal records for alcohol-related offense, and mental hospital records in comparing 96 drinking drivers and 238 non-drinking drivers that were identified in the previous study.[77] The results indicated that there were statistically significant

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[75] Ibid., pp. 951-952.

[76] Ibid., p. 953.

[77] Reginald G. Smart and Wolfgang Schmidt, "Responsibility, Blood Alcohol Levels, and Alcoholism." Traffic Safety Research Review, Vol. II (December, 1967), p. 113.

increases in the number of alcoholics and problem drinkers in the number of originally identified drinking drivers.[78]

> "The mean blood alcohol level for alcoholics was .15 per cent, for the problem drinkers it was .13, but only .07 per cent for the non-alcoholics."[79]

The original degree of responsibility assigned by Smith and Popham to the alcohol-positive drivers was increased to a higher significant level through treatment of the new data. In addition, it was found that a preponderance of the excessive drinkers' accidents occurred between 6:00 p.m. and 8:00 a.m. which was statistically different from the non-alcoholic drivers.[80] Excessive drinkers made up 23 per cent of the accident involved groups examined.[81] It should be noted that the authors used an accident involved group of 1,950 as their control. The results are only applicable in those accidents that were reported, and therefore may also be somewhat a product of the quality of enforcement.

It seems apparent from these results that as the degree of the alcohol problem increases, the blood alcohol level also tends to increase. This does not, however, indicate that the converse of this statement is true. The predictability nature of blood alcohol levels remains to be determined.

N. Kaestner, in a cooperative effort with the Oregon Department of

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[78] Ibid., p. 114.

[79] Ibid., p. 114.

[80] Ibid., p. 114.

[81] Ibid., p. 114.

Motor Vehicles, examined driver history and arrest incident data of 1,020 convicted Oregon drivers in an attempt to more clearly identify the problem drinker.[82] The average age of the 91 per cent male group was 40 years, 25 per cent of which were driving during a license suspension period or without a valid license.[83] The average blood alcohol level of the violator was .21%.[84] The group possessed atypically high violation and accident records with 35 per cent having had prior drunken driving arrests, and 30 per cent coming to the attention of officials as a result of a collision.[85] This report describes a large group of the convicted drinking drivers as those who are "alcohol problemed" individuals who are not controlled by fines or license suspension action.

Summary

These studies have clearly shown that from 35 per cent to 75 per cent of the drinking driving population are not representative of the general population. Although none of the studies completed in the United States have clearly reported sub-group associated problems with specific blood alcohol levels, the Swedish and Canadian studies have shown close correlations between alcohol problem conditions and higher

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[82] Noel Kaestner, Vinita Howard, and Edward Warmoth, Oregon Study of Drinking Drivers, (Oregon Department of Transportation, Motor Vehicle Division, July, 1969), p. 7.

[83] Ibid., p. 10.

[84] Ibid., p. 22.

[85] Ibid., pp. 114-115.

(.15% and above) blood alcohol levels.

Interpretation and synthesis of the results of the studies is difficult. The authors in using different criteria have individually defined a variety of often overlapping sub-group classifications of drinking drivers. Many of the defined sub-groups are primarily descriptive and have little utilitarian value.

It is not the intent of the foregoing remarks to demean the above studies. On the contrary, they have been of value particularly in the formulative stages of further research.

CHAPTER III

DESIGN AND METHODOLOGY

Sample

A random sample of 100 drivers who were arrested for driving under the influence of liquor in 1968 was drawn from approximately 600 arrests made during that time in Eaton, Ingham, and Clinton counties, Michigan. Individuals arrested in these counties for this offense were taken to one of six police stations for blood alcohol determination through breath analysis. The police agencies involved were the Michigan State Police, the county sheriff's departments, and the Lansing and East Lansing Municipal Police Departments. These departments had breath analysis instruments and officers trained and recertified annually in instrument operation. The sample was drawn from these organizational records.

A pilot study conducted in March of 1969 indicated the numbers of arrests made by each of these six agencies during the first six months of 1968. A percentage value of the total number was calculated for each agency. The sample was drawn from the full year's arrest records on the basis of that percentage. Every third or fourth arrest recorded in the log book or on alcohol influence report forms, was taken as part of the sample from the particular police department. A starting number

was determined by the position of the sweep hand of the selector's wrist watch when receiving the records. For example, if every fourth arrest was to be drawn and the sweep hand was in the second quarter of a revolution (from three to and including six) the second arrest made by that department in 1968 was the starting point of the selection. Record entries of individuals who refused to give a sample of breath or who were identified as "out of state" drivers were not counted as possible sample selections since analysis was to be made with respect to blood alcohol level and interviewing was limited to those persons who lived in Michigan.

The sample size was selected to provide an adequate number of subjects at various blood alcohol levels for analysis with respect to various descriptive variables and to increase the probability of the sample as being representative of the population from which it was drawn.

Ingham County is the most populated and industrialized of the three counties with auto manufacturing plants located in Lansing. Clinton and Eaton counties are primarily rural, having only light industry. The mean of the total population and auto registrations for the three counties is slightly above the Michigan county averages.

Instrument

An interview guide questionnaire was used to secure information on the drivers' personal and drinking history and arrest incident information. The guide was designed to provide interview leads in obtaining classification information on the depth of the individual's drinking problem. The questions were based on problems and conditions identified through interviews with known alcoholics and medical people who work with alcoholics in the Lansing, Michigan area, readings on alcohol addiction

stages, and readings of studies of the drinking driver.

Several revisions of the questionnaire guide were made in content, wording, and format. Two separate pilot studies, in which interviews were conducted, were made. The suggestions offered were noted and when warranted the guide was revised to include the suggestions. (see Appendix A).

The Sources of Data

Driving Records:

All subjects' driving records were analyzed for disposition of identifying arrest incident, and previous reckless driving, driving while impaired, or driving while under the influence of liquor convictions. This information was recorded on a three by five inch data card which listed the person's name, address, date of birth, driver's license number, arrest incident date, and past convictions data. The information was coded so that no one but the interviewer could interpret the notations.

Interview:

Interviews, when possible, were made in the person's home. In a few instances the interview was conducted at the individual's place of employment or in a bar. Each contact was initiated by the interviewer identifying himself by name as one conducting educational research with a random sample of individuals in a three-county area. The actual nature of the study was not revealed until personal contact could be made with the sample subject. The subject was asked to participate by taking a few moments and responding to questions from the questionnaire guide. After maximum privacy was assured, the subject was then informed that the specific area of the research was in connection with his being arrested

in 1968 for driving under the influence of liquor. It was then explained that the research was designed to collect and analyze information which would more clearly identify drinking and driving difficulties which would lead to improved treatment of those being arrested. The interviewer then showed the subject the code numbered questionnaire guide and emphasized that the information was to be held in the strictest confidence. It was restressed that the information would not be connected with the subject by anyone but the interviewer and that from that point on the information was only to be tabulated with that from other interviews. The actual interview was then initiated by asking the individual, "What can you recall about the arrest incident?"

The last question on the interview guide and in the interview was to ask the person if he had ever been arrested before for any of the listed alcohol-connected offenses (Appendix A). If the subject's response to this final question was not in agreement with the data card, the person was asked to explain and re-answer previous questions. If the data card indicated previous reckless driving charges, the individual was also asked if that arrest was initially a drinking driving charge.

Criminal Records:

Michigan State Police criminal records of the subjects were surveyed for the following convictions:

1. Driving while under the influence of liquor.
2. Driving while impaired.
3. Drunk and disorderly conduct.
4. Any indication of family disturbance where the subject's drinking was a primary cause.

These record entries were cross validated with the driving records

where possible and additional information was sought where discrepancies occurred.

Social Records:

A survey was made of official social service agencies in the three-county area for contacts resulting from the subject's drinking difficulty. Problems were encountered and this data will not be included in the analysis. The concern of agencies about the client counselor confidentiality prevented the collection of this data.

Hospital Records:

The records of state and private hospitals that may have treated sample subjects for diagnosed alcohol addiction were surveyed. A list of these agencies has been provided in Appendix B.

Data from the above sources was used to classify each sample subject into one of two problem classifications: 1) problem oriented drinkers or those subjects with histories of medical or social drinking problems, and 2) temporary problem drinkers or those who have no history of medical or social drinking problems other than the identification arrest incident.

The Null Hypotheses

The following are statements of the major hypotheses of this study in the null form; i.e., stating that no significant relationships exist between the stated variables for statistical treatment purposes:

Ho1: There is no significant difference between the mean blood alcohol level of those drivers classified as problem oriented drinkers and those drivers classified as temporary problem drinkers.

Ho2: There is no significant relationship between the number of elements of identification of those classified as problem oriented drinkers and their blood alcohol level determined at the time of arrest.

Ho3: There is no significant relationship between any of the following descriptive situational variables and the blood alcohol levels determined at the time of arrest.

a. Age.
b. The number of prior drinking driving convictions.
c. The number of prior drunk and disorderly convictions.
d. An affirmative response to drinking as a cause of marital separation or divorce.
e. The number of work days lost per month because of drinking.
f. The number of position changes in the prior 5 year period because of drinking.
g. The number of alcohol blackouts experienced.
h. The number of delirium tremens or hallucination experiences.
i. The number of alcohol addiction admissions.
j. An affirmative response to the use of medication prior to identifying arrest incident.
k. A positive family history of drinking problems.
l. An affirmative response to extended illness (2 weeks) prior to or around identifying arrest incident.

Ho4: There is no significant relationship between those classified as problem oriented drinkers as opposed to those classifed as temporary problem drinkers and any of the following descriptive or situational variables.

a. Age.
b. An affirmative response to the use of medication prior to identifying arrest incident.
c. A positive family history of alcohol problems.
d. An affirmative response to extended illness (2 weeks) prior to or around identification arrest incident.

Ho5: There is no significant relationship between the income of sample subjects during the year they were arrested and the degree of seriousness of legal action taken.

Methods of Analysis

The data obtained were analyzed using the following: a t-test of significance, a one-way analysis of variance, and a Chi-Square test for association.

Ho1: A t-test for significance was employed to determine the significance of the difference between the mean blood alcohol level of those sample subjects who were classified as problem oriented drinkers and those classified as temporary problem drinkers. An .05 level of significance was used to determine the acceptance or rejection of this hypothesis.

Ho2: The sample group was separated into four approximately equal groups on the basis of blood alcohol level; .09 to .16%, .17 to .20%, .21 to .24%, and .25 to .41%. A one-way analysis of variance was employed to determine the differences between scores associated with the number of identification elements used to identify problem oriented drinkers, and four blood alcohol level categories; i.e., to determine if the scores of individuals in each of the separate blood alcohol level categories differed significantly from scores of individuals in the

other categories. This was done to determine if blood alcohol level is associated with increased numbers of identification elements (the number of observable relationships which demonstrate problem drinking). An .05 level of significance was used to determine the acceptance or rejection of this hyposthesis.

Ho3: A one-way analysis of variance was employed to determine the differences between the scores associated with the twelve variables "a" through "l" listed and all sample individuals for the blood alcohol level categories; i.e., to determine if the scores associated with individuals in each of these separate categories differed significantly from the scores of individuals in other categories. This was done to determine if blood alcohol level is strongly associated with any other of the known descriptional or situational variables. An .05 level of significance was used to determine the acceptance or rejection of the twelve variables of this hypothesis.

Ho4: The four variables of this hypothesis were tested by the Chi-Square test for association. This examination was done to determine if variables other than those used to define the problem oriented drinkers could be used as tools of identification. An .05 level of significance was used to determine the acceptance or rejection of these elements of the hypothesis.

Ho5: The sample group was separated into three approximately equal groups on the basis of the individuals' 1968 income estimated to the nearest thousand dollars; $2,000 to $6,000, $7,000 to $10,000, and $11,000 to $22,000. Disposition of the case was categorized into: 1) case dropped or no record; 2) conviction of a charge other than an

alcohol driving charge; 3) conviction of driving while impaired; 4) conviction of driving under the influence. A one-way analysis of variance was employed to determine the difference between numerical scores (assigned to the disposition levels) and the three income categories; i.e., to determine if the disposition scores assigned to individuals in each of the income categories differed significantly from scores of individuals in the other categories. This was done to determine whether or not income level and the ability of an individual to secure legal assistance could have affected prior conviction records, thereby reduce the number of the sample who were classified by this factor as problem oriented drinkers. An .05 level of significance was used to determine the acceptance or rejection of this hypothesis.

In the following chapter the analysis of the data may be found.

CHAPTER IV

ANALYSIS OF THE DATA

The results of the analysis of data are presented in this chapter. The analysis of the following are presented: 1) the difference in mean blood alcohol level obtained by those classified as problem oriented drinkers and those classified as temporary problem drinkers, 2) the relationship between the number of identification elements used to classify individuals as problem oriented drinkers and blood alcohol level, 3) the relationship of blood alcohol level to each of the 12 different descriptive or situational variables, 4) the relationship between drinker classification of problem oriented as opposed to temporary problemed and four descriptive or situational variable, and 5) the relationship of income level of those arrested and final disposition of the identification arrest incident. In addition, other factors and conditions were used to further describe problem drinkers.

Of the original 100 subject, 77 were interviewed. Three of these interviews were conducted with the parents or spouse of the subject because the subjects were not available. Fifty-three of these interviewed drivers were classified as problem oriented drinkers from interview and record data. Twenty-four were classified as temporary problem drinkers as a result of the interview and record survey. Table 1 presents the

composition of the sample population by interview action and the resulting classification.

TABLE 1.-- Composition of the sample population by interviewing/non-interviewing categories and drinker classification.

	Problem Oriented Drinkers	Temporary Problem Drinkers	Not Classified	Total
Interviewed	53	24	0	77
Not-Interviewed	15	0	8	23
Total	68	24	8	100

Of the 23 subjects not interviewed, nine had moved to another state, three refused to participate, and 11 could not be found after surveying previous landlords, relatives, local tavern owners, local police departments, credit reference bureaus, and criminal and driving record files for recent arrest and address information. Fifteen of those not interviewed were classified as problem oriented drinkers from the results of the criminal, hospital, and driving record surveys. The remaining eight subjects could not be classified.

Differences of Blood Alcohol Level of Classified Drivers

The following is a re-statement of the null hypothesis which was tested:

Ho1: There is no significant difference between the mean blood alcohol level of those drivers classified as problem oriented drinkers and those drivers classified as temporary problem drinkers.

A t-test of significance between means was used to determine the significance of difference between blood alcohol level of the two problem classifications. The results of this appears in Table 2.

TABLE 2.-- T-test for significant difference between blood alcohol levels of the 92 individuals classified as problem oriented drinkers and temporary problem drinkers.

Categories	N	Means	Computed t-value
Temporary Problem Drinkers	24	.18%	2.31
Problem Oriented Drinkers	68	.21%	

Required t-value for significance at the .05 level = 1.67

A t-value of 1.67 was needed to demonstrate significance at the required .05 level: a value of 2.31 was obtained for the t-statistic. On the basis of this obtained t-value presented in Table 2, the null hypothesis of no significant difference between groups was rejected; i.e., the mean blood alcohol levels of these two groups are significantly different at the .05 level. The distribution of problem oriented drinkers' and temporary problem drinkers' blood alcohol levels is

presented in Figure 1. A table of the frequency distribution of drinkers by blood alcohol level and classification is presented in Appendix C. The percentage of problem oriented drinkers found in blood alcohol level categories is presented in Table 3.

In addition to the testing of the above hypothesis, several other tests were made of mean blood alcohol levels with respect to interview action and subject classification into problem categories.

A t-test of significance between means was used to determine if a significance of difference existed between the 1) blood alcohol level means of those subjects interviewed and those not interviewed, and 2) the blood alcohol level means of the problem oriented drinkers who were interviewed and those not interviewed. T-values of .003 and .875 respectively were obtained. Neither of these values was large enough to demonstrate significance at a .05 level.

The Relationship of Blood Alcohol Level to the Number of Elements Used in Classifying Drinkers as Problem Oriented Drinkers

The following is a re-statement of the null hypothesis which was tested:

> Ho2: There is no significant relationship between the number of elements of identification of those classified as problem oriented drinkers and their blood alcohol level determined at the time of arrest.

In using a one-way analysis of variance test, an F-statistic of 1.88 for variance between blood alcohol level categories was obtained. This value was not sufficient to demonstrate significance at the .05 level. The number of identification elements did not increase

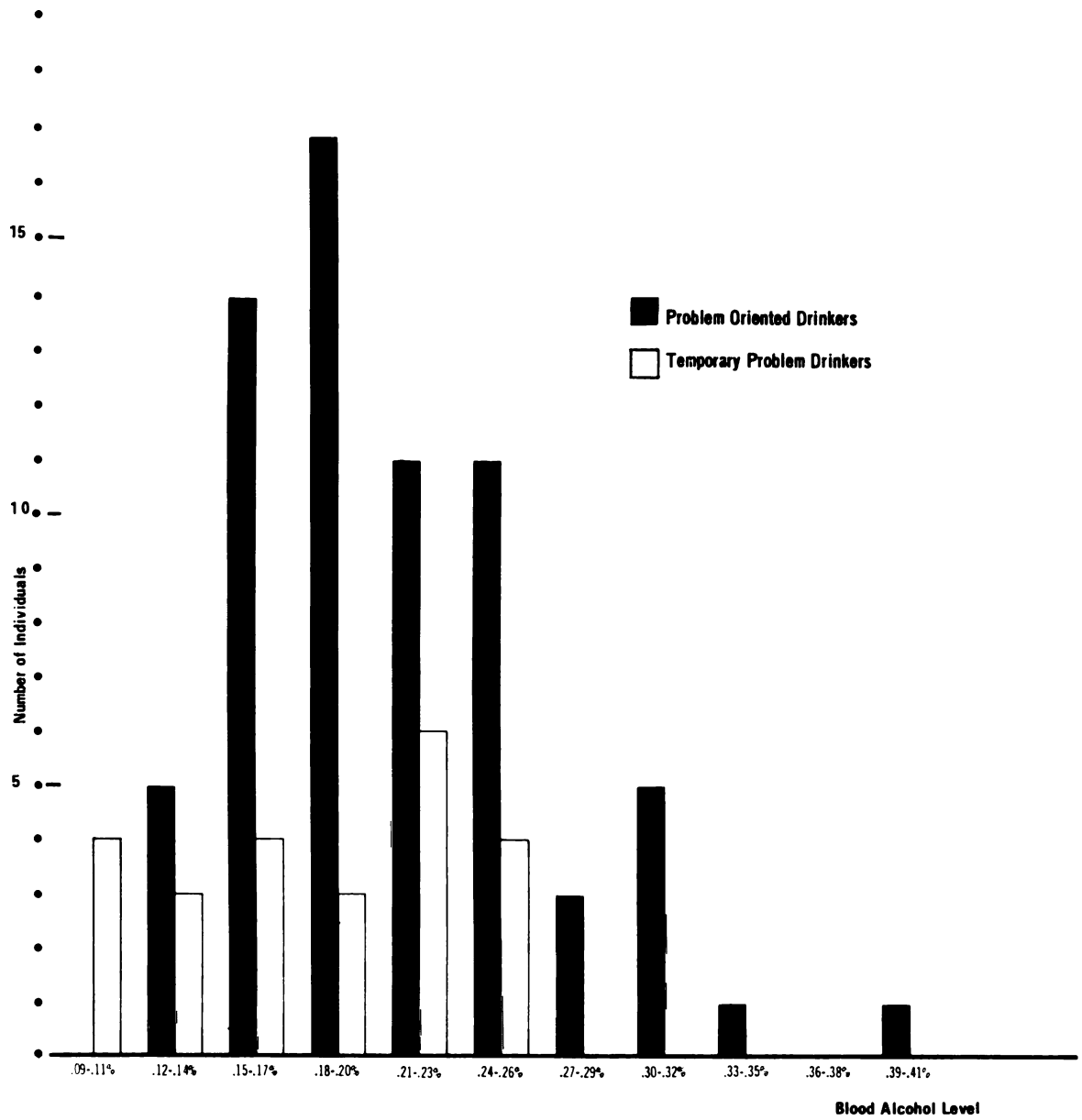

FIGURE 1 **Distribution of classified drinking drivers**

TABLE 3.-- Those classified as problem oriented drinkers in blood alcohol level categories.

Blood Alcohol Level Categories	.09-.14%	.15-.20%	.21-.26%	.27-.32%	.33%-over
Problem Oriented Drinkers	5	31	22	8	2
Classified Drinkers (N=92)	12	38	32	8	2
Per Cent of Classified Drinkers Who are Problem Oriented Drinkers	42%	82%	69%	100%	100%

significantly from one blood alcohol level category to another. The null hypothesis was sustained.

The Relationship of Blood Alcohol Level to Various Situational or Descriptive Variables

The following is a re-statement of the null hypothesis which was tested:

Ho3: There is no significant relationship between any of the following descriptive situational variables and the blood alcohol levels determined at the time of arrest.

The relationship between blood alcohol level and the variables was tested by using a one-way analysis of variance. The elements of the sub-hypothesis were examined with respect to four blood alcohol level categories and the means obtained in these categories for the description or situational variable.

A. Age -- In comparing ages of subjects a 5.075 F-statistic was obtained. This value was sufficiently large to demonstrate significance at the .05 level. The null hypothesis of no significant difference was rejected. Those individuals below 27 years of age showed lower blood alcohol levels than the middle aged and older groups. The results of this analysis of variance are presented in Table 4. Means of the blood alcohol level categories are included so that the curvilinearity of the following functions may be examined. The distribution of drinking drivers by age and blood alcohol level is presented in Table 5.

B. Prior Drinking Driving Convictions -- Thirty-seven of the sample had prior convictions for drinking and driving charges. In comparing the sum of prior driving while impaired and driving under the

TABLE 4.-- Analysis of variance of blood alcohol level and age of the total sample.

Categories	Frequence	Means	F-Statistic	Level of Significance
.09-.16%	24	29.0	5.08	.01
.17-.20%	30	34.4		
.21-.24%	28	34.2		
.25-.41%	18	43.9		

Required F-Statistic for significance at the .05 level = 2.72

influence convictions of subjects found in each of the blood alcohol level categories, a .276 F-statistic was obtained. This value was not sufficient to demonstrate significance at the .05 level, and the null hypothesis of no significant difference between blood alcohol level groups and prior drinking driving convictions was sustained.

C. Prior Drunk and Disorderly Convictions -- Forty-six of the sample had prior convictions for drunk and disorderly behavior. In comparing the number of prior drunk and disorderly convictions of subjects found in each of the blood alcohol level categories, a 4.501 F-statistic was obtained. This value was sufficient to demonstrate a significant difference between blood alcohol level groups at the .05 level of significance and the null hypothesis of no significant difference between these groups with respect to prior drunk and disorderly convictions was rejected. As blood alcohol level reached higher levels the number of drunk and disorderly convictions increased.

TABLE 5.-- Drinking drivers by age and blood alcohol level of the total sample.

Age Groups	Blood Alcohol Level Frequency					Mean Blood Alcohol Level
	Total	.09 - .16%	.17 - .20%	.21 - .24%	.25 - .41%	
52 - 71	12		5	3	4	.22%
46 - 51	14	4	3	3	4	.22%
40 - 45	10	1	2	3	4	.23%
34 - 39	13	3	3	4	3	.21%
28 - 33	8		3	4	1	.22%
22 - 27	32	12	9	9	2	.19%
16 - 21	11	4	5	2		.17%

The results of this analysis of variance are presented in Table 6.

TABLE 6.-- Analysis of variance of blood alcohol level and the number of prior "drunk and disorderly" convictions of the total sample.

Categories	Frequency	Means	F-Statistic	Level of Significance
.09-.16%	24	1.6	4.50	.01
.17-.20%	30	1.2		
.21-.24%	28	1.6		
.25-.41%	18	3.2		

Required F-Statistic for significance at the .05 level = 2.72

D. Marital Separation and Divorce -- Eighteen individuals stated their drinking had contributed to marital separation and divorce. An F-statistic of .204 was obtained when comparing the number of subjects who stated they had experienced marital separation or divorced because of drinking in each of the blood alcohol level categories. This value was not sufficient to demonstrate a significant difference between these blood alcohol level groups at the .05 level of significance. The null hypothesis of no significant difference was sustained. Drinking related marital separation was not significantly related to blood alcohol level.

E. Work Days Lost Monthly Due to Drinking -- Seven individuals stated they had lost two or more days per month from work because of drinking. In comparing the stated number of work days lost per month because of drinking for subjects in each of the blood alcohol level groups, an F-statistic of .575 was obtained. This value was not

sufficient to demonstrate a significant difference between blood alcohol level groups at the .05 level of significance. The null hypothesis of no significant difference between blood alcohol level groups was sustained.

F. Position Changes Caused by Drinking -- Five individuals stated they had changed positions twice within the past five years because of drinking. An F-statistic of 1.619 was obtained when comparing the stated number of position changes within a five year period caused by drinking of subjects found in blood alcohol level categories. This value was not sufficient to demonstrate a significant difference between the blood alcohol level groups at the .05 level of significance. The null hypothesis was sustained. Stated position changes were not significantly related to blood alcohol level.

G. Blackouts Experienced -- Eighteen individuals stated they had experienced alcohol blackouts. An F-statistic of .290 was obtained when comparing the stated number of blackouts experienced by subjects in the blood alcohol level categories. This value was not sufficient to demonstrate a significant difference between the blood alcohol level groups at the .05 level of significance. The null hypothesis was sustained. The stated number of blackouts were not significantly related to blood alcohol level.

H. Delirium Tremens and Hallucinations Experienced -- Only one person stated he had experienced delirium tremens or hallucinations. This individual was found in the highest blood alcohol level category. The null hypothesis was sustained on the basis of insufficient data.

I. Addiction Admissions -- Of the total sample, 10 individuals had been diagnosed as alcohol addicts and had received hospital treatment in Michigan for this problem. An F-statistic of 5.266 was obtained when comparing the number of alcohol addiction admissions for subjects in the blood alcohol level categories. This value was sufficient to demonstrate a significant difference at the .05 level. The null hypothesis of no significant difference was rejected. As blood alcohol level increased to higher levels, the number of addiction admissions increased. The results of this analysis are presented in Table 7.

TABLE 7.-- Analysis of variance of blood alcohol level of the total sample and the number of those who had been admitted into a Michigan hospital as an alcohol addict.

Categories	Frequency	Means	F-Statistic	Level of Significance
.09-.16%	24	.1	5.27	.01
.17-.20%	30	.0		
.21-.24%	28	.2		
.25-.41%	18	1.4		

Required F-Statistic for significance at the .05 level = 2.72

J. Use of Medication Before Arrest Incident -- Fifteen, or 20 per cent, of the 77 interviewed stated they had been using medication during or prior to their drinking and the arrest incident. An F-statistic of 1.661 was obtained when comparing the number of these subjects in the blood alcohol level categories. This value was not sufficient to demonstrate significance at the .05 level. The null hypothesis of no

significant relationship was sustained. The stated use of medication did not increase significantly as blood alcohol increased.

K. Family History of Drinking Problems -- Eleven individuals stated they had parents or siblings with drinking difficulties. An F-statistic of 0.739 was obtained when comparing these subjects in the blood alcohol level categories. This value was not sufficient to demonstrate significance between blood alcohol level categories at the .05 level of significance. The null hypothesis of no significant relationship was sustained. Family drinking problems were not significantly related to increased blood alcohol levels.

L. Illness -- Twenty-seven people stated they had been ill around the time of the identifying arrest. An F-statistic of 2.751 was obtained when comparing the number of these subjects in each blood alcohol level category. This value was sufficient to demonstrate a significance between blood alcohol level categories at the .05 level of significance. The null hypothesis of no significant relationship was rejected. As blood alcohol level increases, the number of related illnesses significantly increase. The results of this analysis are presented in Table 8.

The Relationship Between Drinker Classification and Various Situational or Descriptive Variables

The following is a re-statement of the null hypothesis which was tested:

Ho4: There is no significant relationship between those classified as problem oriented drinkers and any of the following description or situational variables.

The four variables of this hypothesis were tested by the Chi-Square test for association.

A. Age -- The sample population was separated into five approximately equal groups on the basis of age distribution: 16 to 22, 23 to 26, 27 to 37, 38 to 47, and 48 to 71. The observed frequencies of temporary problem drinkers and problem oriented drinkers were then tabulated and tested. A Chi-Square statistic of 2.706 obtained was not a sufficient difference to demonstrate a significance between age and drinker classification. The null hypothesis of no significant relationship was sustained. Temporary problem drinkers and problem oriented drinkers are not significantly associated with any age group.

B. Use of Medication Before Arrest Incident -- The sample subjects were categorized as to those who stated they had taken medication and those who stated they were not taking medication in each drinker classification. A Chi-Square statistic of 1.088 was obtained. This value was not sufficient to demonstrate significance at the .05 level of significance and the null hypothesis was sustained. There was not a significantly large group of problem oriented drinkers or temporary problem drinkers who stated they were using medication at the arrest time.

C. Family History of Drinking Problems -- The sample subjects were categorized as those who stated they had parents or siblings with drinking difficulties and those who did not for each of the drinker classifications. A Chi-Square statistic of .159 was obtained. This was not sufficient to demonstrate a relationship at the .05 level of significance. The null hypothesis was sustained. Neither problem oriented drinkers nor temporary problem drinkers were significantly associated with stated family drinking difficulties.

D. Illness -- The sample subjects were categorized as to positive or negative response to the question of illness around the time of arrest, and drinker classifications. A Chi-Square statistic of 5.870 was obtained. This value was sufficient to demonstrate significance at the .02 level of significance. The null hypothesis of no significant relationship between those stating they had been ill prior to the arrest period and drinker classification was rejected. Problem oriented drinkers stated they were ill at the time of arrest significantly more often than did temporary problem drinkers. The results of this analysis are presented in Table 9.

The Relationship Between Income and Disposition of Arrest Action

The following is a re-statement of the null hypothesis which was tested:

Ho5: There is no significant relatiohsip between the income of the sample subjects during the year they were arrested and the degree of seriousness of legal action taken.

Sample subjects were separated into three approximately equal income groups of: 1) $2,000 to $6,000; 2) $7,000 to $10,000; 3) $11,000 to $22,000 based upon the number of individuals and four independent legal disposition levels of: 1) case dropped or no record; 2) conviction of a change other than an alcohol related driving charge; 3) conviction of driving while impaired; 4) conviction of driving under the influence. A one-way analysis of variance test was used and an F-statistic of .378 was obtained. This value was not sufficient to demonstrate significance at the .05 level. The legal disposition or outcome of the arrest was not significantly dependent on income. The null hypothesis was sustained.

TABLE 8.-- Analysis of variance of blood alcohol level and the number of the 77 interviewed who stated they had been ill prior to the arrest incident.

Categories	Frequency	Means	F-Statistic	Level of Significance
.09-.16%	16	1.1		
.17-.20%	24	1.5	2.75	.05
.21-.24%	24	1.4		
.25-.41%	13	1.5		

Required F-Statistic for significance at the .05 level = 2.72

TABLE 9.-- Chi-Square association results between drinker classification of the 77 subjects interviewed who stated they had been ill prior to arrest incident.

Drinker Classification	Ill	Not Ill	Computed Chi-Square
Temporary Problem Drinkers	17% (N=4)	83% (N=20)	5.87
Problem Oriented Drinkers	43% (N=23)	57% (N=30)	

Required value for significance at the .05 level = 3.84

The Description of Problem Drinkers

Age -- The mean age of all sample subjects was 34.8 years. Means of 36.6 years and 32.4 years was computed for problem oriented drinkers and temporary problem drinkers respectively. This difference was examined by the use of the t-test for significant differences. A t-value of 1.35 was obtained. This value was not sufficient to demonstrate a significant difference at the .05 level of significance.

Sex -- Of the total sample, 95 were male and 74 per cent of the classified male drinkers were classified as problem oriented drinkers. Four of the five, or 80 per cent females, were classified as problem oriented drinkers.

Race - National Origin -- Ninety-five per cent of the sample were white American. Four were Mexican American; three of whom were classified as problem oriented drinkers. One individual was of the black race and could not be classified.

Marital Status -- Of the total 77 interviewed, 42, or 55 per cent had been divorced or were separated from their spouse at the time of the interview. Thirty-four of these were or had been divorced and eight were separated. Of this group, 35, or 83 per cent were classified as problem oriented drinkers. Of the 34 who had been divorced one or more times, 20 had remarried and many were married at the time of the interview.

Nine interviewed subjects had never been married. The mean age of this group was 21 years, and two were classified as problem oriented drinkers.

Income -- The mean incomes of those classified problem oriented drinkers and the temporary problem drinkers was $8,470 and $10,370

respectively. This difference was examined by the use of the t-test for significant differences. A t-value of 1.6812 was obtained. This value was sufficient to demonstrate significance at the .05 level of significance. The results of this analysis are presented in Table 10.

TABLE 10.-- T-Test for significant difference between mean incomes of the 77 interviewed individuals classified as problem oriented drinkers and temporary problem drinkers.

Categories	N	Means	Computed t-value
Temporary Problem Drinkers	24	10,370	1.6812
Problem Oriented Drinkers	53	8,470	

Required t-value for significance at the .05 level = 1.67

Expressed Drinker Classification -- Sample subjects were asked to classify their drinking consumption for 1968 as light, moderate, or heavy. Of those classified as problem oriented drinkers, two felt they should be classified as light drinkers; 25 as moderate drinkers; and 26 as heavy drinkers. Eight temporary drinkers felt they should be classified as light drinkers; 13 as moderate drinkers; and three as heavy drinkers. An examination of this data by the Chi-Square test for association revealed a Chi-Square value of 17.118. This value was sufficient to demonstrate a significant association at the .001 level of significance.

The results of this analysis are presented in Table 11.

TABLE 11.-- Chi-Square association between drinker classification and self rated consumption level for the period in which the arrest occurred for the 77 interviewed subjects.

Drinker Classification	Consumption Level			Computed Chi-Square
	Light	Moderate	Heavy	
Temporary Problem Drinkers	33% (N=8)	54% (N=13)	13% (N=3)	17.12
Problem Oriented Drinkers	4% (N=2)	47% (N=25)	49% (N=26)	

Required value for significance at the .05 level = 5.99

Legal Assistance -- During the collection of data, the interviewer often asked questions to reduce the pressure of continually referring to personal problems. One such "non-scheduled" question was, "Did you secure legal assistance?" This was effective in providing a "pressure relief," but it was only used after some interviews had been conducted and, therefore, responses were not tabulated for all interviewed.

Of the 63 interviewed who were asked, 23 had secured legal assistance. Of the 43 classified as problem oriented drinkers, 16, or 37 per cent, secured assistance. Four of these, or 25 per cent, were convicted of driving under the influence of liquor while 23 of the 27, or 85 per cent, of those who did not secure legal assistance were convicted of this charge. Of the 20 classified as temporary problem drinkers, seven, or 35 per cent, secured legal assistance and none were convicted of driving

under the influence of liquor while 11 of the 13, or 85 per cent, who did not secure legal assistance were convicted of driving under the influence.

Of the 16 problem oriented drinkers who secured assistance, eight, or 50 per cent, were convicted of driving while impaired while two, or seven per cent, of those not securing assistance were convicted of the same charge. Of the seven subjects classified as temporary problem drinkers who secured legal assistance, five, or 70 per cent, were convicted of driving while impaired. Two, or 15 per cent, of the classified temporary problem drinkers who did not secure legal assistance were convicted of the same charge. The results of this questioning are presented in Table 12.

Arresting Agency -- The results of differenct agency arrests action was tabulated and examined for the three governmental unit police agencies and drinker classifications. This was examined for patterns of arrest and legal action which may exist. Conviction rates for the sum of driving under the influence of liquor and driving while impaired charges increased from state to county to municipal police departments for both drinker classifications. The results of this examination are presented in Table 13.

Summary

This chapter includes the analysis of the data. The chapter was divided into six sections, one for each hypothesis to be tested and a section describing problem drinkers from supplementary data. Several analyses were made in the sections.

In the following chapter the summary, conclusions, and recommendations may be found.

TABLE 12.-- Disposition of cases with respect to legal assistance of the 63 subjects questioned.

Drinker Classification	Case Disposition	Legal Assistance	No Legal Assistance	Total
Temporary Problem Drinkers	Driving under the influence	0	11	11
	Driving while impaired	5	2	7
	* Other	2	0	2
Problem Oriented Drinkers	Driving under the influence	4	23	27
	Driving while impaired	8	2	10
	Other	4	2	6
Total		23	40	63

* Other includes convictions of non-alcohol related charges or cases that have been dropped.

TABLE 13.-- Arrests and conviction rates by arresting agencies for driving under the influence of liquor and driving while impaired based on action taken on the 92 classified drinkers.

Arresting Agency	Conviction Rates Among: Problem Oriented Drinkers	Temporary Problem Drinkers	Total
Michigan State Police	20% (N=15)	100% (N=3)	33% (N=18)
County Sheriff's Offices	54% (N=37)	91% (N=16)	64% (N=53)
Municipal Police Departments	94% (N=16)	100% (N=5)	95% (N=21)

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The primary purpose of this study was to investigate the relationship between blood alcohol level and operationally defined stages of problem drinking. An attempt was made to determine if blood alcohol level could be used as an identification tool to classify drinkers into distinct problem drinking categories.

Several other investigations of a secondary nature were made to determine whether or not a relationship existed between the following:

1. Blood alcohol level and various descriptional or situational variables.
2. Blood alcohol level and elements of identification of problem oriented drinking.
3. Problem oriented drinking and various descriptional or situational variables.
4. Income and disposition of cases.

A sample of individuals arrested for driving under the influence of liquor in Ingham, Eaton, and Clinton counties was selected for this investigation for several reasons.

Among these were:

1. The three-county residents represented the broad spectrum of socio-economic, ethnic, and cultural groups.

2. The three-county area provided a somewhat limited geographic area for interviewing of sample subjects.

The interviewing and the surveying of state criminal records, driving records, and state hospital records was conducted in the spring of 1970. On the basis of this information, drinkers were classified into operationally defined, distinct categories of problem oriented drinkers or temporary problem drinkers.

The hypotheses were tested using a t-test for significance, a one-way analysis of variance, and a Chi-Square test for association.

Conclusions

The following are the conclusions based upon the findings from this investigation:

1. The mean blood alcohol level of those classified as problem oriented drinkers was significantly greater than the mean blood alcohol level of temporary problem drinkers.

2. Temporary problem drinkers were not found above .25% blood alcohol level and problem oriented drinkers were not found below .12% blood alcohol level.

3. No significant relationship existed between blood alcohol level and the number of elements used to identify problem oriented drinkers.

4. The lower age groups had lower blood alcohol levels than did the middle aged and older drinkers.

5. No significant relationship existed between blood alcohol level and the number of prior drinking driving convictions.

6. As blood alcohol level reached higher levels the number of drunk and disorderly convictions increased.

7. No significant relationship existed between blood alcohol level and the number of subjects who stated they had experienced marital separation or divorce due to drinking.

8. No significant relationship existed between blood alcohol level and the stated number of work days lost per month due to drinking.

9. No significant relationship existed between blood alcohol level and the stated number of position changes due to drinking for a five-year period.

10. No significant relationship existed between blood alcohol level and the stated number of blackouts experienced.

11. As blood alcohol level increased to higher levels, the number of addiction admissions increased significantly.

12. No significant relationship existed between blood alcohol level and the number of individuals who stated they had been taking medication during or prior to their drinking.

13. No significant relationship existed between blood alcohol level and the number of individuals who stated they had parents or siblings with drinking problems.

14. As blood alcohol levels increased, the number of individuals who stated they were ill around the time of arrest increased.

15. Those classified as problem oriented drinkers were not significantly older than the classified temporary problem drinkers.

16. No significant relationship existed between drinker classification and the number of individuals who stated they were taking medication.

17. No significant relationship existed between drinker classification and the number of individuals who stated they had parents or siblings with drinking difficulties.

18. Of the classified drinkers, significantly more problem oriented drinkers stated they were ill than temporary problem drinkers.

19. No significant relationship eixsted between the 1968 incomes and the disposition level based upon the range of no action or dropped charged to conviction for driving under the influence.

20. Seventy-four per cent of the classified drivers were problem oriented drinkers.

21. Distribution of problem oriented drinkers and temporary problem drinkers did not appear to be governed by sex; however, the arrested population was 95 per cent male.

22. Fifty-five per cent of the classified drinkers had been divorced or separated from their spouse. This information was secured from one to two years after the identifying arrest incident.

23. The mean income of temporary problem drinkers was significantly higher than the mean income of problem oriented drinkers.

24. Problem oriented drinkers classified themselves as heavy drinkers significantly more often than did temporary problem drinkers.

25. Securing legal assistance when faced with a charge of driving under the influence of liquor seems to result in fewer convictions for this charge than for those who do not seek assistance.

26. The conviction rates for driving under the influence or driving while impaired seem to be dependent upon the arresting agency.

Discussion

The findings of this investigation indicate that there is a significant difference in the mean blood alcohol levels of problem oriented drinkers and temporary problem drinkers. This difference, however, is not highly discriminate in determining problem oriented drinkers from blood alcohol level achieved. The findings indicate that problem oriented drinkers and temporary problem drinkers often reach the same blood alcohol levels and the distributions of these two drinker classifications by blood alcohol level overlap. These distributions show that there is a blood alcohol level of .25% beyond which no temporary problem drinkers were found and a blood alcohol level of .12% below which no problem oriented drinkers are found. It should be noted the drinkers reaching blood alcohol levels greater than .25% on the basis of this data probably should be classified as problem oriented drinkers.

The findings have also indicated that the blood alcohol level groups

are significantly different at the .05 level on the basis of age. The young groups tended to have lower blood alcohol levels than the older groups. This substantiates the belief that some physical accommodations to alcohol is a function of the number of years of drinking experience. It should, however, be noted the mean ages of problem oriented drinkers to temporary problem drinkers were not significantly different at the .05 level. A possible conclusion is that blood alcohol level or increased intake is generally associated with age or the number of years of drinking experience, but this does not negate the belief that some individuals may, through learning and some physical accommodation, develop a high alcohol intake and associated drinking problems earlier in their life and, therefore, be classified as problem oriented drinkers sooner than the association of age and blood alcohol level would seem to indicate.

The number of drunk and disorderly convictions for individuals found in blood alcohol level categories was significantly different at the .05 level. Examination of the mean values of the groups indicate that drinkers in the highest blood alcohol level category had higher number of drunk and disorderly convictions than would be expected from their percentage of the total sample.

The significant difference found between blood alcohol categories and the number of addiction admissions of individuals within those groups is the result of the high number of admissions in the highest blood alcohol level category. Being admitted as an alcohol addict generally occurs only when other attempted methods of treatment in the drinker's home environment have failed or when a medical crisis is evident. Admission, therefore, may be considered evidence of one of the most

serious alcohol problem stages a drinker may reach. This substantiates the belief that the depth of the drinking problem is clearly related to higher blood alcohol levels of .25% or greater.

The significant relationship of illness to blood alcohol level categories and the significant association between drinker classification and illness draws an association between increased consumption and increased medical problems; i.e., as blood alcohol level increased, illness increased and problem oriented drinkers are overly represented among subjects who were ill. It is difficult to ascertain whether illness is a result of a physiological difficulty or emotional stress. It seems several of the stated illnesses of back problems or nervous conditions could be psychosomatic in nature due to extreme emotional stress, high anxiety, or physical fatigue around the time of the arrest incident.

The mean income of problem oriented drinkers was significantly lower than temporary problem drinkers at the .05 level of significance. One might hypothesize that the lower mean income of problem oriented drinkers would make it more difficult for this drinker to secure legal assistance and tend to increase the chance of conviction for driving under the influence of liquor. The test for the association of income and disposition levels did not indicate significance at the .05 level. Similar percentages of the two drinker classifications secured legal assistance regardless of income differences. A small percentage of problem oriented drinkers were on welfare or collecting social security as a result of a disabling injury. These subjects had maximum incomes of two or three thousand dollars per year and may have contributed much to these differences. It should also be noted that for those drinkers

getting legal assistance there seemed to be a higher conviction rate for driving while impaired to go with the decreased conviction rate for driving under the influence of liquor. These rates do not appear to be dependent upon income.

When comparing blood alcohol groups on the basis of the number of identifying elements individuals within groups possessed, it was found these groups did not differ at the .05 level of significance. The identifying elements or symptoms of drinking difficulties do not appear to be additive; i.e., all conditions existing in the most "seriously" problemed and just one or two in the "slightly" problemed.

It is interesting to note that blood alcohol level and the number of prior drinking driving charges were not significantly related at the .05 level.

Small numbers of affirmative responses for some variables limited a fair statistical test of a relationship; i.e., those who stated they had experienced delirium tremens or hallucinations. The null hypotheses must remain open until additional data is collected and further testing is accomplished.

Recommendations for Further Research

1. A statewide study of arrested drinking drivers at .20% blood alcohol levels and greater and .15% blood alcohol levels and below to ascertain the usefulness of blood alcohol level as an identification tool of problem drinkers.

2. A follow-up study of the temporary problem drinkers to determine the relative probability of becoming a problem oriented drinker.

3. A follow-up study of the temporary problem drinkers' driving activities.

4. A study similar to this investigation designed and financed to secure interviews from the maximum number of drinking drivers, relatives, and employers.

5. A study to ascertain the effectiveness of extended treatment (beyond 10 to 14 days maximum) with problem oriented drinkers.

6. A study of treatment methods and their effectiveness with temporary problem drinkers.

7. A study to determine nature of the illnesses of problem drinkers.

8. A state study of youthful drinkers to ascertain their drinking experiences, tolerance, and drinking environment and to determine educational approaches.

9. A study to determine the effectiveness of different educational approaches on alcohol use and dangers.

10. A study to investigate this state's expenditures and accomplishments in alcohol treatment and information systems.

11. A study to ascertain the reasons for differences of conviction rates of state, county, and municipal police agencies.

12. A study to investigate State Motor Vehicle Driver Services' methods in controlling the drinking driver.

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APPENDICES

APPENDIX A

Interview Guide Questionnaire

Appendix A

Interview Guide Questionnaire

1. Are you married? Yes( ) No( )

   a. Have you been:

      ( )Married before ( )Divorced ( )Separated ( )Widowed

   b. Has your drinking created problems with your marriage(s)?
      Yes( ) No( )

2. How many job changes have you made in the past five years?
   (not within your plant or company)

   0 1 2 3 4 5 6 7 8 9 10+

   a. In your opinion, were any of these made because of drinking or absenteeism due to drinking?

      0 1 2 3 4 5 6 +

3. Has drinking created any problems in work attendance
   Yes( ) No( )

   a. How many days per month would you say you would be absent?
      #( )

4. What is your annual (family) income?

   1 2 3 4 5 +
   0 1 2 3 4 5 6 7 8 9

5. Have you been ill recently? Yes( ) No( )

6. What medication have you been taking?

   ( )None _____

7. Are you considered a typical drinker by your acquaintances?
   Yes( ) No( )

8. Do other members of your family normally drink? Yes( ) No( )

9. Have there been alcohol problems or alcoholism in your family?
   Yes( ) No( )

10. Have you ever experienced a period while drinking when you had temporary amnesia; i.e., not recalling where you had left your car or where you finished your drinking? #( ) No( )

a. Were you under any medication at this time? Yes( ) No( )

b. Was there any other special reason for this? Yes( ) No( )

11. Where do you generally drink?

( )Home ( )Restaurant ( )Bar ( )Others' homes

( )Other _____

12. Have you ever experienced delirium tremens or hallucinations?
#( ) No( )

13. How many drinks does it usually take to make you "feel good?"

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15+

14. On the evening you were arrested, were you drinking the amount you generally drink?

( )Usual ( )Less than usual ( )More than usual

15. On the night of your arrest, was your condition due to:

( )A celebration ( )Anger ( )Depression ( )Other _____

16. Were you under medication at this time? Yes( ) No( )

a. What? _____

17. Have you had any other problems with the police because of drinking? Yes( ) No( )

D&D's( ) other DUIL's( ) DWI's( )

Family problems where police were called Yes( ) No( )

18. Have you or members of your family had an opportunity to seek social service assistance concerning problems related to your drinking?

_____

_____

_____

APPENDIX B

Alcoholism Treatment Centers

Appendix B

Alcoholism Treatment Centers

St. Lawrence Community
Health Center
1201 West Oakland
Lansing, Michigan

Sparrow Hospital
Alcoholism Unit
1215 E. Michigan Ave.
Lansing, Michigan

Salvation Army
Alcoholism Treatment Center
3611 Cass Ave.
Detroit, Michigan

Brighton Hospital
12851 E. Grand River Ave.
Brighton, Michigan

Towne Hospital
525 E. Grand Boulevard
Detroit, Michigan

Harrison Community Hospital
Alcoholism Program
Ballard Road
Mount Clemens, Michigan

St. Joseph Hospital
Alcoholism Treatment Center
20 Parkview
Mount Clemens, Michigan

Pontiac State Hospital
Alcoholism Unit
Pontiac, Michigan

St. Luke's Hospital
Alcoholism Therapy Unit
Saginaw, Michigan

War Memorial Hospital
Alcoholism Program
Sault Ste. Marie, Michigan

North Woodward Hospital
12024 Woodward Ave.
Highland Park, Michigan

Hurley Hospital
Flint, Michigan

Mayor's Rehabilitation Committee
on Skid Row Problems
585 E. Larned
Detroit, Michigan

The Battle Creek Health
Center
Battle Creek, Michigan

Sacred Heart Rehabilitation
Center
100 S. Eliott
Detroit, Michigan

Veteran's Administration
Hospital
Battle Creek, Michigan

Detroit - Wayne County
Health Department
City - County Building
Detroit, Michigan

National Council on
Alcoholism
202 E. Boulevard Drive
Flint, Michigan

APPENDIX C

Frequency Distribution of All Drinkers by Blood Alcohol Level and Classification

Appendix C

TABLE 14.-- Frequency distribution of all drinkers by blood alcohol level and classification.

Blood Alcohol Level	Problem Oriented Drinkers	Temporary Problem Drinkers	Drinkers Not Classified
.41%	1		
.40%			
.39%			
.38%			
.37%			
.36%			
.35%	1		
.34%			
.33%			
.32%	1		
.31%	3		
.30%	1		
.29%			
.28%	2		
.27%	1		1
.26%	6		
.25%		1	
.24%	5	2	
.23%	2	2	
.22%	5	3	1
.21%	4	1	2
.20%	6	4	
.19%	6		1
.18%	5		
.17%	5	3	1
.16%	2		1
.15%	7	1	
.14%	2	1	1
.13%	2	2	
.12%	1		
.11%		2	
.10%			
.09%		2	