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AN ANALYSIS OF DRIVERS MOST RESPONSIBLE FOR FATAL ACCIDENTS VERSUS A CONTROL SAMPLE

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16. Abstract

Recently the Boston University Traffic Accident Research Special Study Team has completed the investigation of an experimental driver sample consisting of 267 motor vehicle operators judged to have been "most responsible" for a highway fatality in the greater Boston area. Following the field investigations for the experimental sample the Boston team was funded to collect a matched control sample of 801 operators never responsible for a fatal highway accident. The experimental sample was evaluated from two differing perspectives: accident typology and alcohol involvement. The typology results showed 103 (38%) TYPE I accidents where the focal operator was killed; 63 (24%) TYPE II accidents where the focal operator survived the crash which resulted in the death of another vehicular occupant; and, 101 (38%) TYPE III accidents where the focal operator struck and killed a pedestrian. In each case the focus of research was with the focal/"most responsible" operator. In the second evaluation the experimental sample was divided into two segments including: 103 (39%) operators with focal accident alcohol involvement and 164 (61%) operators with no focal alcohol involvement. These sub-experimental samples were analyzed with the 801 control sample operators to establish pre-identification and predictive variables to identify operators who might be potential candidates for a fatal highway accident. The variables most significant in the executed discriminant function analysis included: previous arrests for DWI and speeding, alcohol use patterns, levels of education and occupation. The results detailed a Boston Predictive Formula for identifying potentially high risk operators from the general population.

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FOREWORD

Annually tens of thousands of Americans die in automobile accidents on the highway, about 2 million are hospitalized -- many of whom will never lose the emotional and physical scars of their injuries -- and millions of others find their lives uncomfortably changed because of a serious highway event. For years, highway safety professionals have been pooling together their knowledge to try to reduce at least the proportion of accidents involving motor vehicles. The approaches are as varied as the sciences with effected countermeasures ranging from sophisticated restraint systems, to mercury vapor lighting, to rehabilitation for the drunk driver and advanced driver education schools. One of the principal efforts has come with research investigations designed to identify in advance the driver, or at least the kind of driver, likely to become involved in a fatal or serious motor vehicle accident.

This predictive approach to the problem, through the medium of human factor variables, has been one of the major goals of the Boston University Traffic Accident Research Special Study Team. A 30-month study, ending in 1974, focused its attention on the sequential investigation of each motor vehicle accident occurring in the team's area of responsibility which resulted in a fatal personal injury. Each one of these accidents was researched from the perspective of the "most responsible" operator, regardless of who was killed and from the levels of alcohol and other drug involvement. A subsequent control sample matched

to the fatal operator sample was collected to assist the evaluators in the interpretation of the data relative to the fatally responsible operators. The final reporting from DOT HS-310-3-595 is presented in 3 parts. Part I, "Psychosocial Identification of Drivers Responsible for Fatal Vehicular Accidents in Boston: Final Report" [4] presented the findings from the data relative only to the experimental sample of fatally involved operators. Part I focused its attention principally on the 3 accident type operator groups and the alcohol involved/no alcohol involved drivers. Part III, "Marijuana Use and Driver Behaviors: Historical and Social Observations Among Fatal Accident Operators and a Control Sample"[5] will discuss the experimental and control findings using the smoking of marijuana as the dependent variable. Additional data from the control sample will also be presented.

Part II, which follows, will be a presentation of the findings from the experimental and control samples with particular reference to the 3 accident type evaluations and the differences between the experimental operators with focal alcohol involvement and those with no alcohol. In each set of analyses the control sample will be used as a base for evaluation. A discriminant function analysis will be computed to see if identifying features can be highlighted to assist in the prediction of potentially high risk motor vehicle operators.

ABSTRACT

For the past few years the Boston University Traffic Accident Research Special Study Team has been investigating drivers in the greater Boston area who have been "most responsible" for fatal highway accidents. An experimental sample of 267 such operators, sequentially collected from a designated area of responsibility, established the base for the research. These operators were evaluated from 2 differing perspectives. First by accident type. The Boston team identified 103 (38%) TYPE I accidents where the focal operator was killed; 63 (24%) TYPE II accidents where the focal operator survived the crash but where another vehicular occupant was killed; and, 101 (38%) TYPE III accidents where the focal operator struck and killed a pedestrian. Secondly, by alcohol involvement in the focal crash for the focal operators. This division resulted in 103 (39%) operators judged to have been alcohol influenced at the time of the respective accident and 164 (61%) operators who were not alcohol involved. Subsequent funding became available so the team could collect a matched, randomly selected control sample to use as a normative base for comparison with the experimental operator groups. These 801 control operators had never been "most responsible" for a fatal vehicular accident.

The following presentation of the data shows that the 3 operator/accident types represent differing segments of the Boston population. The single, Irish, high school educated, thirty year old, male clerk or technician with a history of alcohol related problems involved in the TYPE I accident was significantly different from the younger, more poorly educated and less well employed TYPE II driver with a marked history of the heavy use of all intoxicants, including: alcohol, marijuana

and street/entertainment drugs. The TYPE III operator refused to be easily profiled. Generally he presented the picture of a man who was more like the general Boston population. However, further analyses showed that this driver occupied a position between the more acting out TYPE I and TYPE II operators and the controls.

The alcohol involved experimental operator represented the most problemmatical segment of the sample, appearing as the least accomplished driver group, with lower educational and occupational profiles. He came to the focal accident with observable histories of problems associated with the inappropriate use of alcohol. The experimental operator with no alcohol involvement was slightly better educated and employed than his counterpart. He had fewer alcohol related problems and generally less anti-social behaviors. The control operator was clearly the better educated and employed. He presented a heavier drinking pattern than the experimental operator without alcohol involvement and a lighter pattern when compared with the alcohol involved operator. All 3 groups showed significant numbers of operators with histories of marijuana smoking.

Discriminant function analyses were effected to assist in the goal of pre-identification of the high risk driver. Variables associated with arrest histories for driving under the influence of alcohol or for speeding, alcohol use patterns, education and occupation served to most clearly differentiate between the groups under evaluation.

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INTRODUCTION

In the fall of 1974 it became evident to the members of the Boston University Traffic Accident Research Special Study Team and concerned officials in the National Highway Traffic Safety Administration that many of the findings presented in the first part of this final report, "Psychosocial Identification of Drivers Responsible for Fatal Vehicular Accidents in Boston" [4] would need a control sample of Boston operators to fully substantiate and validate some of the initial speculations and hypotheses. The prevading research question for the team was not in relation to the differences between the accident types or alcohol involved/not involved operators, all of whom had been "most responsible" for a fatal highway collision. The question was: "How real were these differences in comparison to the general population?" Was the TYPE I operator really different from the "average" Caucasian male in his mid-thirties? Was the surviving TYPE II operator more risky and more drug involved than most young men? Was the TYPE III operator just a regular guy who was in the wrong place at the wrong time? Was the alcohol involved operator a heavier drinker with more legal infractions than the average Boston citizen? Was the non-alcohol involved operator just like most young men his own age? How did the experimental operators as a group differ from the general population? Were these drivers drinking more, smoking more marijuana, more frequently divorced or separated than other young men? None of these questions would have anything more than an internally significant guess without the benefits of a control sample of motor vehicle operators who were also residents in

the greater Boston area. Part I of this final report, mentioned above, presented findings that indicated significant differences between the 3 operator types. It went on to show the differences between the alcohol influenced focal operator and the operator without significant alcohol influence.

In January, 1975, the NHTSA awarded the Boston University Traffic Accident Research Special Study Team with a contract to collect a controlled sample of non-accident drivers from the same geographical areas represented by the initial experimental sample of fatally involved operators. Rigid controls were established on a number of criterion variables, such as sex, age, and residential township to allow the Control Sample to be from as comparable a part of the Boston population as reasonably feasible.

Map #1 encapsulates the area of responsibility for the Special Study Team. All of the presented townships were included in the catchment area from which the sample of fatally involved motor vehicle operators was sequentially collected. To the north, west and south of this area are the moderate and light suburban communities which serve as residential towns for the metropolitan area of Boston and other smaller cities. The dotted towns and districts on this map represent the area where 68% of the experimental operators lived at the time of their fatal accident and the catchment area for all of the operators who composed the Control Sample.

RESEARCH DESIGN AND METHODOLOGY

The motor vehicle operators included for analysis in this report were collected as 2 distinct samples during different periods of time in the greater Boston area. The 267 operators included in the Experimental Sample were investigated during the 30-month period between September 1971 and February 1974. The 801 operators in the Control Sample were subsequently collected during the first 5 months of 1975. The Experimental Sample was composed of "most responsible" motor vehicle operators who were involved in a highway accident resulting in a personal fatality to themselves, another vehicular occupant or a pedestrian. Each accident-related operator was investigated by the team immediately after the focal collision. Among the wide variety of variables collected on each operator were observations regarding historical patterns of marijuana use and clinical evaluations of marijuana smoking during the 4 hour period prior to the accident under consideration. The findings from this initial investigation of these sequential fatal accident related operators stimulated sufficient interest with the National Highway Traffic Safety Administration, whereupon the Department of Transportation provided supplementary funding so that the Boston team could collect a control sample of individuals with no history of fatal motor vehicle accident involvement. The control protocol was in two parts. Comparable data to the Experimental data collection instrument was scored in the Control Human Factor Index (Appendix A). For each control subject who admitted to having smoked marijuana

more than three times during the previous year information was collected for the scoring of the Marijuana Supplement (Appendix B).

Experimental Sample

The 30-month period of experimental field investigation for the Boston University Traffic Accident Research Special Study Team began with a pilot study in September 1971. Contract DOT HS-310-595 specified that the investigations were to be conducted from a human factors perspective, collecting a wide variety of psychosocial variables of an historic and focal accident related nature with the primary focus of the research being with the operator of the vehicle judged by legal authorities to have been "most responsible" for the fatal accident. The pilot contract for 50 sequential cases was immediately followed by a NHTSA request for the team to investigate a total of 300 consecutive fatal motor vehicle accidents in the geographical area in and around the city of Boston.

The geographical confines of the experimental research included two tangent sub-divisions of the greater metropolitan area. The first was the area of the greatest population density eventually selected as the patrol district for the ASAP countermeasures program. This overlap in areas of responsibility allowed for some ongoing evaluation between the two teams. The second area of responsibility for the Boston team included a number of townships and near urban communities that were tangent to the inner city and considered a part of greater Boston. The total area of team responsibility was relatively homogenous

with regard to topography, highway structure and population.

Early in the research the team identified three principal types of fatal vehicular accident-related "most responsible" operators. There also emerged two sub-types of similar focal operators which have been excluded from the main analysis because their presence would have confounded the initial results. The three principal and two sub-types of focal operators have been briefly characterized as follows: TYPE I -- where the focal operator was killed in the accident; TYPE II -- where the focal operator survived the collision but where another vehicular occupant in his or another vehicle was killed; TYPE III -- where the focal operator struck and killed a pedestrian; TYPE IV -- a TYPE I accident where the focal operator suffered a fatal seizure precipitating his death and the accident; and, TYPE V -- a TYPE III accident where the focal operator was never apprehended and designated as hit-and-run. Parts I and III of these final reports from DOT HS-310-595 present the findings with regard to the operator type divisions [4,5]. Because of the confounding nature of the TYPE IV and TYPE V cases they have been excluded from all analyses and are profiled in the Appendices of Part I [4]. The TYPE I, TYPE II and TYPE III operators represent the 267 cases considered as a part of the Experimental Sample.

During the pilot period the team developed a Human Factor Index (HFI) which scored over 300 historical and focal variables on each of the 267 operators included in the Experimental Sample. The sources for the data came from a wide variety of channels. Each Experimental Sample operator case required from 2 to 23 personal interviews before

the HFI was considered complete. The interview information came from surviving operators (TYPE II and TYPE III); focal accident passengers and witnesses; friends, relatives and lovers; professional peers, health care professionals and many other individuals particular to each case. This information was supported with other data from: the Office of the Medical Examiner of Suffolk County; the Commonwealth Chemistry Laboratory (blood analyses); the Commissioner of Probation; the Registry of Motor Vehicles; state and local police reports; reports and files from supporting health care institutions; reports from cooperating social service agencies; and, other sources individual to each operator. The data on each case was scored and computerized following total sanitization. Every effort was made to eliminate personal identification possibilities for each of the operators included in the investigations. This highly confidential approach to the data has been in harmony with the ethical principals of the team and has eliminated potential subpoena complications.

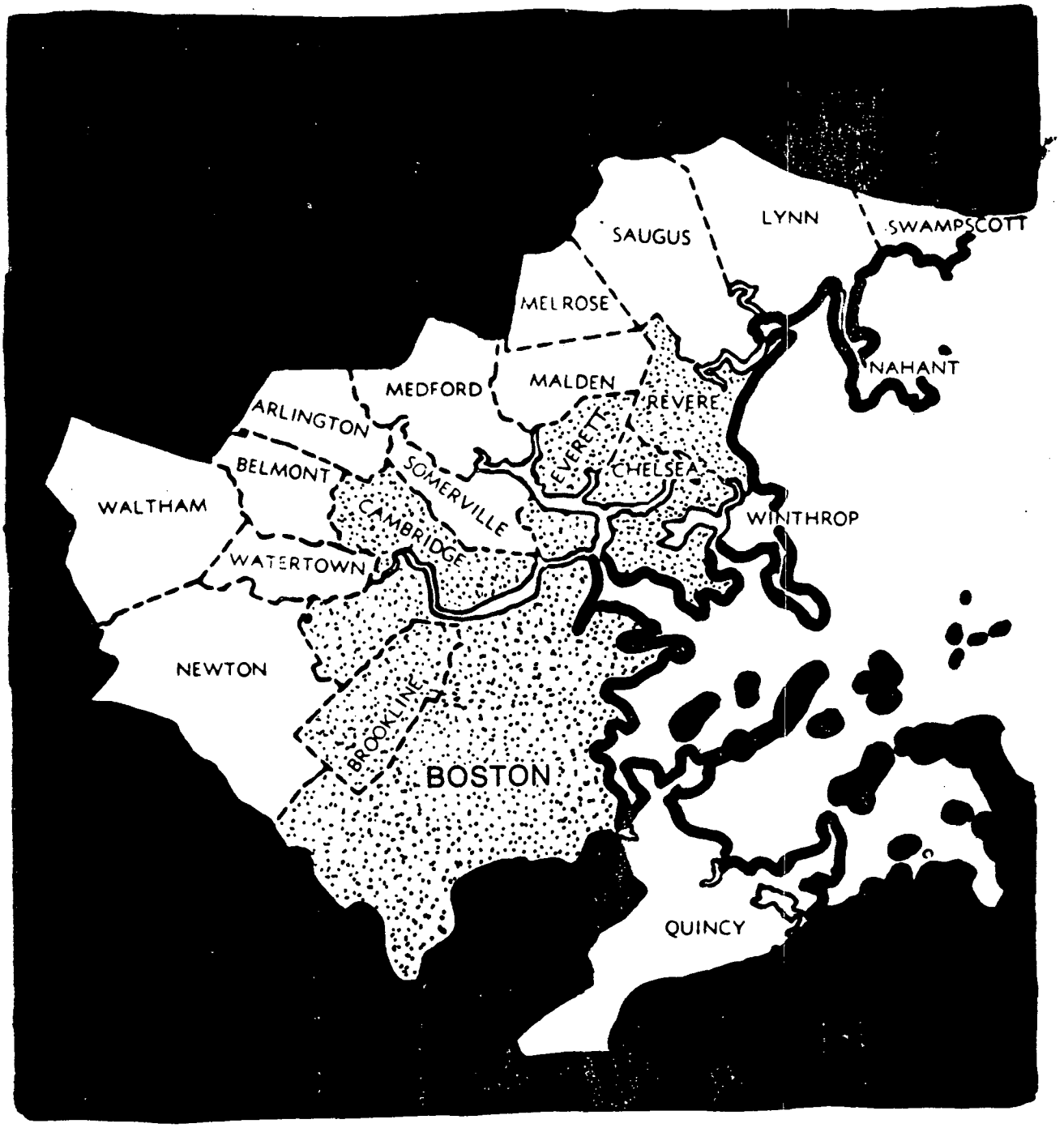
The methodological outline for the collection of the data for the Experimental Sample operators began with the initial notification from the Office of Accident Investigation in the Commonwealth Registry of Motor Vehicles that a fatal accident in the team's area of responsibility had occurred. The case was then carefully assigned to one of the team's Human Factor Associates and the focal operator or his survivors were asked to participate in the research effort. Letters of purpose were sent to prospective informants advising them of the nature of the research (Appendix C). Following the receipt of the correspondence the

prospective informant was contacted by telephone to set up an interview time. These telephone contacts were extremely valuable and the team quickly discovered that informants would often be more informative over the telephone with regard to sensitive information than they would be when seen in person at a later date. In such cases where the informants had been advised by legal counsel to talk to no one about the accident an appropriate letter was sent to the respective lawyer (Appendix D). Upon occasion the team encountered a great deal of legal resistance and continued correspondence, personal meetings and frequent support from cooperating lawyers was necessary before the individual lawyer allowed his client to talk to the Boston team. Initial resistance to participate was encountered with many informants often precipitating full team involvement in a particular case. All means were utilized to secure the cooperation of a sufficient number of informants to complete the case to the satisfaction of the team. This procedure frequently included: clandestine informant meetings, extended telephone conversations, delays, innumerable contacts with the informant, and, other means appropriate to each case. This procedure might have been considered to have been extreme but with the basic research design that specified the sequential investigation of each fatal motor vehicle accident in the team's area of responsibility it appeared to have been appropriate. The final result was that only 6 (2%) of the prospective Experimental Sample were rejected because of inadequate or incomplete data.

As each case was finalized it was reviewed by the Research Director, sanitized and computerized in anticipation of the forthcoming statistical analyses.

MAP # 1

Boston University Special Study Team Area of Responsibility



Total area of Experimental Sample catchment. Dotted insert represents Control Sample catchment areas.

Control Sample

The Control Sample data was collected in quite a different manner from that of the Experimental Sample. The period of field investigation was completed in less than 5 months, between January and May of 1975. In each of the 801 control cases only the specific operator under investigation was interviewed. This approach was in marked contrast to the multiple informants interviewed to complete an experimental case. This very important bias was clearly noted before the finalization of the control data collection instrument and the instruction period for the Human Factor Associates. Every attempt was made to appropriately compensate for this bias so that the eventual comparisons of the selected data points could be evaluated together.

The population of the Control Sample was designated to be three times the size of the Experimental Sample, or 801 cases. The Boston team felt that this number of control cases would be adequate to statistically compensate for any borderline differences that would appear between the selected variables elected for comparison between the samples, and to provide an additional correction for the biases. Additional controls were specified as follows in an attempt to further reduce the evident biases in the collection procedures.

The first control was that the operators would be randomly selected from four community clusters located within the team's experimental area of responsibility. An analysis of the experimental cases showed that 171 (64%) of these experimental operators lived in one of these community clusters at the time of their focal fatal

accident. The names and addresses of the total population from which the sample would be drawn were collected from a wide variety of sources including telephone directories, voter registration lists, town directories and census reports, Cole's Directory and school registration lists. The total accumulated potential population from which the participants were randomly selected at 1:3 intervals included more than 6000 individuals.

The second control was for sex. The Experimental Sample included 88% males and 12% females. The final distribution of the Control Sample was projected so that it would include the same proportionate distribution with a projected variance of no more than one percentage point.

The third control was for age. The Experimental Sample age-by-decade-by-sex matrix was used as a guide for the distribution of the subjects in the Control Sample. The final distribution of the Control Sample was progressively projected so that it would include the same proportionate distribution with a projected variance of no more than one percentage point in any particular cell. The proportionate distributions for the Experimental Sample and for the final Control Sample are seen as follows:

	MALE		FEMALE		TOTAL	
AGE	E	C	E	C	E	C
≤19	19%	19%	18%	18%	19%	19%
20-29	40%	40%	35%	36%	40%	40%
30-39	17%	17%	18%	17%	17%	17%
40-49	12%	12%	12%	12%	12%	12%
50-59	6%	6%	9%	8%	6%	6%
60-69	3%	3%	4%	5%	3%	3%
≥70	3%	3%	4%	4%	3%	3%
TOTAL	100%	100%	100%	100%	100%	100%

The fourth control was for the possession of a valid driver's license. This information was most frequently offered by the prospective informant at the point of the telephone contact if he did not possess a valid license to operate a motor vehicle. These reports were periodically substantiated through the files at the Registry of Motor Vehicles. A total of 86 (5%) of the total contacted population were rejected for not meeting this control.

The fifth control was that the operator was to have never been the "most responsible" driver of a vehicle involved in a fatal accident. Actually, throughout the course of the control field investigations only one individual was so identified. Three additional individuals were identified by name as possible candidates and never contacted.

The methodology for the identification and collection of the control cases is most clearly explained through the following flow chart. The design was considerably simplified over the experimental procedure

because when any potential subject refused to participate or was rejected there was no further attempt to establish contact. The overall flow chart is as follows:

1. Identification of the potential subject from the available population by name and address through an interval random selection of 1:3.
2. Assignment of the case to one of the Human Factor Associates.
3. Letter of purpose and introduction sent to the potential participant (Appendix E).
4. Telephone contact established with some data collected and arrangements made for a personal interview.
5. Interview completed including the Control Human Factor Index (Appendix A) and the Marijuana Supplement (Appendix B) when appropriate and possible.

Throughout the course of the control investigations a total of 1585 potential participants were selected for contact. From this number 316 (20%) were rejected because of a wrong address or because of some reason why they could not be contacted at all by telephone or in person. Another 86 (5%) were rejected because they either possessed no driver's license or had a license under revocation or suspension. An additional 201 (13%) individuals refused to participate in the research for a wide variety of reasons. In the final analysis 181 (11%) completed cases were rejected by random selection because they were not needed to complete the age-by-decade-by-sex matrix described above. The remaining 801 (51%) cases were appropriately proportioned into the Control Sample with corrected considerations for each of the selection control variables.

As each case was finalized it was reviewed by the Research Director, completely sanitized and submitted for computerization in anticipation of the final analyses.

Experimental and Control Samples

The combined data from the variables unique to the Experimental Sample, those variables unique to the Control Sample and the variables that were in common between the 2 represented a substantial amount of information. For the sake of analysis the samples were identified by the following group labels.

Experimental Sample Only

1. TYPE I operators, "most responsible" for accidents resulting in fatal injuries to this operator.

2. TYPE II operators, "most responsible" for accidents resulting in fatal injuries to another occupant in his or another vehicle from which this operator survived.

3. TYPE III operators, "most responsible" for accidents resulting in fatal injuries to a pedestrian.

4. Alcohol related operators, or the drivers of the "most responsible" vehicles that were either clinically or chemically evaluated to have had a Blood Alcohol Concentration $\geq$.05 gm/100 ml % at the time of the fatal accident.

5. Non-alcohol related operators, or the drivers of the "most responsible" vehicles that were either clinically or chemically evaluted to have had a Blood Alcohol Concentration that was negative or $\leq$.04 gm/100 ml % at the time of the fatal accident.

Experimental and Control Samples

1. Problem drinking operators
2. Not problem drinking operators
3. Marijuana smokers
4. Not marijuana smokers
5. Experimental operators only
6. Control operators only

The statistical programs anticipated for the evaluation of the data included in this part of the final report will be: a descriptive analysis, Chi-square tests for simple probabilities, t-Tests for probable differences with appropriate variables, Analysis of Variance and Discriminant Function Analyses for an evaluation of predictive values. All of these procedures will be accomplished through the use of the team's time sharing facilities with the Harvard University Computer Center.

Part I of this final report presented the data from the findings of the 3 types of motor vehicle operators in the experimental sample.[4] Part III has addressed the marijuana question from the perspective of patterns of use to the experimental and control samples with some analyses that are appropriate only to the control marijuana smokers.[5] Part II, included herein will deal very specifically with the variables that were collected in common between the 2 major samples.

Hypothesis

1. A comparison of the TYPE I and TYPE II experimental operators with the operators in the control sample will show that the driver

likely to become involved in a vehicular accident resulting in fatal injuries to himself or another vehicular occupant can be clearly pre-identified by his lower education and employment levels and by his overindulgence in alcohol, marijuana and other drugs.

2. A comparison of the TYPE III experimental operator group with the control sample operators will show that the driver likely to become involved in a vehicular accident resulting in the death of a pedestrian cannot be identified from within the general population.

3. A comparison of the experimental operators with focal alcohol involvement, the experimental operators without focal alcohol involvement and the control operators will produce a pre-identification formula that will allow at least the potentially alcohol involved operator to be predicted from his alcohol history, education and occupation. Key variables that will assist in his identification when compared with the normative population in the control sample, will be a recent separation or divorce, alcohol related job loss or 2 or more previous arrests for speeding.

4. The experimental alcohol involved operator will be a heavier user of alcohol than the general population and will use less marijuana and other drugs. This hypothesis is built on the conception that heavy users of alcohol are "one drug men."

RESULTS

The following findings represent one phase of the data analysis from the investigation of the Boston University Traffic Accident Research Special Study Team during the past 4 years. The team conducted its research into the variety of human factors associated with the operator of a motor vehicle judged to have been "most responsible" for a highway accident resulting in a personal fatality. The field investigation period for the experimental phase of the research began in September, 1971 and continued through February, 1974 with a total accumulation of 300 cases, 267 of which were finally suitable for inclusion in the experimental sample. Part I of this reporting, "Psychosocial Identification of Drivers Responsible for Fatal Vehicular Accidents In Boston" [4] addresses itself to the data from this experimental sample alone with particular interest in how the 3 accident type operators differed from each other and how the alcohol involved operator differed from the operator without alcohol involvement.

The subsequent collection of the matched control sample between January and June, 1975, with all of the restraining matching variables resulted in 801 non-accident operators for whom complete information was coded and computerized in harmony with the experimental data in common. The end result of this effort produced a total case load of 1068 drivers, 267 (25%) of whom had been "most responsible" for a fatal accident and 801 (75%) who were fatal accident free. The large number of matching variables used for qualifying each of the control candidates was an attempt to neutralize the effects of the differing time periods used in the field

investigations. Additional data relative to marijuana use and related opinions and behaviors was collected from the control marijuana smokers. This data together with comparisons between the experimental smokers, experimental non-smokers, control smokers and control non-smokers is found detailed in Part III of this final report, "Marijuana Use and Driver Behaviors· Historical and Social Observations Among Fatal Accident Operators and a Control Sample " [5].

Part II, included in this report, treats the data which is in common between the experimental and control samples in a manner very much like the findings which were presented in Part I for only the experimentals. The additional data from the control sample is used as normative data, generally representative of the greater Boston population for the purposes of this research. The following results will be divided into 3 sections. First, the 3 accident operator types will be compared with the control sample. Secondly, the experimental operators with focal alcohol influence at the time of the respective accident; their non-alcohol involved counterparts and, the control operators will be evaluated for differences and similarities. Finally, a discriminant function analysis will be effected to build a Boston predictive formula for high risk drivers.

The 1068 drivers in the total sample include 267 (25%) experimental operators and 801 (75%) control operators. The experimental sample is composed of 103 (38%) TYPE I operators who were "most responsible" for a motor vehicle accident in the greater Boston area resulting in fatal injuries to themselves; 63 (24%) TYPE II operators who survived the accident for which they were "most responsible" which resulted in fatal injuries to another vehicular occupant and 101 (38%) TYPE III operators who struck and killed a pedestrian.

The remaining 801 (75%) operators from the total sample of 1068 drivers constitute the Control Sample which is used as the main baseline of comparison.

The research design for the collection of the control sample was that it would be proportionately the same as the experimental sample in its sexual distribution. The results in Table 2 show that 236 (88%) of the experimental operators were male and 705 (88%) of the control subjects were male. The females who included 31 (12%) of the experimental sample showed with 96 (12%) control operators for an acceptable match. Even when the somewhat different sexual distributions were seen in the experimental type breakdowns there was no significant difference between any of the samples or sub-samples.

In much the same manner the age-by-decade matrix specified that there would be proportionate distributions in the control sample as seen in the experimental sample. The matching was completed with age-by-decade divisions in the comparison between the groups. In spite of this rough approximation for sampling the mean of the actual ages for the control sample showed 31.7 years, nearly the same as the 31.6 years for the experimental sample as a whole. The TYPE II operator did represent a significantly younger operator group than did the rest. This differentiation has been explained in some detail in Part I of this reporting. The heaviest concentration of operators for the experimental sample came with the 107 (40%) operators between 20 and 29 years with a comparable 320 (40%) operators in the control sample. This single decade was also the strongest category for each of the experimental

operator types. The next largest category included the 49 (19%) experimental operators 19 years or younger and the proportionate 152 (19%) control operators. The operators in their thirties included 46 (17%) of the experimental sample operators and 136 (17%) corresponding controls. The proportions continued to decrease in conjunction with the decreasing numbers of middle and older aged operators included in the experimental sample. A total Chi-square did not show any significant difference between the samples for age (Table 3).

There was a most significant difference in marital status at the <.01 level which showed that the control sample included a larger proportion of married operators and a substantially smaller number of divorced and separated operators. The experimental sample included 93 (35%) married and 30 (11%) divorced or separated operators, as opposed to the 332 (41%) control marrieds and only 34 (5%) control operators who were divorced or separated. There was a less significant difference, at the <.05 level, when the single and non-single operators were evaluated between the 3 experimental types and the control sample. This difference was seen in one direction when the 47 (45%) single TYPE I operators and the 45 (45%) single TYPE III operators were compared with the control 418 (52%) singles. This difference was also noted in the other direction with the 43 (68%) TYPE II singles. There was, however, no significant difference seen between the experimental sample and the control sample for singles and non-singles (Table 4).

Some debate resulted from the findings in Part I showing that 99 (37%) of the experimental operators came from an Irish heritage most

clearly seen with the 45 (43%) TYPE I operators. It should be noted once again that the individuals with Irish surnames represent 22% of the inner city population and 15% of the greater metropolitan population. These census figures are only slightly elevated with the 199 (25%) individuals with Irish heritages found in the control sample. A Chi-square was effected which showed a significant difference between the Irish and non-Irish operators in the experimental and control samples. These findings would further substantiate the claim in Part I that operators of Irish heritage were substantially over-represented in the fatal experimental sample when compared with the available census figures and the results of the control sample for ethnic background (Table 5). With the census figures showing that 19% of the inner city population and 20% of the greater metropolitan population were Italian by background, the speculations of Part I with regard to this ethnic grouping may not be as notable. Part I said that the Italian operators were under-represented with only 47 (17%) of the operators coming from all of southern Europe. The control sample showed 193 (24%) operators from all of southern Europe including most dominantly the Italians with some Greeks and very few operators from Spanish or Portuguese backgrounds. Although this seems to only represent an interesting trend there do appear to be fewer Italians or southern Europeans proportionately in the experimental sample and these ethnic backgrounds may be under-represented (Table 5). The decreased number of African blacks in the control sample showing only 32 (4%) as opposed to 24 (10%) of the operators in the experimental sample is projected

to be a bias of the sample. A very large proportion of the operators rejected from the control sample because they could not be located or because they did not have a telephone number where they could be reached for contact were individuals from black areas of the city. The team made the observation on several occasions during their weekly meetings that the black representation in the control sample might well be smaller than anticipated because of the large number of blacks that could not be positively identified, contacted and interviewed. Unfortunately, there is no available list of ethnic backgrounds available through the Registry of Motor Vehicles which would report the numbers of licenses given to individuals from various ethnic groups.

An evaluation of the data relative to formal educational backgrounds showed a significant difference between the experimental and control samples at the <.01 level consistently. The control sample was better educated than any one of the experimental accident type operator groups and better educated than the experimental sample as a whole. The differences are clearly evidenced in Table 6. These findings show that 75 (28%) of the experimental operators were educated beyond high school and that 430 (54%) of the controls were at least educated in a college, university or some post-high school institution. This is particularly evidenced with the TYPE II operators which included only 10 (16%) subjects who had gone to some kind of post high school institution, and considerably less by the other 2 accident type groups as is evidenced by the 28 (28%) TYPE III and the 37 (36%) TYPE I operators with a better than high school education. To a smaller degree than these statistics indi-

cate, this divergence in educational backgrounds may be a part of the survey procedure. Individuals with less education are often reticent to participate in surveys that might highlight their limited education. Although there is no way of knowing if this was the case with the greater Boston control collection it can be speculated that this bias might have influenced the results to some degree. However, this bias could not have effected the findings to the degree that they represent.

The matter of student status seen in Table 7 also showed a marked difference between the experimental and control samples. Apparently the controls were better educated as seen in the previous table, and also in the process of becoming even better educated. These results show that 80 (10%) part time and 161 (20%) full time students were located in the control sample with 7 (2%) part time and 42 (16%) full time students in the experimental group. The difference was significant at <.01 level as evidenced by the disproportionate percentages in the part time student categories.

As might be expected with the previous findings relative to education and student status the control sample showed a distinct and significant disproportionin the levels of occupational attainment at the <.01 level between all samples with a better/higher employed control sample. The exception was with the comparison of the TYPE III experimental operator group and the control sample with only a notable trend favoring better jobs with the control sample operators than was evidenced by the TYPE III operators. The material in Table 8 shows a 7 level scale of occupational attainment that was used for comparative scoring

of the operators. The differences between the experimental and control operators was not as clearly seen in the middle employed groups in levels 3, 4 and 5 as it was between the 2 samples for levels 1 and 2 and on the other hand for levels 6 and 7. The control operators showed clear dominance of the upper employed levels with 232 (29%) operators in levels 1 and 2 as opposed to 27 (10%) for the experimentals. The opposite was the case with the lower levels of employment where the control operators showed only 121 (15%) subjects as opposed to the 64 (25%) in the experimental sample. As can be seen in a review of the proportionate distributions for the TYPE III experimental operator the differences, especially in the lower levels of occupation were not as severe as were evidenced with the TYPE I and TYPE II operator groups.

During the experimental field investigations, evaluations were made regarding the operator's personal opinion regarding his own physical health. In the case of the 103 deceased operators in the TYPE I group these observations were taken from the survivors or other informants. A comparison of the findings from the control sample with all of the experimental accident type operator groups and the experimental sample as a whole continues to accentuate the observation noted in Part I, that being, that the TYPE I operator was in much poorer general health than any of the others, and that this finding was significant at <.01 level. The statistics show that only 6 (1%) of the control operators considered themselves to have been in poor health as compared to 9 (9%) TYPE I, 2 (3%) TYPE II and 1 (1%) TYPE III operators

or as compared to the 12 (5%) of the operators in all 3 groups together. Those reporting fair health also showed favoritism for the TYPE I operator group. The findings report that 48 (6%) of the controls said that they were in fair health as opposed to 25 (24%) TYPE I, 8 (13%) TYPE II and 14 (14%) TYPE III operators or for 47 (17%) operators in the experimental sample as a whole. There is evidently some factor associated with poor health that is closely linked with the experimental operator group.

One observation of special interest was with regard to the matter of cigarette smoking patterns or habits. There was a significant difference between those operators who smoked and those who did not smoke. Over half, or 424 (53%) of the controls did not smoke as contrasted with the 89 (33%) of the experimentals who did not smoke. However, once smoking cigarettes was reported, there did not appear to be a real difference in the numbers of cigarettes smoked daily. Of the 377 (47%) controls who smoked, only one third, or 122 (33%) smoked more than 2 packages daily. This was the identical pattern seen among the 178 (67%) of the experimentals who smoked cigarettes with 58 (33%) of these operators smoking more than 2 packages of cigarettes daily. In spite of these differences the evidence is clear that the experimental sample and each of the experimental operator types smoked cigarettes more frequently than the control sample (Table 10).

Early in the experimental field investigations there was some speculation as to whether there might be some correlation between the

"normal" use of corrective lenses for driving and vehicular accidents. When the findings in Part I showed that 40 (40%) of the TYPE III operators were required to wear glasses for driving as compared to 33 (32%) TYPE I and 9 (14%) TYPE II operators some consideration was given to the possibility that the striking of a pedestrian might be correlated with wearing glasses. However, the control sample reported that 321 (40%) of its operators (a proportion equivalent to the TYPE III operator group) wore glasses for driving and they had never struck and killed a pedestrian. In fact, only 11 (1%) control operators reported that they had struck a pedestrian when driving with no reported fatalities. These control findings did not support the earlier speculation of the team that wearing glasses and the TYPE III accident were strongly correlated (Table 11).

The reported observations with regard to known histories of psychological or psychiatric treatment did show that a significant difference did exist between the control and experimental samples with regard to reports of inpatient care at the <.05 level. The samples did not show a difference with the numbers of operators without any known treatment history when 226 (85%) experimentals and 681 (85%) controls reported that they had never seen a mental health professional for some emotional problem. The difference in the numbers reporting outpatient services only included 25 (9%) experimentals and 110 (14%) controls. Those with disorders requiring hospitalization included 16 (6%) experimental operators and only 9 (1%) control operators. The Boston team feels that there could be some bias in the matter of subject

selection that has effected this variable. As mentioned earlier the experimental operators were pursued vigorously until all of the desired information for the completion of the data collection instrument was scored. The control prospectives were not followed in the same manner and were allowed the option of refusal. It may be that this selection procedure would have resulted in more people with emotional problems in the experimental group where they could not refuse participation and fewer with the controls who could refuse with some ease. This possible bias should be considered in any evaluation of this variable (Table 12).

One mental health variable that was considered significant in Part I was a known or reported suicide attempt. The information in the experimental sample relative to the scoring of this variable was collected from a variety of sources including hospital records and reports from mental health agencies. However, there was only one contact scheduled with each control operator and the team expressed a great deal of consternation regarding the approach to this item. Initially the variable was carefully placed in the middle of the data collection instrument so that the operator would have had an opportunity to discuss some sensitive material before being approached with regard to the matter of suicide attempts. After a great deal of consideration, the rather stock approach to this variable was prepared in an attempt to de-sensitize the subject matter. The approach was as follows: "Recent reports have shown us the 98% of the people over 17 years of age have just <u>thought</u> about the whole matter of suicide as a viable alternative (or as something not so bad). We'd like to

get some kind of an idea how often you just think about suicide as it might relate to you." (Response -- Negative -- move on to next variable) (Response -- Positive -- "Have you ever done anything about it?") This type of an approach did not appear to elicit undue discomfort with most operators. If he responded "Yes" or an equivalent synonym, the variable was scored in the positive. With this approach only 25 (3%) of the controls said that they had made some sort of attempt-type of action as opposed to 12 (12%) TYPE I, 14 (22%) TYPE II and 8 (8%) TYPE III operators or for 34 (13%) of the experimental sample. Even though the data is statistically significant the collection difficulties warrant a trend approach to the results (Table 13).

Tables 14, 15, and 16 were attempts on the part of the Boston team to find out some information regarding what sort of leisure time patterns the operators exhibited. A significant difference did show itself in the distribution seen in Table 14 at the $<.05$ level. Here there was no real difference between the experimental sample as a whole and the control sample. The difference came in the comparison of the controls and the TYPE I and TYPE III experimentals, with the divergent TYPE II operator. In essence the TYPE II operator spent much less time with his family when compared with the time that he spent with his friends. This is evident when the 43 (68%) TYPE II operators who spent the majority of the time with their friends is compared with the 58 (56%) of the TYPE I, 49 (48%) of the TYPE III or the 421 (52%) of the controls who spent the most of their time with their friends. The numbers of available friends was a measure inserted in the data

collection instrument to get an idea about gregariousness. The 2 most dominant distribution categories in Table 15 come with the 46 (45%) of the TYPE I operators who were reported to have had more than 21 friends (all of these operators were deceased) and the 479 (60%) of the control operators who reported that they had from 1 to 5 close friends. There is no doubt that the 45% figure for the TYPE I operators with more than 20 friends has more to do with his being deceased at the time of the interviews than with the actual numbers of friends that he had. This finding should not be discounted completely but should be evaluated in the light of this unique circumstance. The heavy concentration of the 479 (60%) control operators who reported that they had from 1 to 5 close friends as contrasted with the 90 (34%) of the experimental operators with the same number of friends influenced the probabilities throughout. The most reliable information that might come from these 2 tables would be that the experimental operators tended to spend more time with their friends than with their families and that they also tended to have more friends to spend time with. Table 16 was originally in the Risk Taking Behavior Scale reported in Part I and excluded in Parts II and III because of incomplete control data. The measure of risk regarding leisure activities was not considered, only its relative presence. The varieties of leisure time activities that would have prompted a positive score on this variable were: motocycle racing, scuba diving, sky diving, mountain climbing, high mountain skiing or similar activities. The findings showed that 53 (20%) of the experimentals and 192 (24%) of the controls participated

in such activities. This proportionate distribution followed generally the same pattern for the TYPE I and TYPE II operator groups with the TYPE III operators showing a notable, though not significantly lower proportion of operators who were involved in activities of relative risk during their leisure time.

Alcohol Use Patterns Between Experimental Types and Controls

Tables 17 through 25 present the data from the experimental and control samples that is held in common regarding historic patterns of alcohol use and alcohol related social interactions. The distribution of the alcohol use patterns in Table 17, ranging from abstainers to abusers, presents a remarkably non-significant difference between groups. The only t-Tests that showed probabilities of significant differences not over .500 came when the TYPE I operator group was compared with the TYPE III experimental operator and the controls. These comparisons of scores were not significant. The following trends should be noted with regard to patterns of alcohol use. There was a slight trend showing more abstainers from alcohol with the control sample reporting 107 (13%) operators as opposed to the 22 (8%) of the experimental operators who never or only very rarely drank alcohol. A cursory evaluation of the evidence in Table 17 shows only a trend favoring more light social drinkers in the experimental sample and moderate social drinkers on the control sample. This is supported by the 105 (29%) experimental operators and 196 (24%) of the control operators that were classified as light, social drinkers and then the 56 (21%) of the experimental and 319 (40%) of the control operators that were classified as moderate social drinkers. When these levels

or patterns of alcohol use are collapsed they result in 161 (60%) of the experimental operators that were light to moderate social drinkers as compared to 515 (64%) of the control operators in the same collapsed category. In spite of the slight trends favoring more abstainers in the control sample and heavier drinking patterns in the experimental sample the findings shown by the combination of the light and moderate social drinkers explains the reasons for the non-significant differences between the samples.

There was even less difference between the 2 samples for frequency of alcohol use (Table 18). All t values were non-significantly over .500 in this analysis which indicated basically the same sample means regarding patterns of alcohol use. The findings show that 26 (10%) of the experimental operators and 112 (14%) of the control operators either never or only rarely drank alcohol. Those who drank monthly or less frequently included, 38 (14%) of the experimentals and 122 (15%) of the controls. The proportions increased by double with the distributions reported for those operators who drank more in the direction of a weekly pattern showing 103 (39%) experimental and 267 (33%) control operators. Those operators who drank more in the direction of several times a week to daily included 100 (37%) experimentals and 300 (38%) controls.

A very different picture presented itself in Table 19, dealing with the frequencies of reported alcohol intoxication. Two distinct patterns emerged in the data. The TYPE I and TYPE II operator groups showed a significant difference when compared with either the TYPE III

operator group or the controls in the direction of more frequent reports of alcohol intoxication. These differences were significant at the <.01 level showing that the TYPE III operators and the controls were drunken less frequently and the TYPE I and TYPE II operators were drunken more frequently (Table 19).

The problem drinker evaluations in Table 20 present a confusing profile. The differences between the experimental and control samples are highly significant at the <.01 level. The Boston scale for the evaluation of a problem drinker found in Appendix F shows that 106 (40%) of the experimental operators and only 152 (19%) of the controls had been evaluated as problem drinkers. This is the case even though these 2 samples did not show a significantly different distribution in their drinking patterns or in their frequencies of alcohol use. The reason for nearly a double proportion of problem drinkers with the experimentals comes in the data reported in Table 19 showing a greater frequency of drunkenness with the experimental operators, in the information from Tables 21 through 25 showing slight increases in social problems scored in the index, in the data applicable only to an accident related operator who had been drinking, and in the clinical data available regarding alcohol related social problems and professional treatment for alcohol abuse. There was some information in the experimental protocols that had been collected from other informants that supported or did not support a diagnosis of problem drinker. This "other informant" data was not available in the control sample. What this means with regard to the actual distribution of the problem drinkers in Table 20

is that the team is confident about the judgments made regarding all of the experimental problem drinkers. The problem drinker evaluations for the control sample were made somewhat conservatively with an open possibility of some missing information that might have classified a small number of social drinkers as problem drinkers if it had been available. Therefore, the proportion of control problem drinkers might be somewhat conservative. Whatever the case, the distributions remain significant.

Parental problem drinking histories for the operators included in the 2 samples showed a non-significant difference between the operator groups. The 64 (24%) of the experimental operators and the 149 (19%) of the controls with known parental alcohol problems was not significantly different. There was, however, a difference at the <.05 level between the 58 (22%) of the experimental operators with paternal alcohol problems and the corresponding 121 (15%) of the control operators who reported alcohol problems with their fathers.

Social pressures to drink more or less, for any reason, were notable. Table 22 shows that only 23 (9%) of the experimental operators had social pressures to drink more than they were drinking as opposed to 247 (31%) of the controls reporting pressures to use more alcohol. This was significant at the <.01 level. There were less differences between these groups in Table 23 where reports of social pressures to drink less were distributed. These findings show fewer reports of social pressure to drink less as compared to social pressure to drink more. Only 43 (16%) of the experimental operators reported pressures

to drink less and 119 (15%) of the controls or 162 (15%) of the entire sample. This is in sharp contrast to the 240 (25%) of the operators from the entire sample who had been pressured to drink more. It is interesting to note in Table 24 that a larger proportion of operators in both samples had made some personal attempt to reduce their drinking frequency on their own initiative than had from social pressure to do the same. The distribution shows that 53 (20%) of the experimental operators and 141 (18%) of the control operators had tried to drink less, a 4% and 3% increase respectively.

The data in Table 25 shows that there is a very significant difference at the <.01 level between the samples regarding the known loss of a job because of alcohol use or abuse. When presented with the general portrait of the experimental and control operators a notable difference with regard to this particular variable would be anticipated. However, the same difficulty exists here as has been mentioned earlier with regard to the differences in the data collection process. It is certainly more difficult for an individual to report to an interviewer that he has lost a job because of the inappropriate use of alcohol than it is for an "other informant" to make such a report. With this in mind it seems certain that the distribution of the 39 (15%) experimental and only 27 (3%) control operators with some known alcohol related job loss is an exaggeration. How exaggerated this is remains, unfortunately, an unknown factor.

Marijuana and Other Drug Use Between Experimental Types and Controls

The information in Tables 26 through 31 is presented as a form of reference more than as the basis of a detailed analysis. Part III of the final report[5] is devoted to a particularized evaluation of marijuana use among the groups. The marijuana smoking patterns reported in Table 26 show a difference in the distributions among the non-users of marijuana and the moderate social smokers. The controls did show proportionately fewer marijuana smokers than the experimentals. Operators who had smoked marijuana on at least 3 or more occasions during the year prior to team contact included 121 (45%) of the experimental operators and 272 (34%) of the controls. The non-smokers, or abstainers and experimenters, included 146 (55%) experimental and 529 (66%) control operators. Among the marijuana smokers there were proportionately more moderate smokers (who used marijuana in the direction of a weekly or less pattern) found in the experimental sample with heavier smokers found among the controls. This is most clearly evidenced by the t value that shows a significant difference between the major samples at <.01. The differences in the patterns of use between the TYPE I operator group and the TYPE III operator group was non-significant with the TYPE III showing a t value of over .500 for a near equal proportionate distribution. The real difference came with the TYPE II operators who included a much larger number of smokers, i.e., 40 (63%), completely disproportionate to the rest of the experimental sample. In truth, the difference between the experimentals and the controls for marijuana smoking patterns is found in the heavy number

of users in the TYPE II operator group. However, the more detailed breakdown seen in Table 27 shows that there is not a significant difference between the 42 (40%) TYPE I smokers, the 40 (64%) TYPE II smokers and the 39 (39%) TYPE III smokers. Among the smokers only, there were 16 (38%) TYPE I, 17 (42%) TYPE II and 16 (41%) TYPE III operators that smoked marijuana more than twice weekly. It is of interest to note that 147 (54%) of the control operators that smoked marijuana used it more than twice a week. Evaluating only the smoking operators the findings show that 17 (41%) TYPE I, 10 (25%) TYPE II, 15 (39%) TYPE III and 39 (14%) control smokers used marijuana weekly. A previous analysis showed that 43 (16%) of the experimental operators were evaluated to have been smoking marijuana before the focal accident resulting in a fatal injury (Part I, Table 49 B). Further analysis shows that of these 43 operators 27 (63%) were $\leq$ weekly smokers.

The matrix in Table 28 is a presentation of the marijuana smokers and non-smokers with respect for experimental sample accident type divisions and a comparison with patterns of alcohol use. No comparative trends show a significant finding with regard to the 3 accident types, marijuana use or non-use and patterns of alcohol use. There are trends in all 3 accident type groups showing that there is some relationship between marijuana smoking and heavier drinking patterns which do not actually show significance until they are combined together into the experimental sample and correlated with the control sample when the differences are recorded at the <.01 level favoring heavier drinking patterns for the smokers. This significance is not detectible

in the experimental sample alone and does not become evident until the controls are added to the sample.

The findings associating marijuana use with a corresponding street or entertainment drug familiarity are notable. Table 29 shows that 91 (75%) of the experimental smokers have also had some familiarity with the street or entertainment drugs, including 30 (61%) TYPE I, 33 (82%) TYPE II and 28 (72%) TYPE III operators. This was a much greater proportion of combined use than seen with the 143 (53%) of the control smokers who said that they had some familiarity with the street or entertainment drugs. The marijuana smoking pattern/street or entertainment drug correlations are very high for the TYPE I operator group ($r = 0.792$, $p < .01$), followed closely by the TYPE III operator group ($r = 0.741$, $p < .01$), and then by the TYPE II operator group ($r = 0.706$, $p < .01$). The correlation between this combined use or familiarity and the control sample was quite a bit less ($r = 0.574$, $p < .01$).

The data breakdown in Table 30 is a reduction of the broad scope of the information in Table 29 without regard for whether the operator was a marijuana smoker or not. This detail continues to show that the TYPE II operator group leads all of the data divisions with 35 (56%) of its operators that were at least familiar with street or entertainment drugs, followed by the TYPE I operators with 31 (30%) and then the TYPE III with 29 (29%) subjects. Only 177 (22%) of the control operators were admittedly familiar with these drugs. A drug breakdown particular only to the control sample showed that among these 177 (22%)

operators 108 (61%) had some exposure to hallucinogens such as "acid", mescaline or MDA; 104 (59%) had used one of the amphetamines; 91 (51%) were personally familiar with the "downs" such as quaaludes, barbiturates or VALIUM; 33 (19%) had used one of the inhalants, especially amyl nitrate, and 42 (24%) had used one of the other drugs most particularly cocaine.

The description of problem drinker evaluations and familiarity with street or entertainment drugs seen in Table 31 was basically an attempt to see if there was a relationship between the two. The TYPE I and TYPE III problem drinkers showed a significant trend away from the use or familiarity with street or entertainment drugs. Once again the introduction of the TYPE II operator group with a significant distribution showing a relationship between problem drinking and the use of these drugs altered the direction of the experimental sample. The findings show that 20 (41%) of the TYPE I problem drinkers were familiar with these drugs compared with 13 (42%) of the TYPE III problem drinkers. The change takes place with the 19 (73%) of the TYPE II problem drinkers who had some exposure to these other drugs. Additional correlations were computed to see the strength of the linear relationship between frequency of drunkenness, and street or entertainment drug use. The thinking was that this might be more like the correlations computed between marijuana smoking patterns (i.e., light, moderate, heavy) and street or entertainment drug use. The correlations within groups was significant but comparatively low when viewed alongside of the marijuana correlations. The TYPE II group showed the highest correlation ($r = 0.248$,

$p < .01$), followed by TYPE I ($r = 0.285$, $p < .01$) and then by TYPE III ($r = 0.248$, $p < .05$). The control correlation was equally as low ($r = 0.278$, $p < .01$). Linear correlations cannot be used to determine or predict causality, therefore, the scientist cannot say that heavier marijuana use leads to street drug exposure more than heavy alcohol use leads to some familiarity with these drugs. However, it can be stated without reservation that the interrelationships between these 3 drugs (alcohol, marijuana and the street or entertainment drugs) at levels of known use or intoxication is significantly strong.

Legal Findings Between Experimental Types and Controls

As mentioned earlier it is unfortunate that much of the legal information scored for the experimental operators and reported in Part I, has not been available for the control operators. Innumerable logging problems in the Office of the Commissioner of Probation have made it impossible to secure any number of criminal records without a court order. This made the collection of a great deal of legal information such as previous arrests, citations and dispositions impossible. However, through the Office of the Registry of Motor Vehicles information relative to 3 common variables was scored for the control operators. Table 33 reports the numbers of operators in each sample that have had their license to operate a motor vehicle suspended for any reason. License suspensions were noted for 31 (12%) of the experimental operators and for 46 (6%) of the control operators. This distribution did show significant differences between the samples

as it did with the 13 (13%) TYPE I, 8 (13%) TYPE II and 10 (10%) TYPE III operators when compared with the controls. There were twice as many proportionate license suspensions among the experimental operator group.

Table 34 is of particular interest to the countermeasures people who have been using previous arrests for driving under the influence of alcohol as a signal for operator rehabilitation. There was a significant difference in the proportion of such arrests between the groups. The experimental sample showed 12 (4%) such arrests and the control only 17 (3%). This difference was significant at the <.01 level and particularly so for the TYPE I operator group, which is of special interest to the countermeasures offices. Table 35 is a presentation of the operators with 2 or more previous arrests for speeding or driving to endanger. The difference between the control and experimental operator groups is significantly greater than for the arrests for driving under the influence. Operators with 2 or more such arrests included 20 (19%) TYPE I, 13 (21%) TYPE II and 16 (16%) TYPE III operators or 49 (18%) from the total experimental sample. The control sample recorded only 10 (1%) operators with comparable arrest records. This was significant at the <.01 level.

Demographic Distributions for Focal Alcohol and Control Operators

The experimental sample was composed of 267 motor vehicle operators who were "most responsible" for a vehicular accident resulting in a personal fatality. Within this sample 103 (39%) operators were evaluated

chemically or clinically to have been influenced by alcohol at the time of the focal collision. Alcohol influence as defined by the Office of Alcohol Countermeasures is a focal Blood Alcohol Concentration ≥.05 gm/100 ml% or a clinical evaluation of the same. The remaining 164 (61%) experimental operators were not influenced by alcohol at the time of the focal collision. No alcohol influence is likewise defined as a focal Blood Alcohol Concentration from .00 to .04 gm/100 ml% or a clinical evaluation of the same. The following section of the Results will focus its attention on these 2 groups of experimental operators particularly as they relate to the 801 operators in the control sample.

Tables 36 and 37 show that there were no substantial gender or age differences between the experimental operators with focal alcohol (EA), the experimental operators without focal alcohol (ENA) and the control operators (C). Although there were no controlling factors for age or sex in the collection of the experimental sample the proportions of alcohol involved operators and operators without focal alcohol were the same for sexual distribution with 88% males and 12% females. The control sample was controlled for this variable and, therefore, included the same proportion of men and women in its collection. In the matter of age the EA group showed a mean of 30.2 years as contrasted with the older mean of 32.4 for the ENA group and 31.7 for the C operators. These mean differences did not prove significant.

One of the variables that proved relevant to the forthcoming discriminant function analyses was the size of the family of origin from which the respective operators came. As can be seen in Table 38 the ENA operators

came from significantly larger families than did the EA or C operators. Both the EA and C operators were more likely to have come from families with 3 or less siblings whereas, the ENA operators tended to come from families with 4 or less siblings.

There was a significant difference between the 3 groups with regard to the variable scoring marital status seen in Table 39. Group EA included proportionately less married operators and more operators who were either separated or divorced. The differences between the ENA and C operators were non-significant throughout the matrix with differences showing that the EA operator group included the variance significant at <.01 level. There were no notable differences in the proportion of single, or never married operators between the 3 groups.

One of the most substantial differences between these operator groups was presented in the distributions for levels of formal education (Table 40). Both the EA and the ENA operators were evidently more likely to have had a high school education or less as contrasted with a considerably higher level of education for the C operators. Within the experimental sample 76 (74%) of the EA and 116 (71%) of the ENA operators were only high school educated or less as contrasted with the 371 (46%) C operators in the same educational levels. It is of significant interest to note that only 8 (8%) EA and 18 (11%) ENA operators were either college graduates or greater as contrasted with the 276 (35%) of the C operators similarly educated. This significant difference should be considered with the previously detailed research design in mind. The theory that individuals with less education are more reticent to participate in optional surveys

or research efforts with the fear that these queries might highlight their limited education may well play a vital role in the consideration of this variable. The very high significance level for the proportionate differences makes it clear that even with this consideration there is a most statistically proven difference in formal levels of education between the experimental operators regardless of alcohol involvement and the control operators.

For some time it has been hypothesized that the student population is more likely to become involved in alcohol related accidents because of their youthfulness and position in society. Table 41 shows that in the Boston samples the largest numbers of students were found in the C operator group with 241 (30%) of these subjects in some stage of educational pursuit at the time of the team contact. This proportion is in sharp contrast with the 17 (17%) EA and 32 (20%) ENA operators pursuing higher education. The difference shows significantly that the EA operator is least likely to have been a student at the time of team contact or the focal accident.

When considering the distributions for levels of occupational attainment with the previously mentioned findings relative to education and educational pursuits the conjecture stands valid that the C operators would have been the better employed according to the standards of white and blue collar employment. Table 42 shows a significant distribution favoring EA employment as a skilled manual employee such as a carpenter, painter, policeman, electrician or barber (level 5). The ENA operators were more likely to have been clerks, salesmen, technicians or supervisors

(level 4). There was a decided trend favoring more white collar workers in the C operator group with a heavy concentration of level 4 employees, like the ENA operator group, and a trend favoring more level 3 personnel such as administrators, managers, owners of small businesses and semi-professionals. The difference favoring more manual employees of the traditional blue collar nature in the EA group was highly significant at the <.01 level.

Health Related Variables for Focal Alcohol and Control Operators

The physical and mental health histories showed significant differences indicating that the EA operator group was in the least good health at the time of team contact. Table 43 indicates that 29 (28%) EA operators were in either fair or poor physical health at the time of the focal accident as contrasted with 30 (18%) of the ENA operators. Only 54 (7%) of the C operators were evaluated similarly when they were interviewed. This is a clear indication that the EA operator group was significantly in less good health. If the smoking of cigarettes is indeed a reliable indicator of physical health Table 44 tends to support these findings. Both the EA and the ENA operators were signficantly more likely to have been cigarette smokers at the time of the focal accident showing that 71 (69%) EA and 107 (65%) ENA operators smoked at least some of the time. This was in sharp contrast to the 377 (47%) C operators who smoked cigarettes. The smoking operators were favored at the <.01 level by both of the experimental operator groups. However, the distribution among only the smokers from all 3 groups favored heavier smoking patterns of

≥2 packages daily for the EA operators at the <.05 level of significance.

The data relative to mental health treatment histories showed that all 3 groups were similar with regard to the presence or absence of known psychological or psychiatric care. The significant difference came when the operators from all groups who had some reported treatment history were evaluated. Among those operators with some treatment the ENA and C groups were relatively similar. However, the EA operator group showed a significant distribution favoring inpatient or hospital mental health care for these drivers. The matrix in Table 45 shows 10 (10%) EA operators with histories of inpatient care as contrasted with 6 (4%) ENA and only 10 (1%) C operators.

The EA operators were also significantly favored by the data indicating known histories of suicide attempts prior to the time of the focal accident. At least 21 (20%) of the EA operators had known histories of some suicidal acting out behaviors with only 13 (8%) ENA and 25 (3%) C operators with similar known histories. This finding, though clearly significant should be evaluated in the light of the research design where several informants contributed to the data source for the experimental operator's data collection instrument and only the operator himself was contacted for the control data. In spite of the sensitive manner by which the control Human Factor Associates approached the issue of suicide there were undoubtably some errors in the scoring of this variable.

During the period of field investigation for the experimental sample the Boston team devised a Risk Taking Behavior Scale (RTBS) reported fully in Part I of this final reporting[4]. Unfortunately, some of the risk items were not collectible in a reliable manner for the control operator group. Some of the risk items have been presented in this manuscript when the

comparable data was judged to have been reasonably reliable and collected in a sound methodological manner. One of the risk items considered was that of leisure time high risk activities seen in Table 47. Leisure time high risk activities were scored only by their presence in the social life of the particular operator and not evaluated with such variables as individual skill or safety devices. Such activities included: motorcycle racing, scuba diving, sky diving, mountain climbing, high mountain skiing and other similar avocations. In spite of the speculations to the contrary there were no significant differences between the 3 groups of operators. A total of 23 (22%) EA, 30 (18%) ENA and 192 (24%) C operators participated in some variety of leisure time high risk activity.

Alcohol Use Patterns for Focal Alcohol and Control Operators

One of the areas of prime research interest throughout the course of this study has been the relationship between historic patterns of alcohol use and interaction, and the subsequent "most responsible" operator involvement in an alcohol related fatal accident. The following findings show that in the Boston samples there is significant indication that the operator likely to become involved in an alcohol related fatal accident has a history of heavy alcohol use and resultant social problems.

Table 48 is a scored distribution of the overall evaluations relative to the historic patterns of alcohol use for the experimental and control operators. The classifications range from abstainers, who never or very rarely drank any form of alcohol, to alcohol abusers who drank in the direction of daily and most frequently drank to intoxication. In spite of

the implied scientific problems that come with subjective evaluations of any variety there is a clear indication in this table, and the subsequent alcohol related distributions in Tables 49 through 56, that the operator in the Boston sample who was alcohol influenced at the time of the focal accident came to that situation with a history of heavy alcohol use, problem drinking and social disruptions related to his use of alcoholic beverages. The matrix in Table 48 shows that 56 (55%) of the EA operators came to the focal accident as heavy social drinkers, sporadic binge drinkers or alcohol abusers. This finding is in contrast to the 28 (17%) ENA and 179 (23%) C operators who had similar drinking patterns. The trend of statistical significance favors the heavier drinking patterns for the EA operator group at the <.01 level. The modal category for the EA operators was heavy social followed by light social. Similar modalities for the ENA group were light social followed by moderate social drinkers. The C operator group showed a strong modal cluster in the moderate social drinker category followed at some distance by the light social category. Evaluations of the graded means show that the heaviest alcohol users were in the EA group followed by the C operator group and then by the ENA operators.

The same general pattern was evidenced in Table 49 evaluating the frequency of alcohol use. Over half, or 53 (51%) of the EA operators drank alcohol in the direction of daily as contrasted to 47 (29%) of the ENA operators and 300 (38%) of the C operators. The distribution shows a significant trend favoring more frequent drinking patterns for the EA operators followed by the C operators and finally by the ENA operator group.

Table 50 is detailed distribution of the frequencies of alcohol intoxication. As in the previous tables the EA operator group is significantly favored with more frequent reports of alcohol intoxication during the year prior to the time of team contact. There is a slight change in the trend seen earlier with a non-signficant direction showing more frequent intoxications for the ENA group followed by the C operators.

Tables 51 through 53 report some of the personal and social ramifications associated with inappropriate alcohol use. Apparently encouragement by others to drink less did not differentiate between the groups with 20 (19%) EA, 23 (14%) ENA and 119 (15%) C operators reporting that they had received outside encouragement to cut down on their drinking. There was a strong and significant indication that reported job losses associated with alcohol use favored the EA group with 26 (25%) operators scored with alcohol related job terminations as opposed to 13 (8%) ENA and only 27 (3%) C operators (Table 52). There may well have been some influence in this distribution associated with the previously detailed manner of interviewing the experimental and control operators but it is unlikely that this bias would have changed the direction of the statistical significance. The breakdown in Table 53 gives a strong indication that the EA operators were more likely to have been aware of their inappropriate use of alcohol prior to the time of the focal accident. The distribution shows that 31 (30%) EA operators had made some personal attempt to reduce or eliminate their use of alcohol during the year prior to the accident, in sharp contrast to the 22 (13%) ENA and 141 (18%) C operators with similar attempts. The significance favoring the EA group was at the <.01 level. A further

evaluation associated with alcohol use in the families of origin seen in Table 54, showed that there was a significant likelihood that there would have been some parental problem drinking histories strongly favoring the EA operator group. Over one third, or 37 (36%) of the EA operators had problem drinking mothers, fathers or both parents as contrasted with 27 (17%) ENA and 149 (19%) C operators. This was particularly the case with paternal problem drinking with 32 (31%) EA, 26 (16%) ENA and 121 (15%) C operators reporting that their fathers had a problem with the inappropriate use of alcohol.

With these alcohol related findings reported thus far the distributions in Table 55 are a near logical sequence. Taking into account all of the variables that contribute to a problem drinker diagnosis (Appendix F) there is a significant finding indicating that the EA operator group completely dominated the positive category. Problem drinkers included 65 (63%) of the EA group with only 41 (25%) ENA and 152 (19%) C operators receiving a similar diagnosis. The elimination of the abstainers does not alter the significance of the findings. In essence the EA operators had identifiable problems with alcohol prior to their involvement in the fatal accident.

This finding is further supported by the data distribution in Table 56 reporting the previous known arrests for driving a motor vehicle while under the influence of alcohol (DWI). Although the numbers of operators with such previous arrests noted on their legal records is seemingly small there is a significant distribution favoring the EA operator group at the <.01 level. The findings show that 9 (9%) EA, 3 (2%) ENA and 17 (2%)

C operators had been previously arrested for DWI.

Other Legal Findings for Focal Alcohol and Control Operators

The availability of legal records during the experimental and control field investigations was sufficiently different to make a complete comparison of the data impossible. All of the experimental operators were under court order and their respective records had been made available to the confidence of the team. Unfortunately the same data was not available for the control operators and only previous arrests for DWI and speeding were available through the courtesy of the Massachusetts Registry of Motor Vehicles. The findings for DWI arrests are found above. The findings for previous citations for speeding are detailed in Table 57. The difference between the experimental operators and control operators is clear in this distribution with 36 (35%) EA, 43 (26%) ENA and 81 (10%) C operators reporting with known previous arrests for speeding. Two or more arrests for speeding were noted for 24 (23%) EA, 25 (15%) ENA and 10 (1%) C operators. These differences in proportionate distributions were significant at the $<.01$ level.

The information in Table 58 relative to licensing status is reported as a trend even though the data becomes statistically significant when evaluated. It was very difficult to compare the license situations. One of the initial control variables for the control sample was that the respective operator have a valid license. There was also considerable question as to the updated status of the files indicating revoked or suspended licenses for the control operators. Therefore, these findings show that

there was a trend favoring fewer invalid licenses among the controls.

Marijuana and Street/Entertainment Drug Use for Focal Alcohol and Control Operators

One of the initial hypotheses speculated for the evaluation of the marijuana and other drug information was that there would be less smoking and other drug use with the EA operators because of their apparent addiction to alcohol, and the preconception that they would be users of only one intoxicant. The information in Tables 59 through 61 does not bear out this conjecture. Tables 59 and 60 show that 56 (54%) EA, 65 (40%) ENA and 272 (34%) C operators were light to heavy smokers of marijuana during the year prior to team contact. The nonsmoking operators (abstainers and experimenters) included the remaining 47 (46%) EA operators, 99 (61%) ENA operators and 529 (66%) C operators. The significance showed that there were more smokers in the EA group than would have been found by chance alone. A further analysis among the smoker-only groups showed that moderate smokers, that is, individuals who smoked within the range of monthly to once weekly included 33 (59%) EA, 29 (45%) ENA and 101 (37%) C operators. This distribution placed over half of the EA smokers in this moderate frequency category. The heavy smokers, or those individuals who smoked $\geq$2 times weekly included 19 (34%) EA, 30 (46%) ENA and 147 (54%) C operators. These comparisons show that the lightest smoker group was the EA and the heaviest the C, significant at the $<.05$ level.

Table 51 is a representative delineation of the operators who were known to have had some familiarity with one of the street or entertainment drugs. "Familiarity" might have indicated mere experimentation or regular use. Unfortunately data relative to the frequency of such drug use was not collected with either sample. The particular drugs most commonly reported were: hallucinogens, "downs", and amphetamines. Once again the EA group dominated the positive category with 46 (45%) operators reporting some familiarity with these drugs, followed by 49 (30%) ENA and 177 (22%) C operators. The EA operators were significantly more familiar with these drugs at the <.01 level.

Discriminant Function Analyses Between All Groups

The result of discriminant function analyses are by in large quite self explanatory when all of the computerized data is presented for evaluation. For this section of the final reporting 3 distinct analyses have been computed with the following groups:

1. The 3 experimental accident operator types were analyzed for internal prediction capabilities with the 2 functions applied to the controls for identification.

2. The 2 groups of experimental operators involved in alcohol related accidents and non-alcohol related accidents were analyzed for internal prediction capabilities with the single function applied to the controls for identification.

3. All experimental operators and all control operators were analyzed for internal prediction capabilities with one function.

All of the observations that were held in common for all of the 1068 operators included in the total sample were prepared for the analysis. A stepwise procedure was elected for each of the 3 runs to determine that single variable that in its own right was the most discriminating between the groups used for the analysis. This was followed by the second most discriminating variable, the third, and so forth, until the computer determined that the addition of any other variables to the functions would not increase the strength of discriminating power for the respective dimension.

The first discriminant function analysis used as a subject base only the 267 experimental operators with divisions for accident type. Once those 9 variables selected in stepwise order were identified with the respective standardized discriminant function coefficients and the centroids of the accident types for each of the appropriate functions (2) the formula was applied to the 801 operators who had never been involved in a fatal vehicular accident. The hypothetical situation. established within the computer was that all of the 801 control operators were to be involved in a TYPE I, TYPE II, or a TYPE III

accident and that each of these controls was to be classified in one of these 3 type groups.

The 9 variables finally selected by the computer for inclusion in the classification procedure which most clearly discriminated between the 3 accident groups in stepwise order were: 1 -- age, 2 -- number of friends, 3 -- physical health, 4 -- education, 5 -- problem drinker evaluation, 6 -- known suicide attempt, 7 -- social pressures to drink more, 8 -- some familiarity or use of street or entertainment drugs, and 9 -- a known alcohol related job loss. The dominant coefficient in Function 2 was: problem drinker evaluation (Table 62).

When this formula was applied to the experimental group in an attempt to report probabilities for accident type membership the results were correct 58.43% of the time. The TYPE II operator was most accurately predicted 61.9% of the time, followed closely by the TYPE III operator predictions at 60.4% and finally with the TYPE I operator at 54.4% of the time. If the formula was not able to correctly predict a TYPE I operator into his own type the chances were just about even that he would have been classified as a TYPE II or a TYPE III operator. The TYPE II operators incorrectly classified tended to have been put in the TYPE III accident group. On the other hand, the TYPE III operators incorrectly classified were more likely to have been assigned to the TYPE I accident group. Group membership could have been progressively refined as the probability levels for admission were

increased. The application of this procedure to the 801 non-accident operators in the control sample predicted that 130 (16%) would have been TYPE I accident operators, 303 (38%) TYPE II operators and 368 (46%) TYPE III operators (Table 62 A).

Although the percentage of cases correctly classified for the known experimental operators was a respectable 58.43% it is difficult to project these findings too much further. If an operator was incorrectly classified from the TYPE I and II groups he was more likely to have been classified as a TYPE III operator. The applications of this analysis to the control sample would indicate that these operators were more likely to be classified as TYPE III operators who would become involved in a pedestrian accident. These classification findings would seem to indicate that the TYPE III operator group is more of a "catch all" category made up of many operators who would be difficult to identify with any certainty.

The second discriminant function analysis used as a subject base only the 267 experimental operators with divisions for operator accident alcohol involvement and no alcohol involvement. Once the initial analysis had been prepared the formula was then applied to the 801 control operators with the hypothetical suggestion that they were to become involved in accidents. Question: Were these accidents more likely to be alcohol involved or non-alcohol involved?

The 7 variables finally selected by the computer for inclusion in the procedure because of their discriminating power included: 1 -- alcohol use pattern, 2 -- number of siblings, 3 -- reported frequency

of alcohol drunkenness, 4 -- psychological treatment history, 5 -- previous arrests for driving under the influence of alcohol, 6 -- occupation, and 7 -- education. The dominant coefficient in the single function was alcohol use pattern followed by reported frequency of alcohol drunkenness (Table 63).

When this formula was applied to the experimental group in an attempt to correctly identify alcohol or non-alcohol accident membership the computer was correct with its probabilities 74.16% of the time. This is a very high probability score which would indicate that these particular variables selected by the computer for their disciminating power were, in effect, with considerable power. Apart from the obvious interest that countermeasures people will have with the 7 major predicting variables it is of real interest to note that previous arrests for driving under the influence of alcohol which included such a small number of operators from the total sample was significant (see Table 56) and that education was an important discriminant in this analysis as well. When the discriminating formula was applied to the 801 control operators the prediction was that 641 (80%) were more likely to become involved in non-alcohol accidents and that 160 (20%) were more likely to become involved in alcohol related accidents. This probability is based on a pure 3 digit figure from .000 to .999. For any particular operator a .499 probability for a non-alcohol related accident and a .501 probability for an alcohol related accident would have resulted in an alcohol classification. If the probability criterion were continually increased in an upward direction the findings

would have shown 11 (1%) operators with probabilities over .750 (Table 63 A).

Applying only these 7 variables the alcohol involved operator would have a heavier alcohol use pattern with more frequent drunkenness, would have come from a smaller family, have had a larger number of psychological treatment reports, with more arrests for driving under the influence of alcohol, less education and a lower level of occupational attainment than the non-alcohol involved operator.

The third, and final discriminant function analysis used all 1068 operators as a subject base in an attempt to create a formula which would differentiate the operators involved in a fatal vehicular accident and the non-accident operators. The 12 variables finally selected by the computer as being among the best discriminants to distinguish between the experimental and control samples were: 1 -- number of friends, 2 -- two or more speeding arrests, 3 -- physical health, 4 -- social pressures to drink more, 5 -- alcohol use patterns, 6 -- reported frequency of alcohol drunkenness, 7 -- personal attempts to drink less alcohol, 8 -- reported suicide attempt history, 9 -- alcohol related job loss, 10 -- occupation, 11 -- marijuana smoking pattern, and 12 -- an Irish surname or heritage (Table 64). The 2 dominant variables which reported the highest coefficients were: alcohol use pattern and number of friends. Using this formula the computer was able to predict with correct probabilities a remarkable 84.18% of the time (Table 64 A).

Applying these 12 variables to the 2 samples the discriminant analyses would report that the experimental operator would: be a friendly

Irishman, in less good health, who had a heavier alcohol use pattern and was drunken more frequently -- who had attempted to cut down or stop drinking and who had an alcohol related job loss. He would have a job expressive of less occupational attainment. He would smoke more marijuana and would have had a better chance of having made some reportable suicide attempt. He would also have had 2 or more arrests for speeding or driving to endanger.

DISCUSSION AND RECOMMENDATIONS

Part II of the final reporting for DOT HS-310-3-595 has shown the differences and comparisons between the various groups of automobile operators that have been included in the research investigation for the Boston University Traffic Accident Research Special Study. The total sample of 1068 operators included 267 (25%) experimental operators who were involved as the "most responsible" driver in a fatal vehicular accident. Within the experimental sample 103 (38%) killed themselves in a TYPE I accident, 63 (24%) killed another vehicular occupant and 101 (38%) killed a pedestrian. The remaining 801 (75%) of the operators were collected randomly from among the townships most predominantly represented by the experimental operators to whom the controls were matched. The 801 (75%) non-accident operators were matched for a sex-by-age-by-decade matrix to the experimental operators. The 3 types of experimental accident operators presented 3 differing profiles when they were compared to the control sample of non-accident operators rather than to each other as seen in Part I[4].

The TYPE I operator who killed himself was a very friendly, single, Irish male, with a high school education who was employed as clerk, technician, public service employee or a skilled manual employee. He was in not-so-good health, smoked cigarettes moderately or heavily, had a 1:2 chance of wearing eye glasses and had no psychiatric history. He drank alcohol and was either a light social drinker or a heavy social drinker. He had a tendency toward frequent drunkenness, was a problem

drinker, had been encouraged by others to drink less and had tried to cut down or stop his drinking. He stood a 1:3 chance of having lost a job because of some alcohol related problem. There was a 1:2 possibility that he smoked marijuana and if he did he was very much like the other experimental marijuana smokers. If he smoked he was likely to have had some familiarity with street drugs. He stood a 1:14 chance of having been arrested for driving under the influence of alcohol and a 1:5 probability that he had been arrested for speeding on more than 2 occasions.

The TYPE II operator who was most responsible for killing another vehicular occupant tended to be younger; and tougher across the anti-social variables with which he was familiar. He was in his mid-twenties, possibly Irish, single with a high school education, a relatively poor job from the perspective of occupational attainment and not as outgoing or friendly as he might have been. He was probably a moderate, or more likely a heavy cigarette smoker in fair to good health. If he wasn't a light social drinker, then he drank almost daily and was drunken with alcohol frequently. In spite of his younger age he was most likely a problem drinker, he might have tried to cut down on his drinking and had probably been encouraged by others to stop drinking as much. He was likely to have lost a job with some alcohol related problem associated with the termination. He was much more likely to have smoked marijuana than not. If he did, he smoked with very much the same patterns as the other experimental smokers. As a marijuana smoker he stood a 1:5 chance of also having some familiarity with street or entertainment drugs.

In essence he smoked more, drank more and used more drugs than the others. He had a 1:25 probability that he had been previously arrested for driving a motor vehicle while under the influence of alcohol and a 1:4 probability that he had been arrested 2 or more times for speeding.

The TYPE III operator, who struck and killed a pedestrian, was difficult to profile. When compared with the control operators and then with the other experimentals he came out with a confusing and varied psychosociograph. He was in his mid-thirties and was either married or single. It may be that this is the place where he begins to really differ from the others. He had no psychiatric history and a 1:12 chance that he had made a suicide attempt as opposed to a 1:8 for the TYPE I, 1:4 for the TYPE II and a 1:31 for the control operators. He was less likely to have smoked marijuana but if he did he smoked with the same pattern as the others. He was a light social drinker who drank weekly and was drunken upon occasion. If he smoked marijuana he was less likely than the others to have also had some exposure to the street and entertainment drugs. He also had a 1:24 probability that he had ever been arrested for driving under the influence of alcohol and a 1:5 probability that he had been arrested more than twice for speeding.

When the 3 experimental types were combined into the experimental operator profile the picture was somewhat different. He was a single man in his early thirties who had a high school education and worked as a lower level white collar worker or as a skilled manual employee. He was in fair to good health, smoked cigarettes moderately, did not wear glasses, had no psychiatric history. He was more friendly than

the controls and had more friends that he socialized with. He was a light social drinker; or else a heavier drinker with a drinking frequency of daily, and a several times a year or monthly pattern of drunkenness. He was twice as likely as a control operator to have been a problem drinker with a 1:4 ratio of attempts to drink less alcohol. There was a 1:1 chance that he smoked marijuana and that he was a moderate smoker who smoked less than the control smoker. If he did smoke there was also a very strong possibility that he had some exposure to the street or entertainment drugs. There was a 1:24 chance that he had ever been arrested for driving under the influence of alcohol and a 1:5 chance that he had more than 2 previous citations for speeding.

The experimental operator with focal alcohol involvement is generally portrayed from the Boston data as a young, single, Caucasian, male, between 26 and 30 years of age who was not educated beyond high school. He was employed as a skilled manual employee, most likely as a public employee or craftsman. He came from a family with parents of Irish origin who were living together in spite of a strong likelihood of problem drinking with his father. He had 3 brothers and sisters. At the time of the focal accident he was living with 3 other people. He was most probably in good to excellent health although there was a real possibility that he had some physical health concerns. He smoked cigarettes in the general direction of 2 packages a day. His mental health history was without any sort of professional intervention. He might have attempted suicide. He most surely had some alcohol related problems with a good opportunity that he could have been diagnosed as a problem drinker. He drank beer or whiskey

in the direction of daily and was intoxicated monthly or more frequently. He might have been aware of his personal alcohol related problems and had made some attempt to stop or reduce his alcohol intake. He was likely to have been a moderate marijuana smoker with some exposure to the street or entertainment drugs. He had probably been arrested or cited for some infraction of the law about 4 times with a better chance of having been arrested for speeding than driving under the influence of alcohol. He more than likely was killed in a single vehicle collision where he was the "most responsible" operator. The time was between 1:00 and 2:00 a.m. on Saturday morning and he had been drinking.

The experimental operator with no focal alcohol involvement is best profiled as a young, single, Caucasian, male in his late twenties or early thirties. He more than likely was no more than a high school graduate with only a very slight possibility that he might have attended some college. He worked as a clerk, salesman, technician or in other similar white collar employment. There was a possibility that he came from an Irish family with 3 or 4 brothers and sisters. At the time of the focal accident he was living with 3 other people. He was most likely in good to excellent health even though he smoked cigarettes in the general direction of a pack a day. His mental health history was not notable although he might have had some outpatient contact with a professional. He was most surely a light social drinker of alcohol who drank frequently but was seldom intoxicated. He had no known social, professional or personal problems related to the inappropriate use of alcohol and was not a problem drinker. He had probably been arrested or cited at least once with a

possible chance that it was for speeding. He was more than likely not a marijuana smoker and if he did smoke he did it moderately or heavily. There was only a 1:3 probability that he had any exposure to any of the street or entertainment drugs. He, more than likely, survived a fatal vehicular accident killing a pedestrian or else another vehicular occupant in a multiple vehicle collision before midnight on Wednesday or Saturday.

The control operator from the Boston sample had a general profile as a young, single, Caucasian, male between 28 and 32 years of age. He was most certainly a high school graduate and had probably gone on to college. His employment level placed him somewhere between a clerk, salesman or technician and middle administrative employment or as the owner of a small business. He was surely in good to excellent health and may well have not smoked cigarettes. If he did smoke it was in the general pattern of less than one pack a day. He had no known mental health treatment history. His historic pattern of alcohol use placed him firmly as a moderate social drinker, who drank frequently but was seldom intoxicated. He was a social drinker with no known problems resulting from his inappropriate use of alcohol. He was less likely to have smoked marijuana but if he did he was probably classified as a moderate to heavy smoker. He had no familiarity with street or entertainment drugs. He had never been involved in a fatal vehicular accident.

Through each of the major parts of this final report it has become increasingly evident that the experimental operators are different people than most of the drivers on the highways of greater Boston. That is, if the Control Sample is at all representative of the population

at large. It seems as though the experimental operator does everything except his alcohol and other drugs just enough to get by on. His education is adequate to get an adequate job and not much more. His health isn't as good and he smokes more cigarettes and has a higher incidence of known psychological treatment services. It is obvious that he is an alcohol man. Regardless of his drinking pattern, whether it be light, moderate or heavy social drinker -- or heavier, there is sufficient material to indicate that he gets in trouble a lot when he drinks. He smokes marijuana but not as heavily as the control operator. He has a greater likelihood of having been arrested for speeding or for driving under the influence of liquor, or for having had his license suspended.

The real question, apart from all of the data that can identify him after the fact of a fatal or serious motor vehicle accident, is -- how can he be identified in advance? And, even if he can be identified with a reasonable certainty of probability how can he be singled out for rehabilitation? If the Boston approach to countermeasures is to attempt to educate or rehabilitate the friendly Irishman that drinks a lot, the task would be out of reach and a clear infringement of personal rights and privacies. To conduct driving clinics for thoseindividuals in less than good health or, to attempt to apprehend and rehabilitate the marijuana smoker in driver behaviors would be a completely indiscriminant approach to the problem. Even though the heavy use of alcohol (not necessarily its abuse) is a more discriminating variable the accessibility to such individuals in the greater population would be an unrealistic task.

In order for any psychosocial variable to be of value for predictive

purposes in the identification of the driver likely to become involved in a fatal motor vehicle accident with, or without the concommitant influence of alcohol the variable must be: easily accessible, reasonably predictive and readily available to countermeasures professionals.

The Boston University Traffic Accident Research Special Study Team concludes that the 2 most discriminating variables for initial predictive identification that meet the 3 fold criterion reported above are: a previous arrest or citation for driving a motor vehicle while under the influence of alcohol and, 2 or more previous arrests or citations for speeding or for driving a vehicle to endanger. Two or more citations for speeding appears to be the best pre-identification variable for locating the operator likely to become involved in a fatal or serious motor vehicle accident, with or without the concommitant influence of alcohol. The single variable which would further serve to pre-identify the operator likely to become involved in an alcohol related fatal or serious vehicular accident as opposed to a non-alcohol involved accident of the same nature would be a previous arrest or citation for driving under the influence of alcohol. In essence, the second part of this thesis is the core of the recent program proposed by the Office of Alcohol Countermeasures and the Alcohol Safety Action Project teams. For some time the Boston Special Study team has been somewhat skeptical about the OAC/ASAP approach to the problem largely because of the small number of operators with DWI citations included in the fatal sample (Table 34). The current findings, however, support the OAC thesis for identifying the high risk alcohol operator.

The Boston data suggests that the following 3 lines of variables could be used in a predictive high risk driver formula for pre-identification purposes. Variable 5 would serve to differentiate the predicted alcohol involved accident operators from the non-alcohol involved operators.

FIRST LINE:

1. Male
2. 19-39 years old
3. Caucasian
4. 2 or more arrests for speeding/driving to endanger
(5. 1 or more arrests for driving under the influence of alcohol)

SECOND LINE:

6. Alcohol use patterns (problem drinker evaluations)
7. Frequency of alcohol drunkenness
8. Occupational attainment

THIRD LINE:

9. Physical health histories
10. Psychological health histories
11. Education

The first line variables would of necessity serve as pre-identification features. The second line variables would qualify the first line identifications and the third line would substantiate the diagnosis of a high risk operator. Other variables could be added to the schema to further delineate the high risk individual.

The central recommendation from this part of the final reporting for the Boston team would be that an immediate, practical and scientific

application of the Boston pre-identification and prediction formula be effected in a major metropolitan area. The initial variables for identification of any particular operator would be the first or any subsequent arrest for driving under the influence of alcohol OR any second arrest or citation for speeding or a related offense. The Caucasian males between 19 and 39 years of age could be interviewed immediately following one of these arrests to establish the relevance of the remaining 9 predictive variables. This campaign would be completed in conjunction with a public awareness effort to alert the population to the pertinent factors associated with an alcohol related serious or fatal vehicular accident AND a serious or fatal accident that is not alcohol influenced. The goal of highway safety professionals is to reduce the numbers of fatal and serious accidents regardless of the presence or absence of alcohol influence for the "most responsible" operator.

A second recommendation comes in the area of media propaganda and advertising. The Boston study has shown that even the alcohol related fatal accidents were not necessarily caused by alcoholics or alcohol abusers. In fact 26% of the operators with focal alcohol influence were light social drinkers. There still remains too much advertising that suggests that "THE drunk" (or alcoholic) is primarily responsible for alcohol related highway accidents rather than "A drunk". The team concern is that no segment of the drinking community consider itself immune from potential highway danger because they do not consider themselves to be "drunks".

In conclusion it should be noted that the preceding findings and discussion are addressed only to the Part II hypotheses and evaluations. Part I[4] deals only with an accident involved sample and includes valuable data for research and analysis. Part III[5] presents the marijuana related findings which are summarily important and cannot be dismissed by professionals committed to making the highways safer places to drive and live.

BIBLIOGRAPHY AND REFERENCES

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Bibliography:

1. National Safety Council (Statistics Division), ACCIDENT FACTS: 1974 Edition, National Safety Council, Chicago, 1974.

2. Hollingshead, August B., "Two Factor Index of Social Position," Yale Station, New Haven, 1965.

3. Nunnally, Jum C., Psychometric Theory, McGraw-Hill, New York, 1967.

4. Sterling-Smith, Robert S., Psychosocial Identification of Drivers Responsible for Fatal Vehicular Accidents in Boston (Final Report, Part I), DOT HS-310-3-595, National Highway Traffic Safety Administration, Washington, D.C., September, 1975.

5. Sterling-Smith, Robert S. and David D. Graham, Marijuana Use and Driver Behaviors: Historical and Social Observations Among Fatal Accident Operators and a Control Sample (Final Report, Part III), DOT HS-310-3-595, National Highway Traffic Safety Administration, Washington, D.C., January, 1976.

References:

A complete listing of all pertinent references can be found in Parts I and III referenced above in items 4 and 5.

TABLES

TABLE 1

Sample Distribution for Experimental Sample

by Type and Control Sample

	EXPERIMENTAL TYPES				CONTROL	TOTAL
	I	II	III	ALL		
Subtotal	103 (38%)	63 (24%)	101 (38%)	267 (100%)		
TOTAL				267 (25%)	801 (75%)	1068 (100%)

TABLE 2

Sexual Distribution for Experimental Sample

by Type and Control Sample

	EXPERIMENTAL TYPES				CONTROL	TOTAL
SEX	I	II	III	ALL		
Male	89 (86%)	54 (86%)	93 (92%)	236 (88%)	705 (88%)	941 (88%)
Female	14 (14%)	9 (14%)	8 (8%)	31 (12%)	96 (12%)	127 (12%)
Subtotal	103	63	101			
TOTAL				267	801	1068

χ^2 2.155, p= n.s.

TABLE 3

Age Statistics for Experimental Sample

by Type and Control Sample

AGE BY DECADE	EXPERIMENTAL TYPES I	II	III	ALL	CONTROL	TOTAL
≤19	21 (20%)	15 (24%)	13 (13%)	49 (19%)	152 (19%)	201 (19%)
20-29	35 (34%)	35 (55%)	37 (36%)	107 (40%)	320 (40%)	427 (40%)
30-39	12 (12%)	10 (16%)	24 (24%)	46 (17%)	136 (17%)	182 (17%)
40-49	17 (16%)	2 (3%)	13 (13%)	32 (12%)	93 (12%)	125 (12%)
50-59	8 (8%)	---	7 (7%)	15 (6%)	51 (6%)	66 (6%)
60-69	4 (4%)	1 (2%)	4 (4%)	9 (3%)	26 (3%)	35 (3%)
70-79	6 (6%)	---	3 (3%)	9 (3%)	23 (3%)	32 (3%)
Subtotal	103	63	101			
TOTAL				267	801	1068

χ^2 28.405, p= n.s., t= 5.693, 3df. p < .01

Mean	34.4	25.2	32.8	31.6	31.7	31.6
Median	28.0	24.0	29.0	26.0	28.0	28.0
Standard Deviation	16.7	8.1	14.4	14.6	14.0	14.1
Range	16-79	14-61	16-77	14-79	17-78	14-79

TABLE 4

Marital Status for Experimental Sample

by Type and Control Sample

MARITAL STATUS	EXPERIMENTAL TYPES I	II	III	ALL	CONTROL	TOTAL
Single	47 (45%)	43 (68%)	45 (45%)	135 (51%)	418 (52%)	553 (52%)
Married	39 (38%)	9 (14%)	45 (45%)	93 (35%)	332 (41%)	425 (40%)
Widowed	4 (4%)	--	1 (1%)	5 (2%)	16 (2%)	21 (2%)
Divorced or Separated	11 (11%)	10 (17%)	9 (8%)	30 (11%)	34 (5%)	64 (5%)
Other	2 (2%)	1 (1%)	1 (1%)	4 (1%)	1 (0%)	5 (1%)
Subtotal	103	63	101			
TOTAL				267	801	1068

χ^2 60.826, $p < .01$
Single χ^2 10.571, $p < .05$

TABLE 5

Ethnic Background for Experimental Sample

by Type and Control Sample

ETHNIC BACKGROUND	EXPERIMENTAL TYPES I	II	III	ALL	CONTROL	TOTAL
Anglo Saxon	24 (23%)	9 (14%)	16 (16%)	49 (18%)	167 (21%)	216 (21%)
Irish	45 (43%)	20 (32%)	34 (33%)	99 (37%)	199 (25%)	298 (28%)
No. Europe	7 (7%)	4 (6%)	12 (12%)	23 (9%)	129 (16%)	152 (14%)
So. Europe	12 (12%)	14 (23%)	21 (21%)	47 (17%)	193 (24%)	240 (22%)
Latin	1 (1%)	4 (6%)	3 (3%)	8 (3%)	17 (2%)	25 (2%)
African	7 (7%)	7 (11%)	10 (10%)	24 (10%)	32 (4%)	56 (5%)
Eastern	4 (4%)	4 (6%)	5 (5%)	13 (5%)	61 (8%)	74 (7%)
Other	3 (3%)	1 (2%)	--	4 (1%)	3 (0%)	7 (1%)
Subtotal	103	63	101			
TOTAL				267	801	1068

x^2 61.313, $p < .01$

IRISH x^2 18.614, $p < .01$

TABLE 6

Formal Education Backgrounds for Experimental Sample by Type and Control Sample

EDUCATION BACKGROUNDS	EXPERIMENTAL TYPES I	II	III	ALL	CONTROL	TOTAL
1. Graduate Level	5 (5%)	--	3 (3%)	8 (3%)	119 (15%)	127 (12%)
2. College Graduate	10 (10%)	2 (3%)	6 (6%)	18 (7%)	157 (20%)	175 (16%)
3. Partial College	22 (21%)	8 (13%)	19 (18%)	49 (18%)	154 (19%)	203 (19%)
4. High School	43 (42%)	33 (52%)	45 (45%)	121 (45%)	248 (31%)	369 (35%)
5. Partial High School	18 (17%)	17 (27%)	20 (20%)	55 (21%)	81 (10%)	136 (13%)
6. Junior High	4 (4%)	3 (5%)	3 (3%)	10 (4%)	24 (3%)	34 (3%)
7. ≤ 7 yrs.	1 (1%)	--	5 (5%)	6 (2%)	18 (2%)	24 (2%)
Subtotal	103	63	101			
TOTAL				267	801	1068
MEAN	3.7	4.1	4.0	3.9	3.2	3.4

Experimental vs. Control, t= 7.626, 1066df, p < .01
I vs. Control, t= 3.562, 902df, p < .01
II vs. Control, t= 5.280, 862df, p < .01
III vs. Control, t= 5.397, 900df, p < .01
F=20.947, 3df, p < .01

TABLE 7

Student Status for Experimental Sample by

Accident Type and Control Sample

STUDENT STATUS	EXPERIMENTAL TYPES I	II	III	ALL	CONTROL	TOTAL
None	83 (81%)	50 (79%)	85 (84%)	218 (82%)	560 (70%)	778 (73%)
Part time	3 (3%)	2 (3%)	2 (2%)	7 (2%)	80 (10%)	87 (8%)
Full time	17 (16%)	11 (18%)	14 (14%)	42 (16%)	161 (20%)	203 (19%)
Subtotal	103	63	101			
TOTAL				267	801	1068

x^2 19.685, $p < .01$

TABLE 8

Occupational Attainment for Experimental Sample by Type and Control Sample

OCCUPATIONAL ATTAINMENT	EXPERIMENTAL TYPE I	II	III	ALL	CONTROL	TOTAL
1. Executives, large owners, professionals	6 (6%)	—	4 (4%)	10 (4%)	119 (15%)	129 (12%)
2. Business mgrs., lesser professionals	6 (6%)	3 (5%)	8 (8%)	17 (6%)	113 (14%)	130 (12%)
3. Administrators, medium owners	17 (17%)	5 (8%)	16 (16%)	38 (14%)	103 (13%)	141 (13%)
4. Clerks, technicians, public employees	23 (22%)	20 (32%)	24 (24%)	67 (25%)	167 (21%)	234 (22%)
5. Skilled manual employees	24 (23%)	14 (22%)	32 (31%)	70 (26%)	178 (22%)	248 (23%)
6. Semiskilled employees	16 (16%)	9 (14%)	8 (8%)	33 (13%)	73 (9%)	106 (10%)
7. Unskilled, welfare	10 (10%)	12 (19%)	9 (9%)	31 (12%)	48 (6%)	79 (8%)
Subtotal	103	63	101			
TOTAL				267	801	1068
Means	4.4	4.9	4.3	4.5	3.7	3.9

Experimental vs. Control, $t = 6.220$, 1066 df, $p < .01$
I vs. Control, $t = 3.576$, 902 df, $p < .01$
II vs. Control, $t = 5.187$, 862 df, $p < .01$
III vs. Control, $t = 3.173$, 900 df, p = n.s.
$F = 14.724$, 3 df, $p < .01$

TABLE 9

Physical Health Evaluations for Experimental Sample by Type and Control Sample

PHYSICAL HEALTH EVALUATIONS	EXPERIMENTAL TYPES I	II	III	ALL	CONTROL	TOTAL
Poor	9 (9%)	2 (3%)	1 (1%)	12 (5%)	6 (1%)	18 (2%)
Fair	25 (24%)	8 (13%)	14 (14%)	47 (17%)	48 (6%)	95 (9%)
Good/ Excellent	69 (67%)	53 (84%)	86 (85%)	208 (78%)	747 (93%)	955 (89%)
Subtotal	103	63	101			
TOTAL				266	801	1068

χ^2 82.075, $p < .01$

TABLE 10

Cigarette Smoking Habits for Experimental Sample by Type and Control Sample

CIGARETTE SMOKING HABITS	EXPERIMENTAL TYPES I	II	III	ALL	CONTROL	TOTAL
None	42 (41%)	14 (22%)	33 (33%)	89 (33%)	424 (53%)	513 (48%)
≤39 daily	35 (34%)	36 (57%)	49 (48%)	120 (45%)	255 (32%)	375 (35%)
≥40 daily	26 (25%)	13 (21%)	19 (19%)	58 (22%)	122 (15%)	180 (17%)
Subtotal	103	63	101			
TOTAL				267	801	1068

χ^2 36.239, $p < .01$

≤39 vs. ≥40, χ^2 7.596, p=n.s. (.056)

TABLE 11

Corrective Lenses Needed for Driving for Experimental Sample by Type and Control Sample

LENSES NEEDED	EXPERIMENTAL TYPES I	II	III	ALL	CONTROL	TOTAL
No	70 (68%)	54 (86%)	61 (60%)	185 (69%)	480 (60%)	665 (62%)
Yes	33 (32%)	9 (14%)	40 (40%)	82 (31%)	321 (40%)	403 (38%)
Subtotal	103	63	101			
TOTAL				267	801	1068

χ^2 18.253, $p < .01$

TABLE 12

Mental Health Treatment History for Experimental Sample by Type and Control Sample

TREATMENT HISTORY	EXPERIMENTAL TYPES I	II	III	ALL	CONTROL	TOTAL
None	88 (85%)	50 (80%)	88 (87%)	226 (85%)	681 (85%)	907 (85%)
Outpatient	5 (5%)	9 (15%)	11 (11%)	25 (9%)	110 (14%)	135 (13%)
Inpatient	3 (3%)	2 (3%)	1 (1%)	6 (2%)	9 (1%)	15 (1%)
Both	7 (7%)	2 (3%)	1 (1%)	10 (4%)	1 (0%)	11 (1%)
Subtotal	103	63	101			
TOTAL				267	801	1068

Experimental vs. Control, t= 2.510, 1066 df, $p < .05$
I vs. Control, t= 2.947, $p < .05$
II vs. Control, t= 2.417, p= n.s. (.096)
III vs. Control, t= -0.126, p= n.s. (.500)
F= 4.048, 3df, $p < .01$

TABLE 13

Known Suicide Attempt Histories for Experimental Sample by Type and Control Sample

KNOWN SUICIDE ATTEMPTS	EXPERIMENTAL TYPES I	II	III	ALL	CONTROL	TOTAL
No	91 (88%)	49 (78%)	93 (92%)	233 (87%)	776 (97%)	1009 (95%)
Yes	12 (12%)	14 (22%)	8 (8%)	34 (13%)	25 (3%)	59 (5%)
Subtotal	103	63	101			
TOTAL				267	801	1068

χ^2 51.075, $p < .01$

TABLE 14

Leisure Time Companions for Experimental Sample by Type and Control Sample

LEISURE COMPANIONS	EXPERIMENTAL TYPES I	II	III	ALL	CONTROL	TOTAL
None/Alone	10 (10%)	8 (13%)	15 (15%)	33 (12%)	77 (10%)	110 (10%)
Family	35 (34%)	12 (19%)	37 (37%)	84 (32%)	302 (38%)	386 (36%)
Friends	58 (56%)	43 (68%)	49 (48%)	150 (56%)	421 (52%)	570 (54%)
Subtotal	103	63	101			
TOTAL				267	801	1068

χ^2 21.144, $p < .05$

TABLE 15

Estimated Numbers of Close Friends for Experimental Sample by Type and Control Sample

	EXPERIMENTAL TYPES				CONTROL	TOTAL
NO. OF FRIENDS	I	II	III	ALL		
None	--	4 (6%)	--	4 (1%)	26 (3%)	30 (3%)
1-5	32 (31%)	24 (38%)	34 (33%)	90 (34%)	479 (60%)	569 (53%)
6-10	12 (12%)	14 (23%)	27 (27%)	53 (20%)	224 (28%)	277 (26%)
11-20	13 (12%)	4 (6%)	23 (23%)	40 (15%)	64 (8%)	104 (9%)
≥21	46 (45%)	17 (27%)	17 (17%)	80 (30%)	8 (1%)	88 (8%)
Subtotal	103	63	101			
TOTAL				267	801	1068

Experimental vs. Control, t= 6.028, 1066df, p < .01
I vs. Control, t=14.868, 902df, p < .01
II vs. Control, t= 6.377, 862df, p < .01
III vs. Control, t= 9.626, 900df, p < .01

TABLE 16

Involvement in High Risk Leisure Activities for

Experimental Sample by Type and Control Sample

HIGH RISK LEISURE ACTIVITIES	EXPERIMENTAL TYPES I	II	III	ALL	CONTROL	TOTAL
No	77 (75%)	48 (76%)	89 (88%)	214 (80%)	609 (76%)	823 (77%)
Yes	26 (25%)	15 (24%)	12 (12%)	53 (20%)	192 (24%)	245 (23%)
Subtotal	103	63	101			
TOTAL				267	801	1068

χ^2 7.803, p= n.s. (.051)

TABLE 17

Alcohol Use Patterns for Experimental

Sample by Type and Control Sample

ALCOHOL USE PATTERNS	EXPERIMENTAL TYPES I	II	III	ALL	CONTROL	TOTAL
Abstainer	9 (9%)	3 (5%)	10 (10%)	22 (8%)	107 (13%)	129 (12%)
Light Social	36 (35%)	25 (40%)	44 (43%)	105 (39%)	196 (24%)	301 (28%)
Moderate Social	19 (18%)	13 (21%)	24 (24%)	56 (21%)	319 (40%)	375 (35%)
Heavy Social	24 (23%)	14 (22%)	17 (17%)	55 (21%)	140 (18%)	195 (19%)
Sporadic Binge	4 (4%)	6 (9%)	3 (3%)	13 (5%)	9 (1%)	22 (2%)
Alcohol Abuser	11 (11%)	2 (3%)	3 (3%)	16 (6%)	30 (4%)	46 (4%)
Subtotal	103	63	101			
TOTAL				267	801	1068

All tests for significance between groups over .10, p= n.s.

TABLE 18

Frequency of Alcohol Use for Experimental Sample by Type and Control Sample

ANNUAL FREQUENCY OF ALCOHOL USE	EXPERIMENTAL TYPES I	II	III	ALL	CONTROL	TOTAL
Never, Rarely	8 (8%)	3 (5%)	15 (15%)	26 (10%)	112 (14%)	138 (13%)
> Monthly	16 (15%)	11 (17%)	11 (11%)	38 (14%)	122 (15%)	160 (15%)
> Weekly	39 (38%)	22 (35%)	42 (41%)	103 (39%)	267 (33%)	370 (35%)
> Daily	40 (39%)	27 (43%)	33 (33%)	100 (37%)	300 (38%)	400 (37%)
Subtotal	103	63	101			
TOTAL				267	801	1068

All tests for significance between groups over .500, n.s.

TABLE 19

Frequency of Alcohol Intoxication for Experimental Sample by Type and Control Sample

ANNUAL FREQUENCY OF ALCOHOL INTOXICATION	EXPERIMENTAL TYPE I	II	III	ALL	CONTROL	TOTAL
Never	18 (17%)	8 (13%)	29 (28%)	55 (21%)	282 (35%)	337 (32%)
1-2X	23 (22%)	17 (27%)	21 (21%)	61 (23%)	221 (28%)	282 (26%)
3-8X	23 (22%)	12 (19%)	26 (26%)	61 (23%)	115 (14%)	176 (17%)
≥ Monthly	11 (11%)	7 (11%)	11 (11%)	29 (11%)	111 (14%)	140 (13%)
< Weekly	20 (20%)	12 (19%)	12 (12%)	44 (16%)	56 (7%)	100 (9%)
≥ Weekly	8 (8%)	7 (11%)	2 (2%)	17 (6%)	16 (2%)	53 (3%)
Subtotal	103	63	101			
TOTAL				267	801	1068

Experimental vs. Control, t= 6.301, 1066df, p < .01
I vs. Control, t= 5.461, 902df, p < .01
II vs. Control, t= 5.196, 862df, p < .01
III vs. Control, t= 1.830, 900df, p= n.s. (.406)

TABLE 20

Problem Drinker Evaluations for Experimental

Sample by Type and Control Sample

PROBLEM DRINKER EVALUATIONS	EXPERIMENTAL TYPES I	II	III	ALL	CONTROL	TOTAL
Yes	49 (48%)	26 (41%)	31 (31%)	106 (40%)	152 (19%)	258 (24%)
No	54 (52%)	37 (59%)	70 (69%)	161 (60%)	649 (81%)	810 (76%)
Subtotal	103	63	101			
TOTAL				267	801	1068

x^2 54.669, $p < .01$

TABLE 21

Parental Alcohol Problem Histories for Experimental Sample by Type and Control Sample

PARENTAL ALCOHOL PROBLEMS	EXPERIMENTAL TYPE I	II	III	ALL	CONTROL	TOTAL
None	78 (76%)	42 (67%)	83 (82%)	203 (76%)	652 (81%)	855 (80%)
Mother	3 (3%)	2 (3%)	1 (1%)	6 (2%)	28 (4%)	34 (3%)
Father	20 (19%)	16 (25%)	15 (15%)	51 (19%)	106 (13%)	157 (15%)
Both	2 (2%)	3 (5%)	2 (2%)	7 (3%)	15 (2%)	22 (2%)
Subtotal	103	63	101			
TOTAL				267	801	1068

x^2 13.698, p= n.s.
MOTHERS x^2 2.026, p= n.s.
FATHERS x^2 11.238, $p < .05$

TABLE 22

Others Encouraging to Drink More for Experimental Sample by Type and Control Sample

OTHERS ENCOURAGING MORE DRINKING	EXPERIMENTAL TYPES I	II	III	ALL	CONTROL	TOTAL
No	97 (94%)	53 (84%)	94 (93%)	244 (91%)	554 (69%)	798 (75%)
Yes	6 (6%)	10 (16%)	7 (7%)	23 (9%)	247 (31%)	270 (25%)
Subtotal	103	63	101			
TOTAL				267	801	1068

x^2 54.684, $p < .01$

TABLE 23

Others Encouraging to Drink Less for Experimental Sample by Type and Control Sample

OTHERS ENCOURAGING LESS DRINKING	EXPERIMENTAL TYPES I	II	III	ALL	CONTROL	TOTAL
No	84 (82%)	55 (87%)	85 (84%)	224 (84%)	682 (85%)	906 (85%)
Yes	19 (18%)	8 (13%)	16 (16%)	43 (16%)	119 (15%)	162 (15%)
Subtotal	103	63	101			
TOTAL				267	801	1068

x^2 1.255, p= n.s.

TABLE 24

Personal Attempt to Drink Less Alcohol for Experimental Sample by Type and Control Sample

DRINK LESS ATTEMPT	EXPERIMENTAL TYPES I	II	III	ALL	CONTROL	TOTAL
No	79 (77%)	50 (79%)	85 (84%)	214 (80%)	660 (82%)	874 (82%)
Yes	24 (23%)	13 (21%)	16 (16%)	53 (20%)	141 (18%)	194 (18%)
Subtotal	103	63	101			
TOTAL				267	801	1068

χ^2 2.623, p=n.s.

TABLE 25

Known History of Alcohol Related Job Loss for Experimental Sample by Type and Control Sample

ALCOHOL JOB LOSS	EXPERIMENTAL TYPES I	II	III	ALL	CONTROL	TOTAL
No	88 (85%)	48 (76%)	92 (91%)	228 (85%)	773 (97%)	1001 (94%)
Yes	15 (15%)	15 (24%)	9 (9%)	39 (15%)	27 (3%)	66 (6%)
Subtotal	103	63	101			
TOTAL				267	801	1068

x^2 58.360, $p<.01$

TABLE 26

Marijuana Smokers and Non-Smokers for Experimental Sample by Type and Control Sample

MARIJUANA SMOKERS	EXPERIMENTAL TYPES I	II	III	ALL	CONTROL	TOTAL
Non-Users	61 (60%)	23 (36%)	62 (61%)	146 (55%)	529 (66%)	675 (63%)
Light Smokers	3 (3%)	5 (8%)	2 (2%)	10 (4%)	24 (3%)	34 (3%)
Moderate Smokers	23 (22%)	18 (29%)	21 (21%)	62 (23%)	101 (13%)	163 (16%)
Heavy Smokers	16 (15%)	17 (27%)	16 (16%)	49 (18%)	147 (18%)	196 (18%)
Subtotal	103	63	101			
TOTAL				267	801	1068

Experimental vs. Control, t= 4.118, 1066 df, $p < .01$
I vs. Control, t= 2.120, 902df, p= n.s.
II vs. Control, t= 4.854, 862df, $p < .01$
III vs. Control, t= 1.531, 900df, p over .500, n.s.

TABLE 27

Marijuana Smoking Frequencies During Previous Year for Experimental Sample by Type and Control Sample

ANNUAL MARIJUANA SMOKING FREQUENCY	EXPERIMENTAL TYPES I	II	III	ALL	CONTROL	TOTAL
Abstainer/ Never	50 (49%)	21 (33%)	56 (55%)	127 (48%)	480 (60%)	607 (57%)
Experimentor 1-2X	11 (11%)	2 (3%)	6 (6%)	19 (7%)	49 (6%)	68 (6%)
Light 3-8X	3 (3%)	5 (8%)	2 (2%)	10 (4%)	24 (3%)	34 (3%)
Moderate/ Monthly	6 (6%)	8 (13%)	6 (6%)	20 (7%)	62 (8%)	82 (8%)
≥ Weekly	17 (16%)	10 (16%)	15 (15%)	42 (16%)	39 (5%)	81 (8%)
Heavy ≥ 2X Weekly	16 (15%)	17 (27%)	16 (16%)	49 (18%)	147 (18%)	196 (18%)
Subtotal	103	63	101			
TOTAL				267	801	1068

Experimental vs. Control, t= 4.118, 1066df, p <.01
I vs. Control, t= 2.120, 902df, p= n.s.
II vs. Control, t= 4.854, 862df, p <.01
III vs. Control, t= 1.531, 900df, p over .500, n.s.

TABLE 28

Marijuana Smoking and Alcohol Use Patterns for Experimental Sample by Type and Control Sample

ALCOHOL PATTERN	MARIJUANA SMOKERS: EXPERIMENTAL TYPES I YES	I NO	II YES	II NO	III YES	III NO	ALL YES	ALL NO	CONTROL YES	CONTROL NO	TOTAL YES	TOTAL NO
Abstainer	—	9 (15%)	1 (2%)	2 (9%)	—	10 (17%)	1 (1%)	21 (14.5%)	17 (6%)	90 (17%)	18 (4%)	111 (16%)
Light	14 (33%)	22 (36%)	16 (40%)	9 (39%)	19 (44%)	25 (43%)	45 (37%)	60 (41%)	38 (14%)	158 (30%)	83 (21%)	218 (32%)
Moderate	8 (19%)	11 (18%)	8 (20%)	5 (22%)	11 (26%)	13 (22%)	27 (22%)	29 (20%)	122 (45%)	197 (37%)	149 (38%)	226 (34%)
Heavy	14 (33%)	10 (16%)	8 (20%)	6 (26%)	12 (28%)	5 (9%)	34 (28%)	21 (14.5%)	74 (27%)	66 (12%)	108 (28%)	87 (13%)
Sporadic	2 (5%)	2 (3%)	5 (13%)	1 (4%)	1 (2%)	2 (4%)	8 (7%)	5 (3%)	6 (2%)	3 (1%)	14 (4%)	8 (1%)
Abuser	4 (10%)	7 (12%)	2 (5%)	—	—	3 (5%)	6 (5%)	10 (7%)	15 (6%)	15 (3%)	21 (5%)	25 (4%)
Subtotal	42 (100%)	61 (100%)	40 (100%)	23 (100%)	43 (100%)	58 (100%)	121 (100%)	146 (100%)	272 (100%)	529 (100%)	393 (100%)	675 (100%)
TOTAL	103		63		101		267		801		1068	
	χ^2 29.091 p = n.s.		χ^2 28.565 p = n.s.		χ^2 28.387 p = n.s.		χ^2 28.493 p = n.s.		χ^2 96.049 p < .01		χ^2 106.856 p < .01	

TABLE 29

Marijuana Smokers and Operators Familiar With Street or Entertainment Drugs for Experimental Sample by Type and Control Sample

MARIJUANA SMOKERS

STREET OR ENTERTAINMENT DRUGS	EXPERIMENTAL TYPES I YES	I NO	II YES	II NO	III YES	III NO	ALL YES	ALL NO	CONTROL YES	CONTROL NO	TOTAL YES	TOTAL NO
None	12 (29%)	60 (98%)	7 (18%)	21 (91%)	11 (28%)	61 (98%)	30 (25%)	142 (97%)	129 (47%)	495 (94%)	159 (40%)	637 (94%)
Some	30 (61%)	1 (2%)	33 (82%)	2 (9%)	28 (72%)	1 (2%)	91 (75%)	4 (3%)	143 (53%)	34 (6%)	234 (60%)	38 (6%)
Subtotal	42 (100%)	61 (100%)	40 (100%)	23 (100%)	39 (100%)	62 (100%)	121 (100%)	146 (100%)	272 (100%)	529 (100%)	393 (100%)	675 (100%)
TOTAL	103		63		101		267		801		1068	
	χ^2 17.791 $p < .01$		χ^2 11.012 p = n.s. (.052)		χ^2 11.490 $p < .05$		χ^2 13.431 $p < .05$		χ^2 69.659 $p < .01$		χ^2 442.057 $p < .01$	

TABLE 30

Street or Entertainment Drug Familiarity or Use for

Experimental Sample by Type and Control Sample

DRUG FAMILIARITY OR USE	EXPERIMENTAL TYPES				CONTROL	TOTAL
	I	II	III	ALL		
None	72 (70%)	28 (44%)	72 (72%)	172 (64%)	624 (78%)	796 (75%)
Some	31 (30%)	35 (56%)	29 (29%)	95 (36%)	177 (22%)	272 (25%)
Subtotal	103	63	101			
TOTAL				267	801	1068

χ^2 36.562, $p < .01$

TABLE 31

Problem Drinker Evaluations and Street or Entertainment Drug Exposure for Experimental Sample by Type and Control Sample

STREET OR ENTERTAINMENT DRUGS	PROBLEM DRINKER EVALUATIONS											
	EXPERIMENTAL TYPE								CONTROL		TOTAL	
	I		II		III		ALL					
	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
No	29 (59%)	43 (80%)	7 (27%)	21 (57%)	18 (58%)	54 (77%)	54 (51%)	118 (73%)	93 (61%)	531 (82%)	147 (57%)	649 (80%)
Yes	20 (41%)	11 (20%)	19 (73%)	16 (43%)	13 (42%)	16 (23%)	52 (49%)	43 (27%)	59 (39%)	118 (18%)	111 (43%)	161 (20%)
Subtotal	49 (100%)	54 (100%)	26 (100%)	37 (100%)	31 (100%)	70 (100%)	106 (100%)	161 (100%)	152 (100%)	649 (100%)	258 (100%)	810 (100%)
TOTAL	103		63		101		267		801		1068	
	χ^2 4.179 $p < .05$		χ^2 4.362 $p < .05$		χ^2 2.945 p = n.s.		χ^2 3.962 $p < .05$		χ^2 29.041 $p < .01$		χ^2 36.801 $p < .01$	

TABLE 32

Normal Seat Belt Use for Experimental Sample by Type and Control Sample

NORMAL SEAT BELT USE	EXPERIMENTAL TYPES I	II	III	ALL	CONTROL	TOTAL
No	92 (89%)	57 (90%)	74 (73%)	223 (84%)	575 (72%)	798 (75%)
Yes	11 (11%)	6 (10%)	27 (27%)	44 (16%)	226 (28%)	270 (25%)
Subtotal	103	63	101			
TOTAL				267	801	1068

x^2 23.667, $p < .01$

TABLE 33

Previous License Suspensions for Experimental by Type and Control Sample

LICENSE SUSPENSION	EXPERIMENTAL TYPES I	II	III	ALL	CONTROL	TOTAL
No	90 (87%)	55 (87%)	91 (90%)	236 (88%)	755 (94%)	991 (93%)
Yes	13 (13%)	8 (13%)	10 (10%)	31 (12%)	46 (6%)	77 (7%)
Subtotal	103	63	101			
TOTAL				267	801	1068

x^2 11.015, $p < .05$

TABLE 34

Previous Arrests for Driving Under the Influence of Alcohol (DWI) for Experimental Sample by Type and Control Sample

DWI ARRESTS	EXPERIMENTAL TYPES I	II	III	ALL	CONTROL	TOTAL
No	96 (93%)	62 (98%)	97 (97%)	255 (96%)	784 (98%)	1039 (97%)
Yes	7 (7%)	1 (2%)	4 (4%)	12 (4%)	17 (2%)	29 (3%)
Subtotal	103	63	101			
TOTAL				267	801	1068

χ^2 8.455, $p < .05$

TABLE 35

Two or More Citations for Speeding or Driving to Endanger for Experimental Sample by Type and Control Sample

≥2 CITATIONS	EXPERIMENTAL TYPES I	II	III	ALL	CONTROL	TOTAL
No	83 (81%)	50 (79%)	85 (84%)	218 (82%)	791 (99%)	1009 (94%)
Yes	20 (19%)	13 (21%)	16 (16%)	49 (18%)	10 (1%)	59 (6%)
Subtotal	103	63	101			
TOTAL				267	801	1068

χ^2 24.631, $p < .01$

TABLE 36

Sexual Distribution for Experimental Operators With Focal Alcohol*/Without Focal Alcohol and Control Operators

SEX	EXPERIMENTAL Focal Alcohol	No Focal Alcohol	CONTROL	TOTAL
Male	91 (88%)	145 (88%)	705 (88%)	941 (88%)
Female	12 (12%)	19 (12%)	96 (12%)	127 (12%)
TOTAL	103	164	801	1068

χ^2 0.030, p=n.s.
*focal alcohol involvement is a BAC ≥.05gm/100ml %, if available, or a clinical evaluation of the same.

TABLE 37

Age by Decade Distribution for Experimental Operators

With Focal Alcohol*/Without Focal Alcohol and Control Operators

AGE BY DECADE	EXPERIMENTAL Focal Alcohol	EXPERIMENTAL No Focal Alcohol	CONTROL	TOTAL
≤19	18 (17%)	31 (19%)	152 (19%)	201 (19%)
20-29	45 (44%)	62 (38%)	320 (40%)	427 (40%)
30-39	18 (17%)	28 (17%)	136 (17%)	182 (17%)
40-49	13 (13%)	19 (11%)	93 (12%)	125 (12%)
50-59	5 (5%)	10 (6%)	51 (6%)	66 (6%)
60-69	3 (3%)	6 (4%)	26 (3%)	35 (3%)
70-79	1 (1%)	8 (5%)	23 (3%)	32 (3%)
TOTAL	103	164	801	1068
mean	30.2	32.4	31.7	31.6
median	26	26	28	28

$\chi^2$4.450, p=n.s.

*focal alcohol involvement is a BAC $\geq$.05 gm/100ml %, if available, or a clinical evaluation of the same

TABLE 38

Numbers of Siblings for Experimental Operators

With Focal Alcohol*/Without Focal Alcohol and Control Operators

NUMBERS OF SIBLINGS	EXPERIMENTAL Focal Alcohol	EXPERIMENTAL No Focal Alcohol	CONTROL	TOTAL
None	12 (11%)	12 (7%)	44 (6%)	68 (6%)
1 - 2	43 (42%)	57 (35%)	361 (45%)	461 (43%)
3 - 4	26 (25%)	50 (31%)	250 (31%)	326 (31%)
5 - 6	11 (11%)	21 (13%)	84 (10%)	116 (11%)
7 - 8	6 (6%)	12 (7%)	45 (6%)	63 (6%)
$\geq$ 9	5 (5%)	12 (7%)	17 (2%)	34 (3%)
TOTAL	103	164	801	1068
mean	3.0	3.5	2.9	3.0

χ^2 64.203, $p<.01$

*focal alcohol involvement is a BAC $\geq$.05 gm/100ml %, if available, or a clinical evaluation of the same

TABLE 39

Marital Status for Experimental Operators

With Focal Alcohol*/Without Focal Alcohol and Control Operators

MARITAL STATUS	EXPERIMENTAL Focal Alcohol	EXPERIMENTAL No Focal Alcohol	CONTROL	TOTAL
Single	51 (49%)	84 (51%)	418 (52%)	553 (52%)
Married	29 (28%)	64 (39%)	332 (41%)	425 (40%)
Common Law	3 (3%)	1 (1%)	1 (1%)	5 (0%)**
Separated	8 (8%)	5 (3%)	8 (1%)	21 (2%)
Divorced	10 (10%)	(4%)	26 (3%)	43 (4%)
Widowed	2 (2%)	3 (2%)	16 (2%)	21 (2%)
TOTAL	103	164	801	1068

χ^2 49.440, $p<.01$

*focal alcohol involvement is a BAC$\geq$.05 gm/100ml %, if available, or a clinical evaluation of the same

**.004%

TABLE 40

Formal Education Backgrounds for Experimental Operators

With Focal Alcohol*/Without Focal Alcohol and Control Operators

EDUCATION BACKGROUNDS	EXPERIMENTAL Focal Alcohol	EXPERIMENTAL No Focal Alcohol	CONTROL	TOTAL
1. Graduate level	3 (3%)	5 (3%)	119 (15%)	127 (12%)
2. College graduate	5 (5%)	13 (8%)	157 (20%)	175 (16%)
3. Partial College	19 (18%)	30 (18%)	154 (19%)	203 (19%)
4. High School	48 (47%)	73 (45%)	248 (31%)	369 (35%)
5. Partial High School	22 (21%)	33 (20%)	81 (10%)	136 (13%)
6. Junior High	6 (6%)	4 (2%)	24 (3%)	34 (3%)
7. $\leq$ 7 yrs.	0 (0%)	6 (4%)	18 (2%)	24 (2%)
TOTAL	103	164	801	1068
mean	4.0	3.9	3.2	3.4

χ^2 80.136, p .01

*focal alcohol involvement is a BAC $\geq$.05 gm/100ml %, if available, or a clinical evaluation of the same

TABLE 41

Student Status for Experimental Operators

With Focal Alcohol*/Without Focal Alcohol and Control Operators

STUDENT STATUS	EXPERIMENTAL Focal Alcohol	EXPERIMENTAL No Focal Alcohol	CONTROL	TOTAL
None	86 (83%)	132 (80%)	560 (70%)	778 (73%)
Part time	4 (4%)	3 (2%)	80 (10%)	87 (8%)
Full time	13 (13%)	29 (18%)	161 (20%)	203 (19%)
TOTAL	103	164	801	1068

$\chi^2 20.314$, $p<.01$

*focal alcohol involvement is a BAC $\geq$.05 gm/100ml %, if available, or a clinical evaluation of the same

TABLE 42

Occupational Attainment for Experimental Operators

With Focal Alcohol*/Without Focal Alcohol and Control Operators

OCCUPATIONAL ATTAINMENT	EXPERIMENTAL Focal Alcohol	EXPERIMENTAL No Focal Alcohol	CONTROL	TOTAL
1. Executives, large owners, professionals	3 (3%)	7 (4%)	119 (15%)	129 (12%)
2. Business mgrs., lesser profes- sionals	3 (3%)	14 (8%)	113 (14%)	130 (12%)
3. Administrators, medium owners	15 (15%)	23 (14%)	103 (13%)	141 (13%)
4. Clerks, tech- nicians, sales	26 (25%)	42 (26%)	167 (21%)	235 (22%)
5. Skilled manual employees	23 (22%)	47 (29%)	178 (22%)	248 (23%)
6. Semiskilled employees	17 (17%)	16 (10%)	73 (9%)	106 (10%)
7. Unskilled, welfare	16 (15%)	15 (9%)	48 (6%)	79 (8%)
TOTAL	103	164	801	1068
mean	4.7	4.3	3.7	3.9

χ^2 52.808, $p<.01$

*focal alcohol involvement is a BAC $\geq$.05 gm/100ml %, if available, or a clinical evaluation of the same

TABLE 43

Physical Health Evaluations for Experimental Operators

With Focal Alcohol*/Without Focal Alcohol and Control Operators

PHYSICAL HEALTH EVALUATIONS	EXPERIMENTAL Focal Alcohol	EXPERIMENTAL No Focal Alcohol	CONTROL	TOTAL
Poor	8 (8%)	4 (2%)	6 (1%)	18 (2%)
Fair	21 (20%)	26 (16%)	48 (6%)	95 (9%)
Good/ Excellent	74 (72%)	134 (82%)	747 (93%)	955 (89%)
TOTAL	103	164	801	1068

χ^2 65.268, $p<.01$

*focal alcohol involvement is a BAC $\geq$.05 gm/100ml %, if available, or a clinical evaluation of the same

TABLE 44

Cigarette Smoking Patterns for Experimental Operators

With Focal Alcohol*/Without Focal Alcohol and Control Operators

CIGARETTE SMOKING PATTERN	EXPERIMENTAL		CONTROL	TOTAL
	Focal Alcohol	No Focal Alcohol		
None	32 (31%)	57 (35%)	424 (53%)	513 (48%)
$\leq$ 39 daily	44 (43%)	76 (46%)	255 (32%)	375 (35%)
$\geq$ 40 daily	27 (26%)	31 (19%)	122 (15%)	180 (17%)
TOTAL	103	164	801	1068

χ^2 31.392, $p<.01$

*focal alcohol involvement is a BAC $\geq$.05 gm/100ml %, if available, or a clinical evaluation of the same

TABLE 45

Mental Health Treatment Histories for Experimental Operators With Focal Alcohol*/Without Focal Alcohol and Control Operators

MENTAL HEALTH TREATMENT HISTORIES	EXPERIMENTAL		CONTROL	TOTAL
	Focal Alcohol	No Focal Alcohol		
None	88 (85%)	138 (84%)	681 (85%)	907 (85%)
Outpatient only	5 (5%)	20 (12%)	110 (14%)	135 (13%)
Inpatient only	4 (4%)	2 (1%)	9 (1%)	15 (1%)
Both	6 (6%)	4 (3%)	1 (0%)	11 (1%)
TOTAL	103	164	801	1068

χ^2 43.464, $p<.01$

*focal alcohol involvement is a BAC $\geq$.05 gm/100ml %, if available, or a clinical evaluation of the same

TABLE 46

Suicide Attempt Histories for Experimental Operators

With Focal Alcohol*/Without Focal Alcohol and Control OPerators

SUICIDE ATTEMPT HISTORIES	EXPERIMENTAL Focal Alcohol	EXPERIMENTAL No Focal Alcohol	CONTROL	TOTAL
None known	82 (80%)	151 (92%)	776 (97%)	1009 (95%)
≥ one known	21 (20%)	13 (8%)	25 (3%)	59 (5%)
TOTAL	103	164	801	1068

χ^2 58.707, $p < .01$

*focal alcohol involvement is a BAC ≥.05 gm/100ml%, if available, or a clinical evaluation of the same

TABLE 47

Involvement in High Risk Leisure Activities for Experimental Operators With Focal Alcohol*/Without Focal Alcohol and Control Operators

HIGH RISK LEISURE INVOLVEMENT	EXPERIMENTAL Focal Alcohol	EXPERIMENTAL No Focal Alcohol	CONTROL	TOTAL
No	80 (78%)	134 (82%)	609 (76%)	823 (77%)
Yes	23 (22%)	30 (18%)	192 (24%)	245 (23%)
TOTAL	103	164	801	1068

χ^2 2.602, p=n.s.
*focal alcohol involvement is a BAC $\geq$.05 gm/100ml %, if available, or a clinical evaluation of the same

TABLE 48

Historic Patterns of Alcohol Use for Experimental Operators

With Focal Alcohol*/Without Focal Alcohol and Control Operators

ALCOHOL PATTERN	EXPERIMENTAL Focal Alcohol	EXPERIMENTAL No Focal Alcohol	CONTROL	TOTAL
Abstainer (0)	0 (0%)	22 (13%)	107 (13%)	129 (12%)
Light Social (1)	27 (26%)	78 (48%)	196 (24%)	301 (28%)
Moderate Social (2)	20 (19%)	36 (22%)	319 (40%)	375 (35%)
Heavy Social (3)	32 (31%)	23 (14%)	140 (18%)	195 (19%)
Sporadic Binge (4)	11 (11%)	2 (1%)	9 (1%)	22 (2%)
Alcohol Abuser (5)	13 (13%)	3 (2%)	30 (4%)	46 (4%)
TOTAL	103	164	801	1068
mean	2.6	1.5	1.8	1.8

χ^2 128.193, $p<.01$

*focal alcohol involvement is a BAC $\geq$.05 gm/100ml %, if available, or a clinical evaluation of the same

TABLE 49

Frequency of Alcohol Use for Experimental Operators

With Focal Alcohol*/Without Focal Alcohol and Control Operators

FREQUENCY OF ALCOHOL USE	EXPERIMENTAL		CONTROL	TOTAL
	Focal Alcohol	No Focal Alcohol		
Never/rarely	0 (0%)	26 (16%)	112 (14%)	138 (13%)
Monthly or less	10 (10%)	28 (17%)	122 (15%)	160 (15%)
Monthly to weekly	40 (39%)	63 (38%)	267 (33%)	370 (35%)
Weekly to daily	53 (51%)	47 (29%)	300 (38%)	400 (37%)
TOTAL	103	164	801	1068

χ^2 26.830, $p<.01$

*focal alcohol involvement is a BAC $\geq$.05 gm/100ml %, if available, or a clinical evaluation of the same

TABLE 50

Frequency of Alcohol Intoxication for Experimental Operators

With Focal Alcohol*/Without Focal Alcohol and Control Operators

ANNUAL FREQUENCY OF ALCOHOL INTOXICATION	EXPERIMENTAL Focal Alcohol	EXPERIMENTAL No Focal Alcohol	CONTROL	TOTAL
Never	0 (0%)	55 (33%)	282 (35%)	337 (32%)
1 - 2x	24 (23%)	37 (23%)	221 (28%)	282 (26%)
3 - 8x	25 (24%)	36 (22%)	115 (14%)	176 (17%)
≥ monthly	13 (13%)	16 (10%)	111 (14%)	140 (13%)
< weekly	28 (27%)	16 (10%)	56 (7%)	100 (9%)
≥ weekly	13 (13%)	4 (2%)	16 (2%)	33 (3%)
TOTAL	103	164	801	1068

χ^2 116.732, p<.01

*focal alcohol involvement is a BAC ≥.05 gm/100ml %, if available, or a clinical evaluation of the same

TABLE 51

Encouragement by Others to Drink Less for Experimental Operators With Focal Alcohol*/Without Focal Alcohol and Control Operators

ENCOURAGEMENT TO DRINK LESS	EXPERIMENTAL Focal Alcohol	EXPERIMENTAL No Focal Alcohol	CONTROL	TOTAL
No	83 (81%)	141 (86%)	682 (85%)	906 (85%)
Yes	20 (19%)	23 (14%)	119 (15%)	162 (15%)
TOTAL	103	164	801	1068

χ^2 1.816, p=n.s.
*focal alcohol involvement is a BAC $\geq$.05 gm/100ml %, if available, or a clinical evaluation of the same

TABLE 52

Known History of Alcohol Related Job Loss for Experimental Operators With Focal Alcohol*/Without Focal Alcohol and Control Operators

KNOWN ALCOHOL RELATED JOB LOSS	EXPERIMENTAL Focal Alcohol	EXPERIMENTAL No Focal Alcohol	CONTROL	TOTAL
None	77 (75%)	151 (92%)	773 (97%)	1001 (94%)
Yes	26 (25%)	13 (8%)	27 (3%)	66 (6%)
TOTAL	103	164	801	1068

χ^2 77.209, p <.01
*focal alcohol involvement is a BAC $\geq$.05 gm/100ml %, if available, or a clinical evaluation of the same

TABLE 53

Personal Attempt to Drink Less for Experimental Operators

With Focal Alcohol*/Without Focal Alcohol and Control Operators

ATTEMPT TO DRINK LESS	EXPERIMENTAL Focal Alcohol	EXPERIMENTAL No Focal Alcohol	CONTROL	TOTAL
No	72 (70%)	142 (87%)	660 (82%)	874 (82%)
Yes	31 (30%)	22 (13%)	141 (18%)	194 (18%)
TOTAL	103	164	801	1068

χ^2 10.831, $p<.01$

* focal alcohol involvement is a BAC $\geq$.05 gm/100ml %, if available, or a clinical evaluation of the same

TABLE 54

Parental Problem Drinking Histories for Experimental Operators With Focal Alcohol*/Without Focal Alcohol and Control Operators

PARENTAL PROBLEM DRINKING	EXPERIMENTAL Focal Alcohol	EXPERIMENTAL No Focal Alcohol	CONTROL	TOTAL
None	66 (64%)	137 (83%)	652 (81%)	855 (80%)
Maternal	5 (5%)	1 (1%)	28 (4%)	34 (3%)
Paternal	28 (27%)	23 (14%)	106 (13%)	157 (15%)
Both	4 (4%)	3 (2%)	15 (2%)	22 (2%)
TOTAL	103	164	801	1068

χ^2 22.893, $p<.01$

* focal alcohol involvement is a BAC $\geq$.05 gm/100ml %, if available or a clinical evaluation of the same

TABLE 55

Problem Drinker Histories for Experimental Operators

With Focal Alcohol*/Without Focal Alcohol and Control Operators

DRINKING HISTORY	EXPERIMENTAL Focal Alcohol	EXPERIMENTAL No Focal Alcohol	CONTROL	TOTAL
Problem Drinker	65 (63%)	41 (25%)	152 (19%)	258 (24%)
Social Drinker	38 (37%)	101 (62%)	542 (68%)	681 (64%)
Abstainer	0 (0%)	22 (13%)	107 (13%)	129 (12%)
TOTAL	103	164	801	1068

χ^2 94.418, p<.01

* focal alcohol involvement is a BAC $\geq$.05 gm/100ml %, if available, or a clinical evaluation of the same

TABLE 56

Previous Arrests for Driving Under the

Influence of Alcohol (DWI) for Experimental Operators

With Focal Alcohol*/Without Focal Alcohol and Control Operators

DWI ARREST HISTORY	EXPERIMENTAL Focal Alcohol	EXPERIMENTAL No Focal Alcohol	CONTROL	TOTAL
No Previous DWI arrest	94 (91%)	161 (98%)	784 (93%)	1039 (97%)
Previous DWI arrest	9 (9%)	3 (2%)	17 (2%)	29 (3%)
TOTAL	103	164	801	1068

$\chi^2$15.974, p<.01

* focal alcohol involvement is a BAC $\geq$.05 gm/100ml %, if available, or a clinical evaluation of the same

Note: These DWI arrests are those recorded in the Commonwealth of Massachusetts Criminal Systems History Records and those from cooperating states. Other alcohol related arrests such as public drunkenness were not available for the control sample.

TABLE 57

Previous Citations for Speeding for Experimental Operators

With Focal Alcohol*/Without Focal Alcohol and Control Operators

SPEEDING CITATIONS	EXPERIMENTAL Focal Alcohol	EXPERIMENTAL No Focal Alcohol	CONTROL	TOTAL
None	67 (65%)	121 (74%)	720 (90%)	908 (85%)
1	12 (12%)	18 (11%)	71 (9%)	101 (9%)
≥2	24 (23%)	25 (15%)	10 (1%)	59 (6%)
TOTAL	103	164	801	1068

χ^2 124.182, $p<.01$

*focal alcohol involvement is a BAC≥.05 gm/100ml %, if available, or a clinical evaluation of the same

TABLE 58

Licensing Status for Experimental Operators

With Focal Alcohol*/Without Focal Alcohol

and Potential Control Operators**

LICENSING STATUS	EXPERIMENTAL Focal Alcohol	EXPERIMENTAL No Focal Alcohol	POTENTIAL CONTROL	TOTAL
Valid	91 (91%)	155 (97%)	695 (82%)	941 (85%)
Learners Permit	0 (0%)	4 (2%)	106 (12%)	110 (10%)
Suspended/ Revoked	9 (9%)	1 (1%)	51 (6%)	61 (5%)
TOTAL	100	160	852**	1112
[none ***	3	4	NA	NA]
TOTAL	103	164	-	-

χ^2 for valid and learners / suspended and revoked, 30.191, $p<.01$

*focal alcohol involvement is a BAC $\geq$.05 gm/100ml %, if available, or a clinical evaluation of the same

**this total figure includes the 801 control operators with valid licenses or learners permits and the 51 other operators originally contacted as potential participants whose licenses were invalid thus eliminating them from the sample by design

*** comparable data between samples not available/not collected

TABLE 59

Marijuana Smoking Patterns for Experimental Operators

With Focal Alcohol*/Without Focal Alcohol and Control Operators

ANNUAL MARIJUANA SMOKING PATTERNS	EXPERIMENTAL Focal Alcohol	EXPERIMENTAL No Focal Alcohol	CONTROL	TOTAL
Abstainer/ never	39 (38%)	88 (54%)	480 (60%)	607 (57%)
Experimentor/ 1-2X	8 (8%)	11 (7%)	49 (6%)	68 (6%)
Light Smoker/ 3-8X	4 (4%)	6 (4%)	24 (3%)	34 (3%)
Moderate Smoker/ monthly	8 (8%)	12 (7%)	62 (8%)	82 (8%)
≤weekly	25 (24%)	17 (10%)	39 (5%)	81 (8%)
Heavy Smoker ≥ 2X weekly	19 (18%)	30 (18%)	147 (18%)	196 (18%)
TOTAL	103	164	801	1068

χ^2 32.627, $p<.01$

*focal alcohol involvement is a BAC ≥.05 gm/100ml %, if available, or a clinical evaluation of the same

TABLE 60

Annual Levels of Marijuana Smoking

for Experimental Marijuana Smokers With Focal Alcohol*/

Without Focal Alcohol and Control Smokers**

ANNUAL LEVEL OF MARIJUANA SMOKING	EXPERIMENTAL SMOKERS		CONTROL SMOKERS	TOTAL SMOKERS
	Focal Alcohol	No Focal Alcohol		
Light Smoker/ 3-8X	4 (7%)	6 (9%)	24 (9%)	34 (9%)
Moderate Smoker/ monthly to ≤weekly	33 (59%)	29 (45%)	101 (37%)	163 (41%)
Heavy Smoker ≥2X weekly	19 (34%)	30 (46%)	147 (54%)	196 (50%)
TOTAL	56	65	272	393

χ^2 9.670, $p<.05$

*focal alcohol involvement is a BAC ≥.05 gm/100ml%, if available or a clinical evaluation of the same

** this table includes only operators who were also marijuana smokers. Abstainers and Experimentors were not included

TABLE 61

Street or Entertainment Drug Familiarity or Use

for Experimental Operators With Focal Alcohol*/

Without Focal Alcohol and Control Operators

DRUG FAMILIARITY OR USE	EXPERIMENTAL		CONTROL	TOTAL
	Focal Alcohol	No Focal Alcohol		
None	57 (55%)	115 (70%)	624 (78%)	796 (75%)
Some	46 (45%)	49 (30%)	177 (22%)	272 (25%)
TOTAL	103	164	801	1068

χ^2 27.054, $p<.01$

*focal alcohol involvement is a BAC $\geq$.05 gm/100ml %, if available or a clinical evaluation of the same

TABLE 62 (PART 1)

Summary Table for Discriminant Function Analysis Using
Experimental Operators by Accident Type (I,II,III)

STEP NUMBER	VARIABLE ENTERED	F TO ENTER	SIG. OF WILKES' LAMBDA	SIG. OF CHANGE IN RAO'S V	TYPE I MEAN	TYPE II MEAN	TYPE III MEAN
1	Age	8.36575	.001	.001	34.2718	25.2698	32.7723
2	Number of friends	8.39586	.001	.001	2.7087	2.0952	2.2277
3	Physical health	5.62682	.001	.002	2.5825	2.7619	2.8416
4	Education	4.04155	.001	.009	3.7282	4.1746	4.0099
5	Problem drinker evaluation	2.67486	.001	.039	0.4757	0.4127	0.3069
6	Suicide attempt	3.05349	.001	.018	0.1165	0.2222	0.0792
7	Pressures to drink more	2.27306	.001	.073	0.0583	0.1587	0.0693
8	Street or entertainment drugs	1.99857	.001	.076	0.3010	0.5556	0.2871
9	Alcohol related job loss	2.85520	.001	.032	0.1456	0.2381	0.0891

TABLE 62 (PART 2)

STANDARDIZED DISCRIMINANT FUNCTION COEFFICIENTS

	FUNCTION 1	FUNCTION 2
Age	-0.16930	0.07063
Number of friends	-0.33525	0.05426
Physical health	0.25556	0.06073
Education	0.31524	0.08717
Problem drinker evaluation	-0.08186	0.20521
Suicide attempt	0.26974	0.00644
Pressures to drink more	0.09938	-0.11679
Street or entertainment drugs	0.38956	0.06162
Alcohol related job loss	0.09309	-0.12095

CENTROIDS OF GROUPS

	FUNCTION 1	FUNCTION 2
TYPE I	-0.40361	-0.01039
TYPE II	0.27827	-0.27094
TYPE III	0.23804	0.17961

TABLE 62 A

Prediction Results in 3 Way Discriminant Function Analysis Using Experimental Operator Types with Controls as Unclassified Cases

ACTUAL GROUP MEMBERSHIP	Number of Operators	PREDICTED GROUP MEMBERSHIP Group 1	Group 2	Group 3
GROUP 1 (Experimental Type I)	103	56 54.4%	21 20.4%	26 25.2%
GROUP 2 (Experimental Type II)	63	10 15.9%	39 61.9%	14 22.2%
GROUP 3 (Experimental Type III)	101	23 22.8%	17 16.8%	61 60.4%
UNCLASSIFIED CASES (Controls) Not included in analysis	801	130 16.2%	303 37.8%	368 45.9%

PERCENT OF GROUPED CASES CORRECTLY CLASSIFIED: 58.43%

TABLE 63

Summary Table for Discriminant Function Analysis Using Experimental Operators Involved in Non-Alcohol Related Accidents and the Experimental Operators Involved in Alcohol Related Accidents*

STEP NUMBER	VARIABLE ENTERED	F TO ENTER	SIG. OF WILKES' LAMBDA	SIG. OF CHANGE IN RAO'S V	NON-ALCOHOL MEAN	ALCOHOL MEAN
1	Alcohol use pattern	63.82567	.001	.001	1.4756	2.6408
2	Number of siblings	4.96623	.001	.013	3.5305	3.0971
3	Frequency drunkenness	5.56646	.001	.008	1.4695	2.8155
4	Psychological history	3.15201	.001	.042	0.2195	0.3010
5	DWI arrests	3.53313	.001	.030	0.0183	0.0874
6	Occupation	2.01383	.001	.099	4.3171	4.7282
7	Education	2.38000	.001	.071	3.9268	3.9612

STANDARD DISCRIMINANT FUNCTION COEFFICIENTS

	FUNCTION 1
Alcohol use pattern	0.43350
Number of siblings	-0.19666
Frequency drunkenness	0.29288
Psychological history	-0.17308
DWI arrests	0.16649
Occupation	0.18746
Education	-0.15893

CENTROIDS OF GROUPS

	FUNCTION 1
Non-alcohol	-0.30538
Alcohol	0.48337

* An alcohol related accident was one where the focal operator had a Blood Alcohol Concentration ≥.05 gm/100 ml % or a clinical evaluation of the same.

TABLE 63 A

Prediction Results in 2 Way Discriminant Function Analysis Using the Experimental Operators Involved in Non-Alcohol Related Accidents and the Experimental Operators Involved in Alcohol Related Accidents* With Controls as Unclassified Cases

ACTUAL GROUP MEMBERSHIP	Number of Operators	PREDICTED GROUP MEMBERSHIP GROUP 1	GROUP 2
GROUP 1 (Non-Alcohol Accidents)	164	129 78.7%	35 21.3%
GROUP 2 (Alcohol Accidents)*	103	34 33.0%	69 67.0%
UNCLASSIFIED CASES (Controls) Not included in analysis	801	641 80.0%	160 20.0%

PERCENT OF GROUPED CASES CORRECTLY CLASSIFIED: 74.16%

* An alcohol related accident was one where the focal operator had a Blood Alcohol Concentration ≥.05 gm/100 ml % or a clinical evaluation of the same.

TABLE 64 (PART 1)

Summary Table for Discriminant Function Analysis Using
Total Experimental and Control Samples

STEP NUMBER	VARIABLE ENTERED	F TO ENTER	SIG. OF WILKES' LAMBDA	SIG. OF CHANGE IN RAO'S V	EXPERI-MENTAL MEAN	CONTROL MEAN
1	Number of friends	223.75101	.001	.001	2.3820	1.4370
2	≥2 speeding arrests	102.33536	.001	.001	0.1835	0.0150
3	Physical health	56.80069	.001	.001	2.7228	2.9251
4	Pressures to drink more	26.53419	.001	.001	0.0861	0.3084
5	Alcohol use pattern	24.91179	.001	.001	1.9251	1.8002
6	Frequency drunkenness	40.44232	.001	.001	1.9888	1.3583
7	Attempts to drink less	11.08580	.001	.001	0.1985	0.1760
8	Suicide attempt	8.81545	.001	.001	0.1273	0.0312
9	Alcohol related job loss	7.18303	.001	.001	0.1461	0.0375
10	Occupation	5.60077	.001	.002	4.4757	3.7278
11	Marijuana smoking pattern	5.44142	.001	.007	1.9176	1.3571
12	Irish heritage	4.32891	.001	.012	0.3708	0.2484

TABLE 64 (PART 2)

STANDARDIZED DISCRIMINANT FUNCTION COEFFICIENTS

	FUNCTION 1
Number of friends	0.24365
>2 speeding arrests	0.16392
Physical health	-0.10127
Pressures to drink more	-0.08889
Alcohol use pattern	-0.22617
Frequency drunkenness	0.16774
Attempts to drink less	-0.06282
Suicide attempt	0.05776
Alcohol related job loss	0.05003
Occupation	-0.08560
Marijuana smoking pattern	0.03914
Irish heritage	0.04318

CENTROIDS OF GROUPS

	FUNCTION 1
Experimental	0.50688
Control	-0.16896

TABLE 64 A

Prediction Results in 2 Way Discriminant Function Analysis Using the Total Experimental and Control Samples

ACTUAL GROUP MEMBERSHIP	Number of Operators	PREDICTED GROUP MEMBERSHIP GROUP 1	GROUP 2
GROUP 1 (Experimental Sample)	267	202 75.7%	65 24.3%
GROUP 2 (Control Sample)	801	104 13.0%	697 87.0%

PERCENT OF GROUPED CASES CORRECTLY CLASSIFIED: 84.18%

APPENDIX A

CASE # _____

HUMAN FACTOR INDEX
CONTROL SAMPLE DATA COLLECTION
BUTAR, 1975

Letter sent _____
P & R rec'd _____
HFI completed _____
HFI checked _____
HFI computerized _____
By _____
Supplement _____

01. Sex:

___1 Female
___2 Male

02. Age: ___ ___

03. Categorized age:

___1 ≤19
___2 20-29
___3 30-39
___4 40-49
___5 50-59
___6 60-69
___7 70-79

04. Race:

___1 Caucasian
___2 Latin American
___3 Negroid
___4 Oriental
___5 Other: _____

05. Dominant ethnic background:

_____

___1 Anglo
___2 Irish
___3 Northern European
___4 Southern European
___5 Latin American
___6 African
___7 Near/Far Eastern
___8 Other: _____

06. Current marital status:

___1 Single
___2 Married
___3 Common law/Homosexual
___4 Widowed
___5 Divorced
___6 Separated
___7 Other: _____

07. How many times married:

___1 Single, never married
___2 Married, 1st marriage
___3 Married, 2nd marriage
___4 Married, 3rd marriage
___5 S D W from 1st marriage
___6 S D W from 2nd marriage
___7 Other: _____

08. Number of children: ___ ___

09. Highest level of education:

___1 Graduate, professional training
___2 College, university graduate
___3 Partial college training
___4 High school graduate
___5 Partial high school training
___6 Junior high school
___7 ≤7 years education

10. Student status:

___0 None
___1 Yes, part time
___2 Full time

11. Occupational attainment: (R11) _____

___1 Higher executive, etc.
___2 Business managers, etc.
___3 Administrators, etc.
___4 Clerical, sales, etc.
___5 Skilled manual employees
___6 Machine operators, semiskilled
___7 Unskilled, welfare, chronic unemployed

12. Number of job changes in past five years: ___ ___

13. Two Factor Index of Social Position

Education × 7
Occupation × 4

___1 Class I (11-17)
___2 Class II (18-27)
___3 Class III (28-43)
___4 Class IV (44-60)
___5 Class V (61-77)

14. Number of siblings: ___ ___

15. Number of people living in present household (excluding interviewee):

___ ___

16. General physical health:

___1 Poor
___2 Fair
___3 Good/excellent

17. General practice re: medical advice (ever neglected MD advice or prescription directions)(R8):

___0 No
___1 Yes:_____

18. Cigarette smoking: (R6)

___0 None
___1 Some: ___(2 ppd ___)___

19. Chronic physical illness (heart, asthma, epilepsy, etc.)

___0 None
___1 Yes: _____

20. Correctional lenses for driving:

___0 No
___1 Yes

21. Leisure time usually spent: (R3)

___1 Alone
___2 With family
___3 With friends
___4 Other: _____

22. Number of close friends:

___0 None
___1 1-5
___2 6-10
___3 11-20
___4 21

23. Well-liked by peers:

___0 No
___1 Generally liked
___2 Always liked

24. More high strung or sensitive than most people

___0 No
___1 Yes

25. Received psychiatric treatment: _____

___0 None
___1 Outpatient only
___2 Inpatient only
___3 Both

26. Reported suicide attempts: (R4)

___0 None
___1 Some: _____
_____

ALCOHOL:

27. Preferred alcoholic beverage:

___0 None, abstainer
___1 Wine
___2 Beer
___3 Whisky, scotch
___4 Other:_____
___5 Vodka
___6 No specific preference

28. Frequency of alcohol use:

___0 Never, very rarely
___1 1x per month or less
___2 Weekly
___3 Daily

29. Frequency of alcohol influence (Dk):

___0 Never
___1 1-2x per year
___2 3-8x per year
___3 Monthly
___4 Weekly
___5 >1x per week

30. Parental alcohol problems:

___0 Neither
___1 Mother
___2 Father
___3 Both

31. Any guilt regarding alcohol use:

___0 No
___1 Yes

32. Any social problems over alcohol use:

___0 No
___1 Yes

33. Any personal attempt to drink less:

___0 No
___1 Yes

34. Others encouraging to drink less:

___0 No
___1 Yes

35. Others encouraging to drink more:

___0 No
___1 Yes

36. Alcohol related job loss:

___0 No
___1 Yes

37. General alcohol use pattern:

___0 Abstainer
___1 Light social drinker never drunken
___2 Moderate social drinker seldom drunken
___3 Heavy social drinker frequently drunken
___4 Sporadic, excessive binge drinker
___5 Alcohol abuser (alcoholic)

38. (Problem drinker:)(R7)

___0 No
___1 Yes

39. Boston Alcohol Safety Action Project:

___0 Never heard of, no contact
___1 Television, radio, newspaper
___2 ASAP contact

40. Marijuana smoking pattern: (R10)

___0 Never
___1 1-2x per year
___2 3-8x per year
___3 Monthly
___4 Weekly (__ weekend)
___5 >Weekly

41. Street/Entertainment drug use:

___0 No, no answer
___1 Yes

42. Street/Entertainment drugs used:

___a Hallucinogens (LSD, mescaline, psylicibin, peyote)
___b Amphetamines (speed, etc.)
___c Downs (barbiturates, sopers, quaaludes, etc.)
___d Inhalants (amyl nitrate)
___e Other street drugs: _____ (heroin, cocaine, etc.)

43. Ever cited/arrested for anything:

___0 No
___1 Yes

44. Number of years with a license to operate a motor vehicle:

___ ___

45. License ever suspended/ revoked:

___0 No
___1 Yes: ___x

46. Ever arrested for DUIL:

___0 No
___1 Yes

47. Have you ever been the driver of a car through which there was an accident where someone was injured and required hospital care?

___0 No
___1 Yes: _____

_____

48. Formal driver's education:

___0 No
___1 Yes

49. Do you own a car or regularly drive one automobile:

___0 No
___1 Yes

50. Normal use of seat belts/ restraints: (R2)

___0 No
___1 Yes

51. Which of the following items would you consider to be high risk items for you personally, when driving a car?

___a Driving to let off steam
___b Driving after drinking a little
___c Driving after drinking too much
___d Driving after smoking marijuana
___e Driving after using other drugs
___f Driving in bad weather
___g Driving early in the evening
___h Driving late at night
___i Driving alone
___j Driving in heavy traffic
___k Driving after a serious argument
___l Driving when late for an appointment
___m Driving when tired or fatigued
___n Driving on an unfamiliar road
___o Driving an unfamiliar car/vehicle

52. Risk Taking Behavior Scale:

___1 ≥2 citations for speeding or driving to endanger
___2 Normal non-use of seat belts
___3 Auto/motorcycle racing; scuba diving; mountain climbing, etc.
___4 ≥1 suicide attempts
___5 Abusing advice of LMD or hospital
___6 Smoking ≥40 cigarettes daily
___7 Problem drinker history
___8 Abusing pharmaceuticals
___9 Using street drugs
___10 Marijuana use (≥3x)
___11 Employment hazardry

53. Rater evaluation:

___0 Totally unreliable
___1 Apparently reliable
___2 Very reliable

54. Human Factor Associate:

___1 Graham
___2 Selfridge
___3 Sterling
___4 Wallace
___5 Yellin

APPENDIX B

CASE # _____

MARIJUANA SUPPLEMENT

01. Number of years smoking marijuana:

___1 <1 yr
___2 1-2 yrs
___3 3-4 yrs
___4 5-6 yrs
___5 7-8 yrs
___6 9-10 yrs
___7 11-12 yrs
___8 >13 yrs

02. Frequency of marijuana use:

___1 Less than monthly
___2 Monthly
___3 Once a week
___4 Several times a week
___5 Daily
___6 More than once a day

03. Time of week:

___1 Weekends only
___2 Weekdays only
___3 Weekends and weekdays
___4 No preference

04. Preferred intoxicant:

___1 Marijuana
___2 Alcohol

05. Marijuana source:

___1 Purchase own
___2 Smoke others

06. Price per ounce:

___1 <$15
___2 $16-20
___3 $21-25
___4 $26-30
___5 $31-35
___6 $36-40
___7 $41

07. Main reasons for using marijuana:

___a. To relax or reduce tension
___b. To make myself more sociable
___c. To help get away from pressures of life or business
___d. Because many of my friends are smokers
___e. To improve my appetite for food or to help food to taste better
___f. Because it is socially expected of me
___g. Other:_____

08. Amount of marijuana necessary to "get stoned":

___1 <1 joint
___2 1 joint
___3 2-3 joints
___4 >4 joints

09. Pressures to smoke MORE:

___0 No
___1 Yes

10. Pressures to smoke LESS:

___0 No
___1 Yes

11. Past year smoking pattern:

___1 Less frequently
___2 About the same
___3 More frequently

12. Fear of legal apprehension:

___0 None
___1 Some of the time
___2 Always

13. Time of day most frequently "stoned":

___1 6 AM to noon
___2 Noon to 6 PM
___3 6 PM to midnight
___4 Midnight to 6 AM

14. Length of marijuana "high":

___1 <1 hr
___2 1-2 hrs
___3 2-3 hrs
___4 3-4 hrs
___5 4-5 hrs
___6 5-6 hrs
___7 >6 hrs

15. Marijuana smoking effects on driving:

___1 Drive less well
___2 Drive about the same
___3 Drive better

16. Combined marijuana and alcohol use:

___0 Never
___1 Upon occasion
___2 Frequently
___3 Always

17. When driving a car after smoking which items considered "most risky":

___a. Driving to let off steam ...
___b. Driving after drinking a little
___c. Driving after drinking too much
___d. Driving after using other drugs
___e. Driving in bad weather
___f. Driving early in the evening
___g. Driving late at night
___h. Driving alone
___i. Driving in heavy traffic
___j. Driving after a serious argument
___k. Driving when late for an appointment
___l. Driving when tired or fatigued
___m. Driving on an unfamiliar road
___n. Driving an unfamiliar car/vehicle

18. After smoking generally:

___1 Slightly stoned
___2 Somewhat/moderately stoned
___3 Very stoned

After you have been smoking marijuana do you generally find that it is easier or more difficult for you:

19. To make sudden decisions:

___1 Easier
___2 The same
___3 More difficult

20. To remember things:

___1 Easier
___2 The same
___3 More difficult

21. To think creatively:

___1 Easier
___2 The same
___3 More difficult

22. To see as clearly:

___1 Easier
___2 The same
___3 More difficult

23. To hear as well:

___1 Easier
___2 The same
___3 More difficult

24. To be distracted:

___1 Easier
___2 The same
___3 More difficult

25. To make sudden physical movements:

___1 Easier
___2 The same
___3 More difficult

26. To become angry, hostile or aggressive:

___1 Easier
___2 The same
___3 More difficult

27. To make foolish or impulsive decisions:

___1 Easier
___2 The same
___3 More difficult

28. To concentrate on a job or a project:

___1 Easier
___2 The same
___3 More difficult

29. To be concerned about how people see you socially:

___1 Easier
___2 The same
___3 More difficult

APPENDIX C

BOSTON UNIVERSITY
CENTER FOR LAW AND HEALTH SCIENCES
TRAFFIC ACCIDENT RESEARCH
141 Bay State Road, Boston, Massachusetts 02215. (617) 353-3020

Michael A. Luongo, M.D., Director
George G. Katsas, M.D., Co-director

TYPE I LETTER

17 December 1974

Mrs. John Doe
51 California Street
Arlington, Massachusetts 02174

Dear Mrs. Doe:

Each year the National Highway Traffic Safety Administration, under the sponsorhip of the U.S. Department of Transportation in Washington, D.C., conducts a confidential in-depth survey into every fatally involved motor vehicle accident in the greater Boston area. The goal of this research is not to determine the degree of guilt or innocence on the part of any of the individuals involved but rather to collect information, mostly of a historical nature, pertaining to the operators of accident-related motor vehicles, and through this to assist in the nationwide effort for increased highway safety.

It is with this goal in mind that the Boston University Traffic Accident Research Project has been considering the recent motor vehicle accident involving the late John Doe. All of the collected information that we have secured on this case will be completely sanitized before the final reports are forwarded to the Washington office of Highway Safety. "Sanitized" means that all of the identifying features such as names, addresses, etc. will have been deleted prior to finalization. In brief, this is a completely confidential Ralph Naderish-type research effort.

During the next few days, one of the research psychologists from the Boston Team will be in touch with you to collect some additional information. May I once again stree to you the confidential nature of this important research and encourage your cooperative participation.

In the event that you have any questions which you find to be unanswered by our researcher, please feel free to call me at (617) 262-4256.

In the interest of highway safety,

Robert S. Sterling-Smith, Ph.D.
Research Director

RSSS:nwc

BOSTON UNIVERSITY
CENTER FOR LAW AND HEALTH SCIENCES
TRAFFIC ACCIDENT RESEARCH
141 Bay State Road, Boston, Massachusetts 02215. (617) 353-3020

Michael A. Luongo, M.D., Director
George G. Katsas, M.D., Co-director

TYPE II LETTER

2 December 1974

Mr. John Doe
35 Main Street
Lexington, Massachusetts 02173

Dear Mr. Doe:

Each year the National Highway Traffic Safety Administration, under the sponsorship of the U.S. Department of Transportation in Washington, D.C., conducts a confidential in-depth survey into every fatally involved motor vehicle accident in the greater Boston area. The goal of this research is not to determine the degree of guilt or innocence on the part of any of the individuals involved but rather to collect information, mostly of a historical nature, pertaining to the operators of accident-related motor vehicles, and through this to assist in the nationwide effort for increased highway safety.

It is with this goal in mind that the Boston University Traffic Accident Research Project has been considering your recent motor vehicle accident. All of the collected information that we have secured on this case will be completely sanitized before the final reports are forwarded to the Washington office of Highway Safety. "Sanitized" means that all of the identifying features such as names, addresses, etc. will have been deleted prior to finalization. In brief, this is a completely confidential Ralph Naderish-type research effort.

During the next few days, one of the research psychologists from the Boston Team will be in touch with you to collect some additional information. May I once again stress to you the confidential nature of this important research and encourage your cooperative participation.

In the event that you have any questions which you find to be unanswered by our researcher, please feel free to call me at (617) 262-4256.

In the interest of highway safety,

Robert S. Sterling-Smith, Ph.D.
Research Director

RSSS:nwc

BOSTON UNIVERSITY
CENTER FOR LAW AND HEALTH SCIENCES
TRAFFIC ACCIDENT RESEARCH
141 Bay State Road, Boston, Massachusetts 02215. (617) 353-3020

Michael A. Luongo, M.D., Director
George G. Katsas, M.D., Co-director

TYPE III LETTER

4 February 1974

Mr. John Doe
88 Center Avenue
Waltham, Massachusetts 02154

Dear Mr. Doe:

Each year the National Highway Traffic Safety Administration, under the sponsorhip of the U.S. Department of Transportation in Washington, D.C., conducts a confidential in-depth survey into every fatally involved motor vehicle accident in the greater Boston area. The goal of this research is not to determine the degree of guilt or innocence on the part of any of the individuals involved but rather to collect information, mostly of a historical nature, pertaining to the operators of accident-related motor vehicles, and through this to assist in the nationwide effort for increased highway safety.

It is with this goal in mind that the Boston University Traffic Accident Research Project has been considering your recent motor vehicle-pedestrian accident. All of the collected information that we have secured on this case will be completely sanitized before the final reports are forwarded to the Washington office of Highway Safety. "Sanitized" means that all of the identifying features such as names, addresses, etc. will have been deleted prior to finalization. In brief, this is a completely confidential Ralph Naderish-type research effort.

During the next few days, one of the research psychologists from the Boston Team will be in touch with you to collect some additional information. May I once again stress to you the confidential nature of this important research and encourage your cooperative participation.

In the event that you have any questions which you find to be unanswered by our researcher, please feel free to call me at (617) 262-4256.

In the interest of highway safety,

Robert S. Sterling-Smith, Ph.D.
Research Director

APPENDIX D

BOSTON UNIVERSITY
CENTER FOR LAW AND HEALTH SCIENCES
TRAFFIC ACCIDENT RESEARCH
141 Bay State Road, Boston, Massachusetts 02215. (617) 353-3020

Michael A. Luongo, M.D., Director
George G. Katsas, M.D., Co-director

LAWYER LETTER

7 February 1974

Attorney John J. Smith
One Central Square
Somerville, Massachusetts

Dear Mr. Smith:

Each year the National Highway Traffic Safety Administration, under the sponsorhip of the U.S. Department of Transportation in Washington, D.C., conducts a confidential in-depth survey into every fatally involved motor vehicle accident in the greater Boston area. The goal of this research is not to determine the degree of guilt or innocence on the part of any of the individuals involved but rather to collect information, mostly of a historical nature, pertaining to the operators of accident-related motor vehicles and through this to assist in the nationwide effort for increased highway safety.

It is with this goal in mind that the Boston University Traffic Accident Research Project, within the Boston University Law School, has been considering the recent motor vehicle accident involving one of your clients, Mr. John Doe. We have talked with Mr. Doe and he has advised us to contact you for your clearance before proceeding with a personal interview.

The information we would like to secure from your client is mostly of a historical nature, including demography, medical history and so forth, as well as some human factor information regarding feelings, attitudes and conjectured causalities during the moments prior to the crash. Our research is primarily human factor oriented. Our interview policy is that any individual of course has the right not to answer any of our questions inthe event that he so chooses. All material collected is immediately sanitized of all identifying features such as names, addresses, etc.

Because of the nature of this research and its projected impact on vehicular safety in this country, it is very important that we be able to obtain the essential data on each and every fatal accident that takes place within our geographical boundaries. With this in mind, we would like to have your clearance to see your client.

Should you have any further questions, please feel free to call me at (617) 262-4256. During the next few days, one of our researchers will contact your office for your advice.

May I once again stress the confidential nature of this important research and encourage your cooperative participation.

In the interest of highway safety,

Robert S. Sterling-Smith, Ph.D.
Research Director

RSSS:nwc

APPENDIX E

BOSTON UNIVERSITY
CENTER FOR LAW AND HEALTH SCIENCES
TRAFFIC ACCIDENT RESEARCH
141 Bay State Road, Boston, Massachusetts 02215. (617) 353-3020

Michael A. Luongo, M.D., Director
George G. Katsas, M.D., Co-director

CONTROL SAMPLE LETTER OF INTRODUCTION

For the past several years the National Highway Traffic Safety Administration has been conducting a confidential research study in the greater Boston area into many of the issues related to the reduction of traffic accidents and the general increase in automobile safety. This Ralph Naderish study has come up with some amazing result which tell us that the Boston area driver is very different from drivers in other parts of the country.

With this in mind the Boston University Traffic Accident Research Team has been asked to conduct a general survey, involving hundreds of people in the greater Boston area, so that we can get some good ideas about how the "average" person feels about certain things which are directly and indirectly related to traffic safety. Right now this survey is, in a very real way, dependent upon you. We need your help. Your name has been selected through a procedure known as random sampling from thousands of names made available to the team from updated telephone listings, public records, voting lists and other available documents. Within the next few days one of the members of the interviewing team listed at the bottom of this letter will be in touch with you to make arrangements for an interview. It certainly isn't necessary for us to tell you how very much we would appreciate your cooperation.

During the past years, and particularly for this survey, we have adopted a highly confidential approach to all of the information that we collect from people like you. This procedure is known as total sanitization. What this means in practice is that after our team member has talked with you and filled in the interview form, your name and address are destroyed so that there is no way your answers can be tied in with your name. This may seem to be very unnecessary to you but this procedure allows us to operate with complete ethical freedom in knowing that we have not been disrespectful of any person's individual privacy.

In the event you have any questions please feel free to call me on my direct telephone (247-1017) and either I or one of the team members will be happy to talk with you.

Thank you in advance for your cooperation. We sincerely appreciate your help.

In the interest of highway safety,

Robert S. Sterling-Smith, Ph.D.
Psychologist, Research Director

Team Members: David Graham, Arthur Wallace, Calvin Selfridge, Michael Yellin

P.S. If your telephone is either unlisted or listed under someone else's name would you give us a call at either 247-1017 or 353-3019 and let us know when would be the best time to contact you. Thanks.

APPENDIX F

PROBLEM DRINKER DATA GENERATION

The scheduled period of field investigation for the Boston team was well under way with more than half of its experimental population collected when the Office of Alcohol Countermeasures presented to the team the essential data items necessary for identifying the "problem drinker". Unfortunately, the team had not collected some of the necessary data in the same manner, had collected other data not essential to the problem drinker identification and had not collected other information. This being the case the team attempted to use the data available and make an identification that would be compatible with the OAC standards. This was approved by the OAC.

The Boston team scored an operator as a problem drinker if he received positive responses to four or more of the following data items:

a. _____ self identification as heavy social drinker, sporadic binge drinker or an alcohol abuser, or

_____ other informant identification as a heavy social drinker, sporadic binge drinker or an alcohol abuser

b. _____ a drinking pattern in the direction of several times weekly or daily

c. _____ a drunkenness pattern in the direction of weekly or several times a month

d. _____ personal attempts to drink less

e. _____ encouragement by others to drink less

f. _____ personal guilt regarding the use of alcohol

g. _____ five or more drinks before the focal accident

h. _____ a BAC ≥ .15 gm/100 ml % or a clinical evaluation of the same in the focal accident

i. _____ hospitalization for alcohol related problems within a year of the focal accident and a continuing drinking habit

j._____ a previous arrest or citation for driving under the influence of alcohol or for public drunkenness