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WASHTENAW COUNTY 1971, 1972 AND
1973 BAC ROADSIDE SURVEYS

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16. Abstract Three roadside surveys of drivers in Washtenaw County, Michigan were conducted in March of 1971, 1972 and 1973. The surveys were an integral part of the evaluation procedures for the Washtenaw County Alcohol Safety Action Program (WCASAP) and were designed to obtain representative samples of nighttime driving residents. Forty-eight time-location cells were defined throughout the county based on time of night, day of week, traffic volume and location. Drivers were sampled from 7-9PM, 10-12PM and from 1-3AM on each of four nights for four consecutive weeks. A short on-site interview was obtained from participating drivers as well as a breath specimen, used to determine blood alcohol concentration (BAC). Survey sample sizes included 748 drivers in 1971, 1023 in 1972 and 847 in 1973. The distributions of drivers are given by BAC and demographic variables, drinking episodes prior to the survey, and awareness of WCASAP activities. The major conclusion to be drawn from the three surveys is that the proportion of drivers with measurable BAC decreased each year. In 1971, 19% of the drivers had positive BAC, decreasing to 15% in 1973. Over the same time period, the proportion of drivers with BAC of .05 or higher decreased from 10% to 8%. These findings are in accord with program objectives.			
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The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of Washtenaw County.

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1. INTRODUCTION AND SUMMARY OF RESULTS

The ultimate objective of the Washtenaw County Alcohol Safety Action Program (WCASAP) is a reduction in the number of alcohol-related crashes. The WCASAP program is predicated on the assumption that a decrease in the number of persons who drink prior to driving, or a decrease in the amount consumed prior to drinking, will favorably affect this long range goal. In addition, other intermediate goals, such as improvement in knowledge and attitudes related to drinking and driving, are considered important in affecting the program objective.

Three roadside surveys were conducted by the Highway Safety Research Institute (HSRI) in order to measure the nature and extent of alcohol usage in the nighttime driving population. A secondary objective of the surveys was to measure driver's awareness of program activities and media messages related to drinking and driving. Roadside surveys have been used by NHTSA's Office of Alcohol Countermeasures and a number of ASAP evaluators, including HSRI, as one means of measuring the achievement of these objectives.

The three HSRI roadside surveys were conducted using generally the same procedures in March of 1971, 1972, and 1973. Each survey took place over a period of four weeks on 16 different nights--eight on weekdays and eight on weekends, at three different geographic locations per night. The survey shifts included early evening (7-9PM), late evening (10-12PM), and early morning (1-3AM).

Drivers were stopped by law enforcement officers after having been randomly selected from the driving stream by a member of the survey team. If the driver was a Washtenaw County resident, he was asked to take an alcohol breath test and answer a few questions. Driver cooperation was comparable over the three years with a participation rate of 87.3% in 1971 (N=748), 90.4% in 1972 (N=1023), and 87.4% in 1973 (N=847).

The major conclusion to be drawn from the three surveys, and one which is in accord with program goals is that the proportion of drivers with measurable blood alcohol concentrations ($BAC \geq .02$) decreased each year. Drinking drivers comprised 19% of the sample in 1971, 17% in 1972, and 15% in 1973. The reduction in the proportion of drinking drivers between 1971 and 1973 is statistically significant.

The reduction in drinking was a result of a decrease in the proportion of total drinking drivers as well as a decrease in the proportion of drivers within the high BAC categories. Survey findings indicate that the proportion of drivers with $BAC \geq .05$ decreased from 10% in 1971 to 8% in 1973. A decrease also took place in the proportion of drivers with $BAC \geq .15$ (1% in 1971 and 0.5% in 1973).

The inclusion of estimated BAC for persons refusing to participate, with the BAC distributions of participants, support the conclusion that a reduction in drinking has occurred.

The highest proportion of drinking drivers occurred during the 1-3AM time period. This variable was the one consistent predictor of drinking drivers in the experimental design. No significant differences in the proportion of drinking drivers occurred between weekend and weekday nights.

Although the late hour time period had the highest proportion of drinking drivers, due to a decrease in traffic volume during these hours, the expected frequency of drivers with $BAC \geq .05$ would be roughly equivalent for the three time periods sampled.

Survey data indicate that the yearly decrease in drinking was actually due to a decrease in drinking among drivers aged 21 years or older. In 1972, Michigan's age of majority, including the right to drink legally was lowered from 21 to 18 years. Between 1971 and 1973, a statistically significant increase in drinking occurred among 18 to 20 year olds which was perhaps related to the change in the law. No clear trends in drinking were evident among 16 and 17 year olds during the same time period.

In terms of other demographic variables, a decrease in the proportion of drinking drivers occurred most notably among blacks, divorced drivers, and persons with at least one year of college education.

The proportion of drivers who reported themselves to be abstainers (16%) did not change over the three years, nor did the proportion of drivers who admitted drinking on the day of the interview. However, of those who admitted to drinking, the proportion with measurable BAC decreased (50% in 1971 and 43% in 1973) and the proportion who were drinking at more than one location decreased (66% in 1971 and 18% in 1973). These findings suggest that although drinking habits per se have not changed, there has been a notable decrease in the amount of driving after drinking.

With respect to knowledge of WCASAP activities, an increase was noted in the proportion of drivers who had heard of the roadside survey, who had heard of the program to reduce alcohol-related accidents, and who were aware of more police on the alert for drunk drivers. Awareness of drinking driving media messages decreased slightly. Persons with BAC $\geq .10$ were generally as aware or slightly more aware of program activities than were abstainers or persons who were not drinking on the day of the survey.

2. EXPERIMENTAL DESIGN AND OPERATIONAL PROCEDURES

As noted in the Introduction, the three surveys were conducted in generally the same manner each year. A full description of the survey procedures and experimental design used each year appears in the report on the 1971 Roadside Survey.¹ This section summarizes the earlier documentation, noting any minor deviations from earlier procedures.

The experimental design model used for the surveys had as its objective the representation of nighttime driving trips occurring in Washtenaw County by residents. The surveys took place between March 13 and April 7, 1971, March 14 to 25 and April 4 to 15, 1972,* and March 9 to April 3, 1973. Driving trips were not sampled from expressways nor on roads with "low" traffic volume (less than 3000 vehicles/day). The experimental design variables stratified the target population by time of night (7-9PM, 10-12PM and 1-3AM), weekday versus weekend, urban versus rural areas, and traffic volume (medium=3000-9000 vehicles/day, and high=above 9000 vehicles/day). The resulting 3x2x2x2 experimental design model was run as a full factorial requiring 24 cells. Each cell was sampled twice, resulting in 48 sites which remained the same each year. The desired sample size at each site was 20 respondents. Due to blizzard weather conditions and generator failure, one site was not sampled in both 1971 and 1972, and three sites were not sampled in 1973.

Operational procedures were prepared for interviewer/
Breathalyzer** operators and police officers. Critical

*The 1972 survey was not conducted during the Easter weekend which was also spring holiday at The University of Michigan.

**BAC data were obtained using a Breathalyzer Instrument (Model #900) manufactured by the Stephenson Corp. This is the same equipment used by many police departments.

guidelines included confidentiality of respondents' BAC readings and responses, a non-arrest policy once a driver agreed to participate in the survey, and the offer of a ride home if a driver was found to have a BAC in excess of presumed legal limits.

The procedure at the survey site was for an interviewer to count to ten, and signal a police officer stationed downstream in the traffic flow to direct the next vehicle to the survey site. If a driver was a Washtenaw County resident (non-residents were waved on), the purpose of the survey was explained, and the driver was asked to enter the survey van to take a breath test and answer some questions. One survey team member gave the breath test and analyzed results while the second team member conducted the interview. The interview, lasting about 3-4 minutes, varied only slightly each year (see Appendix A for copies of the interview protocols). At the end of the interview, the driver was given the results of his BAC test. He was encouraged to permit a team member to drive him home if his BAC exceeded the presumed limits for Impaired Driving. (A BAC of .10 was presumed Impaired in 1971 and 1972. Due to a change in the statute, this dropped to .08 in 1973.) Car license plate numbers were recorded in the event of legal proceedings against the University for drivers who refused the offer of the ride.

In each year, appropriate liaison activities were continued with police departments, city and University attorneys and owners of land used for survey sites. News articles with photographs of the team members and the survey van were carried in local newspapers. Participant cooperation was also requested through radio stations.

3. ANALYSIS OF RESULTS

This section describes the various analyses performed on the roadside survey data. Section 3.1 compares BAC with variables used in the experimental design; Section 3.2 discusses the location of drinking drivers; Section 3.3 describes the relationship of BAC to demographic variables and drinking patterns; and Section 3.4 reviews responses of drivers regarding knowledge about the WCASAP program. An analysis of drivers who refused to participate in the survey appears in Section 3.5.

The distribution of drivers by BAC and year of survey is shown in Table 1. Cumulative distributions by BAC and year are displayed in Figure 1. In the analyses, a positive BAC is construed to mean a BAC equal to or greater than .02. This was done in order to provide a conservative measure of drinking.

TABLE 1. DISTRIBUTION OF DRIVERS BY BAC AND YEAR

Year	BAC					Total*
	.00-.01	.02-.04	.05-.09	.10-.14	.15+	
1971	606 81%	64 9%	46 6%	22 3%	8 1%	746 100%
1972	844 83%	77 8%	55 5%	29 3%	15 1%	1020 100%
1973	721 85%	59 7%	43 5%	20 2%	4 0.5%	847 100%

*BAC was missing on two participants in 1971 and three participants in 1972. These cases have been excluded from the table.

The data in Table 1 indicate that in 1971, 81% of the drivers sampled did not have positive BAC readings. (BAC less than .02) Although this rose to 83% in 1972, the reduction in the proportion drinking was not statistically significant.* Data from the 1973 survey indicate that 85% of the drivers sampled did not have a positive BAC. A statistical

*95% level of confidence used throughout report unless stated otherwise.

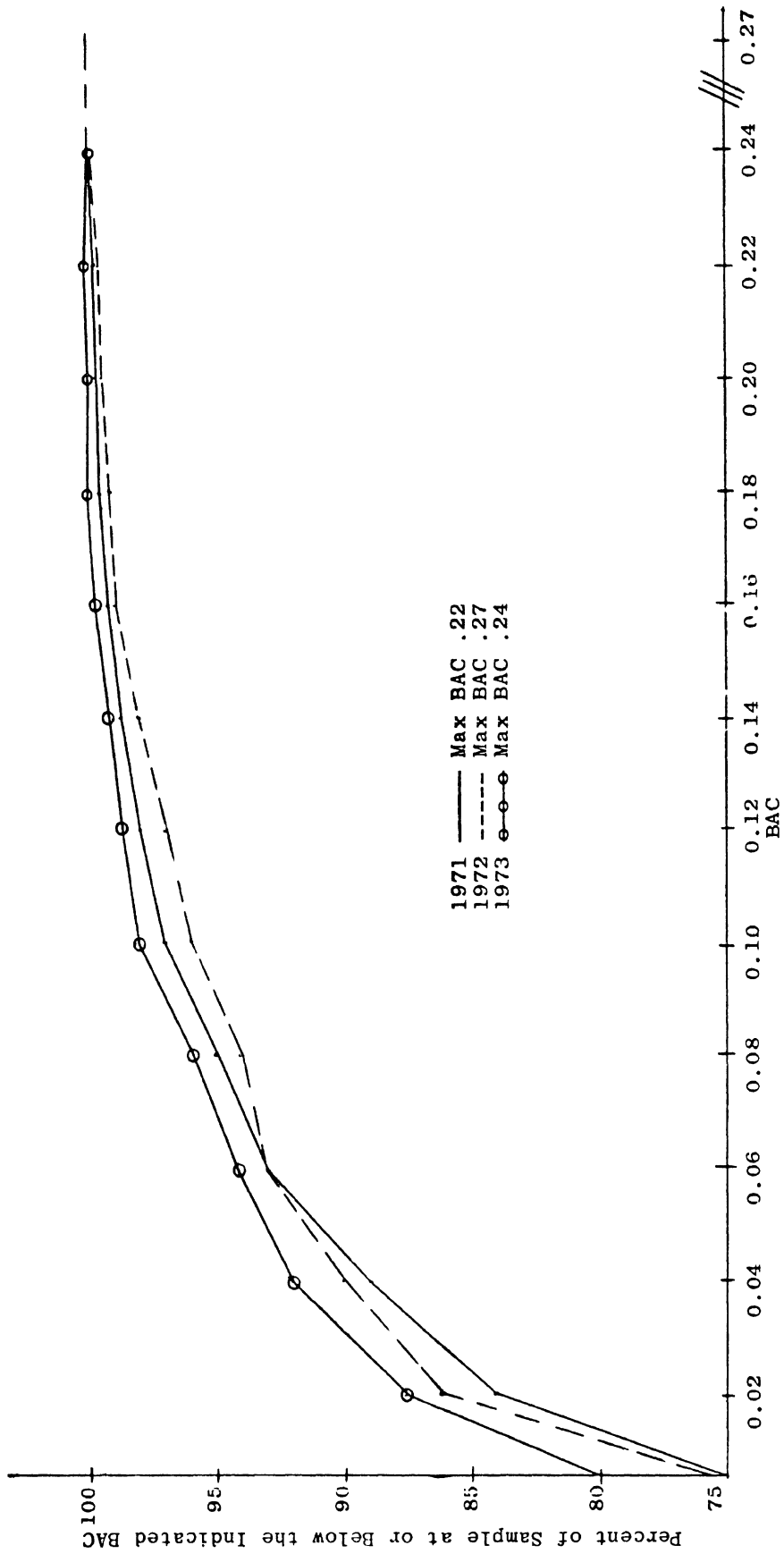


FIGURE 1. CUMULATIVE DISTRIBUTION OF DRIVERS BY BAC

significance test using the binomial approximation to the normal was performed using the distribution of the t statistic.² Since $t > 1.645$ the hypothesis that there was no decrease in the proportion of 1971 and 1973 drivers with $BAC \geq .02$ was rejected. Therefore it is concluded that there was a decrease in drinking between 1971 and 1973.

Comparing the distribution of drivers by BAC and year, the data indicate that there was a reduction in the proportion of drinkers within all BAC categories, including BAC of .15 and higher (1% of the sample in 1971 and 0.5% in 1973).

3.1 BAC AND EXPERIMENTAL DESIGN

The purpose of the following analyses was to determine, within the limits of the four circumstantially defined independent variables of the factorial design*, where and when nighttime drivers with high blood alcohol concentrations can be expected to be found on Washtenaw County roadways. An analysis of variance was performed at both 0.02 and greater BAC and 0.05 and greater BAC to study the effects of the design variables. Statistical significance tests were performed on all main and interactive effects. The dependent variables used were the proportions of drivers at each particular site who were at or above 0.02 BAC and at or above 0.05 BAC.** These variables were chosen in order to provide analyses of all drinking and of a BAC at which impairment is generally considered to begin. They were also used in the Mecklenburg County roadside survey which permits comparisons between the present three-year replication and that earlier study.³

*These analyses were based on data displayed in Appendices B-1, B-2 and B-3 in which the complete factorial design for the 1971, 1972 and 1973 surveys are provided.

**The use of proportion variables overcomes the difficulties of using the mean BACs per site which are less sensitive to the effects of independent variables. This insensitivity results from the fact that the distribution of individual BACs contains a large percentage of persons with zero BAC. Thus the means tend to be small and to be affected greatly by individual BACs, especially if the readings are large.

The use of variables which represent sites rather than individuals has the effect of weighting each site equally. This in turn results in certain discrepancies between percentages calculated for the total population of individuals and the population of sites. Complicating the interpretations of positive BAC percentages are the generally larger sample sizes in the 1972 survey. This problem was discussed by Carlson, et.al. in 1971 and the biases were demonstrated to be small in the statistical sense.⁴ Grand means of site percentages of positive BAC proportions should be interpreted only within the context of this discussion of the experimental design analysis.

The significance levels reported for the analysis of variance are approximate because proportion variables do not completely satisfy the assumptions of the model. However, Edwards, 1960, has indicated that the F test is very insensitive to modest variance inequities and nonnormality and remains a robust test under a variety of violations of the assumptions on which it is mathematically based.⁵

Appendix Tables B4-B15 present the results of the analyses of variance applied to the experimental design model for the three year replication. Tables B4-B7 refer to the 1971 survey, Tables B8-B11 refer to the 1972 survey and the analyses of the 1973 survey are found in Table B12-B15. In 1971, at both the 0.02 and 0.05 BAC levels, significant effects resulted from traffic volume, time of night and the interaction between these two factors. In addition it should be noted that the average percent of drivers (computed by site proportion) operating at or above 0.02 BAC was 19.8% while 10.9% was the average percent of drivers operating at or above the 0.05 level.

In 1972, in the 0.02 case a significant effect resulted from time of night only, while in the 0.05 BAC analysis the time of night plus the interaction of urban versus rural -- weekday versus weekend was statistically significant. This suggests that for the higher BAC we can tell not only when drivers with elevated BACs were found in 1972 but we can also indicate where they were found; on weekend nights outside the

city limits of Ann Arbor or Ypsilanti. In 1972 the average percent of drivers operating at or above 0.02 BAC was 20.1% while 11.9% was the comparable figure for drivers at or above 0.05 BAC.

In the 1973 survey analysis for both the 0.02 and 0.05 levels, the only significant main effect was the time of night. Also at both BACs a significant three-way interaction was found between time of night (1-3AM), traffic volume (medium), and urban versus rural (rural) factors. In 1973, 15.7% of the drivers were operating at or above the 0.02 BAC level and 8.4% were operating at or above 0.05 BAC.

Significance tests were performed on post hoc comparisons between main effect means within each combination of levels of two independent variables. Time of night and traffic volume were selected for these analyses in order to study the consistency of results for the entire three year replication. These two factors interacted significantly in the published 1971 roadside survey report. For these analyses the Tukey method was selected. A complete description of the Tukey Studentized Range (Q) Statistic can be found in Winer, 1962.⁶ The results of these analyses are found in Tables B16-B27. The overwhelming conclusion of these analyses is that time of night is the most consistently significant variable in the experimental design analysis. In other words, level 3 of the time of night factor (1-3AM) predicts most consistently when a high proportion of operating drivers in Washtenaw County will have BACs at or above either the 0.02 or 0.05 level. Traffic volume does not consistently predict where high BAC drivers will be found in that the significance of time of night is true for both levels of the traffic volume factor.

3.2 LOCATION OF DRINKING DRIVERS

As noted in Section 3.1, an important question with regard to drinking drivers concerns when and where they are operating their vehicles. The answer has implications for police patrols designed to control the behavior of drinking drivers. Appearing in this section is a discussion of the BAC distributions

of drivers for several of the variables used in the experimental design.

Table 2 indicates the BAC distribution of drivers by year and the time the sample was taken. (Weekday includes Tuesday and Wednesday night, weekend includes Friday and Saturday night. Three time periods were sampled on both weekday and weekend nights.) The data indicate that the 1-3AM time period is characterized by a high proportion of drinking drivers, irrespective of the night of the week. These same data are displayed in Figure 2 for drivers with $BAC \geq .05$. Although the proportion of drivers with $BAC \geq .05$ shows a tendency to be higher on weekends than on weekdays, these differences are not statistically significant. The important difference is the increase in the proportion of drinkers related to the time of night. In 1973, on weekday nights the proportion of drivers with $BAC \geq .05$ went from 4.5% between 10 and 12PM, to 14.6% between 1-3AM. A similar increase occurs on weekend nights (5.3% between 10-12PM and 19.0% between 1-3AM).

Although the proportion of drinking drivers greatly increases with the lateness of the hour, this does not suggest that police should limit their patrols only to late hours. The volume of traffic decreases dramatically between 7PM and 3AM (see Table 3 for actual traffic frequencies at sites sampled between 7-9PM, 10-12PM and 1-3AM). Given the proportion of drivers with high BAC during these time periods, and the actual traffic volume, the data in the table indicate that the expected frequency of high BAC drivers would be roughly equivalent during the three time periods.

Although 1971 data indicated a higher proportion of drinking drivers on rural roads as compared to urban roads, these differences disappeared in 1972 and 1973 data. This may be related to the increasing urbanization of the county and is not known to be attributable to any ASAP activities.

TABLE 2. DISTRIBUTION OF DRIVERS BY BAC, WEEKDAY OR WEEKEND, AND TIME OF NIGHT

	BAC								Total
	.00-.01		.02-.04		.05-.09		.10+		
1971									
Weekday									
7-9PM	112	89%	8	6%	2	2%	4	3%	126
10-12PM	111	84%	11	8%	6	5%	4	3%	132
1-3AM	77	75%	11	11%	6	6%	8	8%	102
Weekend									
7-9PM	114	89%	7	5%	5	4%	2	2%	128
10-12PM	114	81%	12	9%	10	7%	4	3%	140
1-3AM	78	66%	15	13%	17	14%	8	7%	118
1972									
Weekday									
7-9PM	156	92%	5	3%	7	4%	2	1%	170
10-12PM	157	87%	13	7%	8	4%	2	1%	180
1-3AM	92	69%	13	10%	12	9%	16	12%	133
Weekend									
7-9PM	169	91%	9	5%	5	3%	3	1%	186
10-12PM	195	89%	14	6%	8	4%	2	1%	219
1-3AM	75	57%	23	17%	15	11%	19	14%	132
1973									
Weekday									
7-9PM	146	94%	4	3%	5	3%	1	1%	156
10-12PM	139	89%	10	6%	5	3%	2	1%	156
1-3AM	102	75%	15	11%	12	9%	8	5%	137
Weekend									
7-9PM	130	93%	7	5%	3	2%	0	-	140
10-12PM	121	92%	4	3%	5	4%	2	1%	132
1-3AM	83	66%	19	15%	13	10%	11	9%	126

TABLE 3. EXPECTED FREQUENCY OF DRIVERS WITH BAC \geq .05 BY TIME OF NIGHT

Year	Time	Site Traffic Volume	% of Survey Participants with BAC \geq .05	Expected Frequency of Drivers with BAC \geq .05
1971	7-9PM	9052	5%	453
	10-12PM	6521	9%	587
	1-3AM	1959	18%	353
1972	7-9PM	8197	5%	410
	10-12PM	6814	5%	341
	1-3AM	1975	23%	454
1973	7-9PM	9040	3%	271
	10-12PM	6512	5%	326
	1-3AM	1713	17%	291

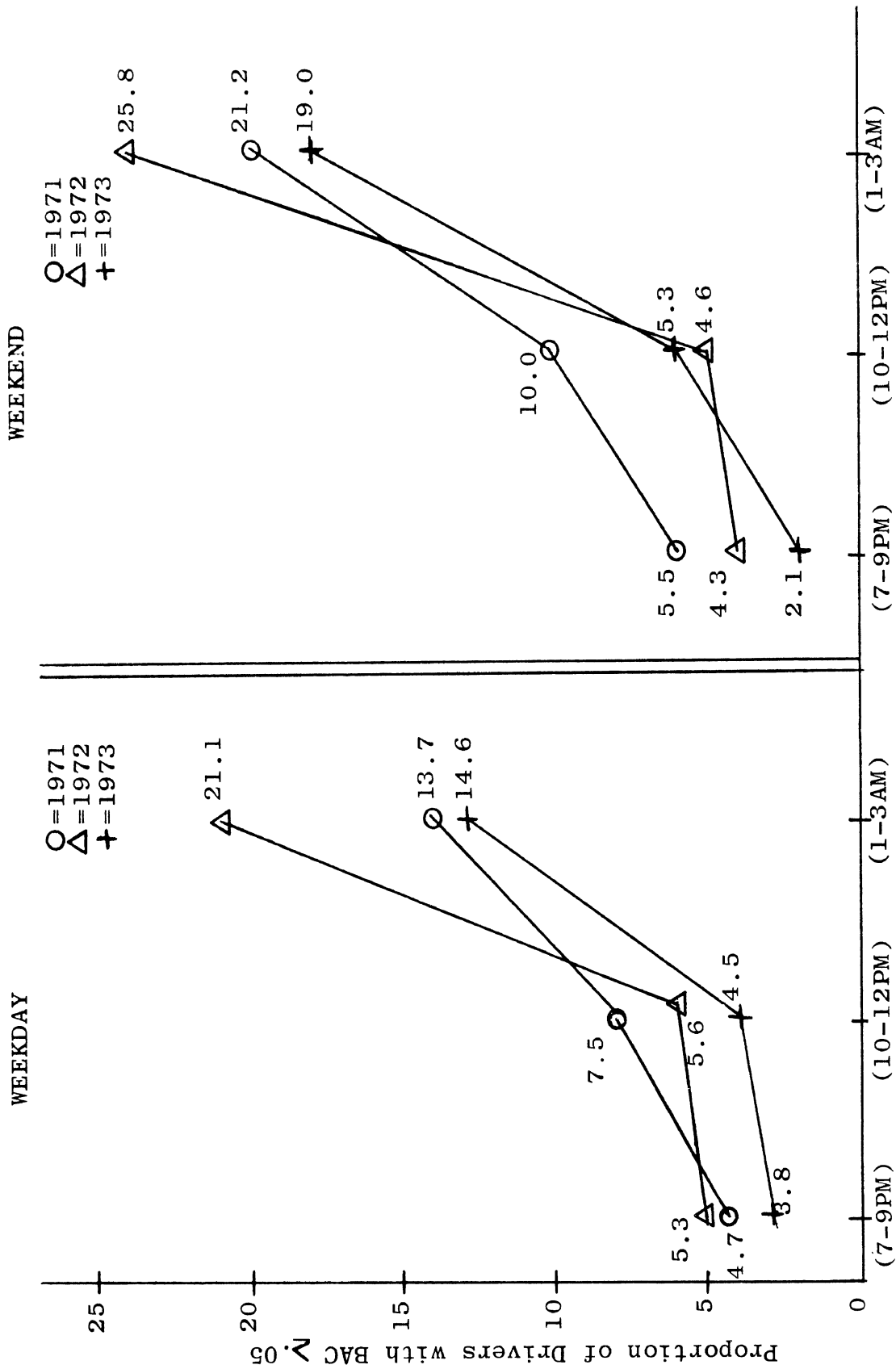


FIGURE 2. DISTRIBUTION OF DRIVERS WITH BAC \geq .05 BY WEEKDAY, WEEKEND AND TIME OF NIGHT

3.3 BAC DEMOGRAPHIC VARIABLES AND DRINKING PATTERNS

The following section includes a discussion of the relationship between demographic variables and BAC. Changes over the three year period have occurred, primarily in the age and race of drinking drivers. Also included are responses to questions related to drinking pattern immediately prior to participation in the survey.

3.3.1 Demographic Variables

AGE

Analysis of data on age (Table 4) indicate that the yearly decrease in the proportion of all drinking drivers is actually due to a decrease in drinking among drivers aged 21 or older. The reverse was true for drivers aged 18 to 20. In 1971 8% of 18-20 year old drivers were drinking. This proportion rose to 12% in 1972, and 16% in 1973. Not only was there a statistically significant* increase in the proportion drinking among this age group, but much of the increase occurred in the BAC ranges of .05 and higher. One explanation for the differences in proportion trends between the 18-20 age group and older drivers might be the change in Michigan's age of majority law which gave 18 year olds the right to drink legally (formerly given to 21 year olds) on January 1, 1972. Although hypotheses regarding the reason for the increase in 18-20 year old drinking were not tested, the increase was related, in time, to the legal change.

Very few drivers aged 16 and 17 were drinking in any year. Although the proportion rose from 3% in 1971 to 7% in 1972, a decrease to 2% occurred in 1973. In each year, the sample size for this age group was too small for statistical analysis.

Table 5, showing the proportion of drinking drivers by individual ages of 16 through 25, confirms that the increase in drinking occurred most prominently among 18 to 20 year olds.

*A statistical significance test using the binomial approximation to the normal distribution was performed using the distribution of the t statistic.

TABLE 4. DISTRIBUTION OF DRIVERS BY BAC, AGE GROUP AND YEAR

Age	BAC								Total
	.00-.01		.02-.04		.05-.09		.10+		
1971									
16-17	32	97%	1	3%	-	-	-	-	33
18-20	108	92%	7	6%	2	2%	-	-	117
21-30	265	79%	31	9%	26	8%	14	4%	336
31-40	85	75%	11	10%	9	8%	8	7%	113
41+	115	79%	14	10%	9	6%	8	5%	146
1972									
16-17	41	93%	1	2%	2	5%	-	-	44
18-20	158	88%	13	7%	7	4%	2	1%	180
21-30	355	80%	40	9%	21	5%	27	6%	443
31-40	128	82%	10	6%	13	8%	6	4%	157
41+	162	83%	13	7%	12	6%	9	4%	196
1973									
16-17	41	98%	-	-	-	-	1	2%	42
18-20	109	84%	8	6%	8	6%	5	4%	130
21-30	319	85%	33	9%	16	4%	6	2%	374
31-40	111	83%	8	6%	6	4%	9	7%	134
41+	141	84%	10	6%	13	8%	3	2%	167

Between the ages of 21 and 25 the data indicates a decrease in the proportion drinking (21% in 1971 versus 14% in 1973) although this was not a consistent pattern within each age year.

Figure 3 summarizes these findings on age and trends in drinking. At the three blood alcohol concentrations plotted, the proportion of drinking drivers aged 21 or older decreased, with most of the change taking place between 1971 and 1972. An increase in drinking appears among 16 to 20 year olds (although as Table 5 indicates, most of the increase occurred among 18 to 20 year olds). By 1973, a higher proportion of young drivers were drinking than were older drivers. This is a reversal of the pattern indicated by 1971 data.

SEX

Survey data are consistent over the three year period, with females comprising 21-23% of the nighttime drivers (see Table 6). In accord with other literature on sex and drinking, a larger proportion of females are non-drinking drivers (92-93%) than are males (78-83%).

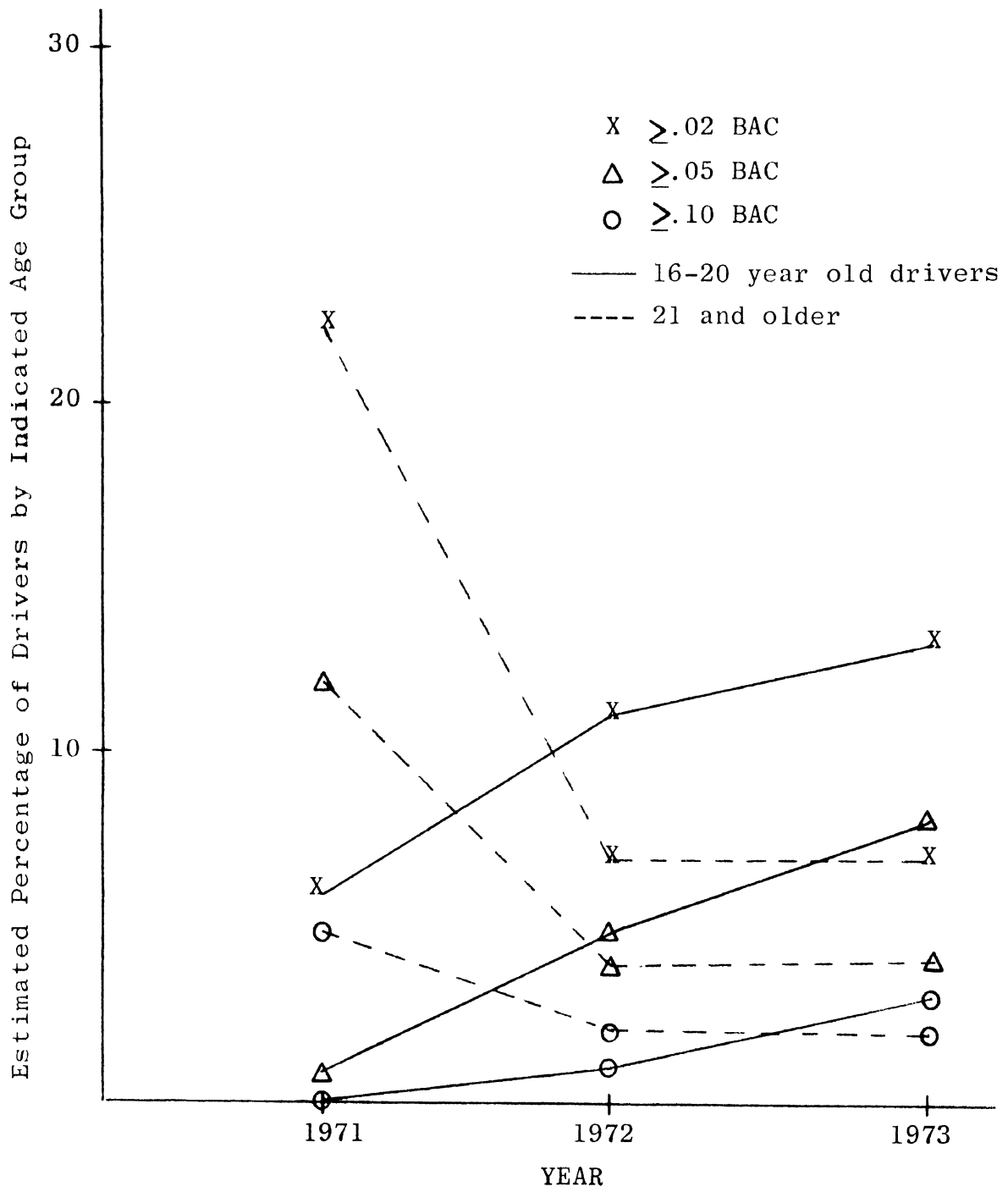


FIGURE 3. PERCENTAGE OF DRIVERS AT OR ABOVE INDICATED BAC BY AGE GROUP AND YEAR

TABLE 6. DISTRIBUTION OF DRIVERS BY BAC, SEX AND YEAR

Sex	BAC								Total
	.00-.01		.02-.04		.05-.09		.10+		
<u>1971</u>									
Male	451	78%	57	10%	40	7%	30	5%	578
Female	152	92%	6	4%	6	4%	0	0%	164
<u>1972</u>									
Male	646	80%	69	8%	53	7%	38	5%	806
Female	198	92%	8	4%	2	1%	6	3%	214
<u>1973</u>									
Male	542	83%	52	8%	39	6%	20	3%	653
Female	179	93%	6	3%	6	3%	2	1%	193

RACE

Because WCASAP program activities have not been selective in terms of race there is no apparent explanation for the findings displayed in Table 7. In 1972, 31% of the black drivers were drinking as compared to 16% of white drivers. 1973 data indicate a significant decrease in the proportion of black drinking drivers, to the point where there are no differences on the basis of race. (Data on race were not recorded in 1971.)

TABLE 7. DISTRIBUTION OF DRIVERS BY BAC, RACE* AND YEAR

Race	BAC								Total
	.00-.01		.02-.04		.05-.09		.10+		
<u>1972</u>									
White	773	84%	68	7%	50	6%	31	3%	922
Black	50	69%	6	8%	5	7%	12	16%	73
Other	9	100%	0	0	0	0	0	0	9
<u>1973</u>									
White	638	85%	51	7%	39	5%	21	3%	749
Black	64	84%	8	11%	3	4%	1	1%	76
Other	17	89%	0	0	0	0	2	11%	19

*Race not recorded in 1971.

MARITAL STATUS

The largest change in drinking patterns occurred among divorced drivers (see Table 8). In 1971, 42% of divorced drivers were drinking. This dropped to 30% in 1972 and 18% in 1973.

EDUCATION

Patterns in drinking by educational subgroups are presented in Figure 4. The data indicate decreases in drinking for those persons who had completed at least one year of college through graduate school. Conversely the subgroup of high school graduates showed an increase in drinking. This latter finding may be related to the increase in drinking among 18 to 20 year olds, many of whom are in the high school graduate category.

OCCUPATION

The distribution of drivers by BAC and occupational category is shown in Table 9. Except for persons engaged in clerical and sales work, a decrease in the proportion of drinkers occurred among all other categories of employed drivers.

RESIDENCE

Table 10 shows the distribution of drivers by BAC and place of residence in Washtenaw County. The 1973 data indicate a slight tendency for residents of Ypsilanti City to have a higher proportion of drinkers, and drinkers at high BAC, than residents of other areas.

3.3.2 Drinking Patterns

An analysis of drinking patterns is presented in Figure 5. Each year approximately 16% of the interviewees reported that they abstain from the use of alcoholic beverages. Of those who admitted to drinking on the day of the interview (nearly unchanged over the three years), the proportion with measurable BAC decreased each year (50% in 1971, 46% in 1972, and 43% in 1973).

Table 11 indicates that of those drivers who reported drinking on the day of interview, the percentage who had more than one drinking episode decreased from 66% in 1971 (173 of 261) to 18% in 1973 (51 of 291). Because location defined a drinking episode in this study, this decrease should be related to the occurrence of less driving after drinking.

The data in Table 11 also indicate a direct relationship between BAC and the number of drinking episodes; as the number of drinking episodes increases, so does the proportion of

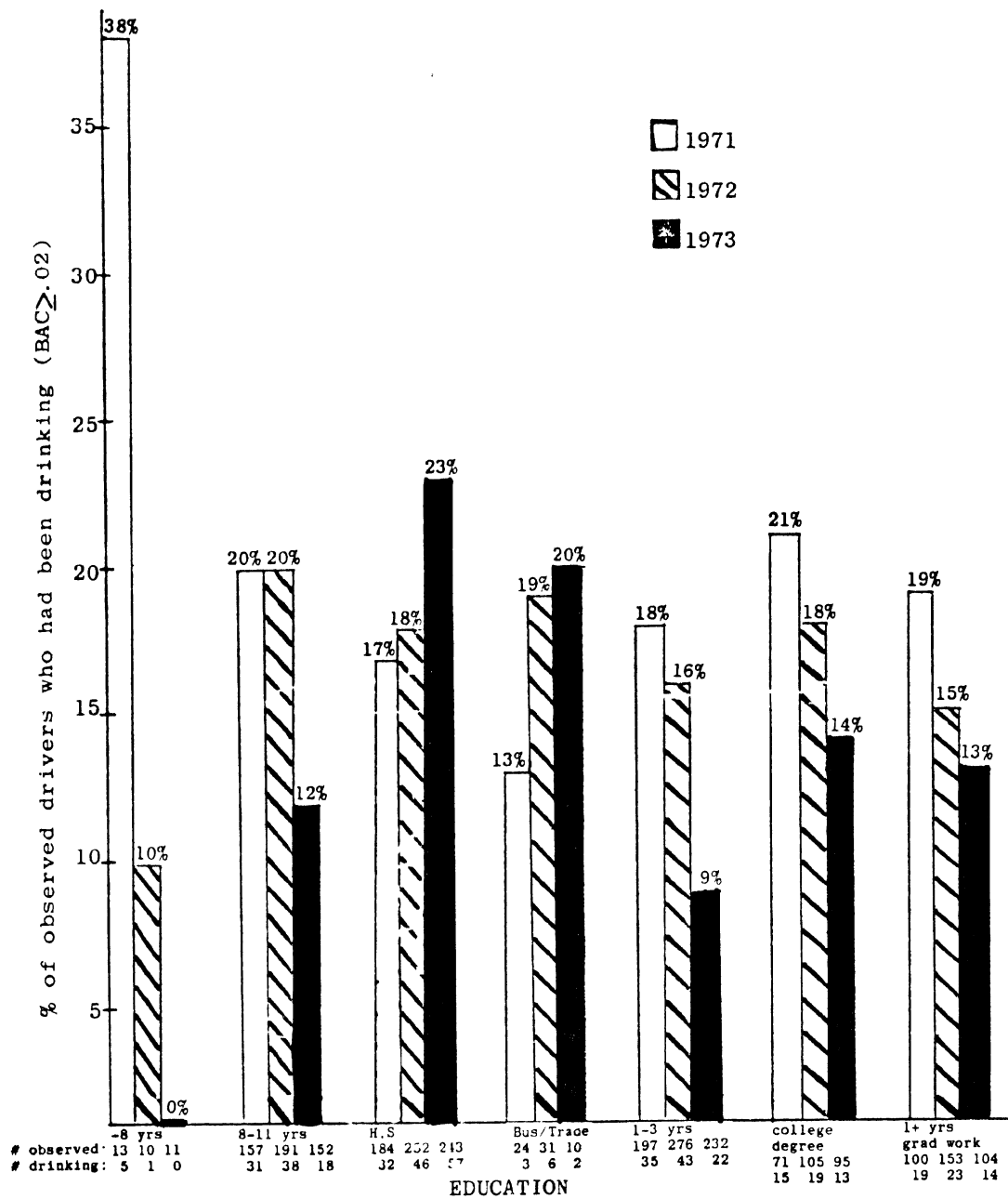


FIGURE 4. PERCENTAGE OF EACH EDUCATIONAL SUBGROUP WHO HAD BEEN DRINKING (BAC > .02) BY YEAR

TABLE 9. DISTRIBUTION OF DRIVERS BY BAC, OCCUPATION AND YEAR

Occupation	BAC								Total
	.00-.01		.02-.04		.05-.09		.10+		
<u>1971</u>									
Professional & managerial	127	80%	18	11%	9	6%	4	3%	158
Clerical & sales	58	88%	4	6%	4	6%	0	0	66
Crafts, service & laborers	187	74%	20	8%	26	10%	19	8%	252
Students	165	88%	17	9%	5	3%	1	0	188
Unemployed, housewives, retired	54	93%	1	2%	1	2%	2	3%	58
<u>1972</u>									
Professional & managerial	207	83%	23	9%	11	4%	8	3%	249
Clerical & sales	105	86%	9	8%	3	2%	5	4%	122
Crafts, service & laborers	282	78%	25	7%	28	8%	26	7%	361
Students	192	85%	17	8%	13	6%	3	1%	225
Unemployed, housewives, retired	49	94%	1	2%	0	0	2	4%	52
<u>1973</u>									
Professional & managerial	186	87%	15	7%	10	5%	3	1%	214
Clerical & sales	61	81%	5	7%	3	4%	6	8%	75
Crafts, service & laborers	254	80%	27	9%	23	7%	12	4%	316
Students	159	91%	8	5%	5	3%	3	2%	175
Unemployed, housewives, retired	60	92%	3	5%	2	3%	0	0	65

TABLE 10. DISTRIBUTION OF DRIVERS BY CUMULATIVE BAC, PLACE OF RESIDENCE AND YEAR

Residence	BAC						Total
	≥.02		≥.05		≥.10		
<u>1971</u>							
Ann Arbor City	54	20%	26	9%	10	4%	276
Ypsilanti City	29	20%	16	11%	10	7%	144
Ypsilanti Twp.	19	17%	11	10%	4	4%	109
Ann Arbor & Pittsfield Twps.	6	16%	4	11%	0	0	37
Other	32	18%	19	11%	6	3%	180
<u>1972</u>							
Ann Arbor City	70	20%	36	10%	17	5%	351
Ypsilanti City	29	19%	17	11%	8	5%	152
Ypsilanti Twp.	27	14%	18	9%	8	4%	194
Ann Arbor & Pittsfield Twps.	10	16%	4	7%	1	2%	61
Other	40	15%	24	9%	10	4%	262
<u>1973</u>							
Ann Arbor City	44	15%	19	7%	6	2%	290
Ypsilanti City	30	19%	19	12%	9	6%	157
Ypsilanti Twp.	24	15%	12	8%	4	3%	159
Ann Arbor & Pittsfield Twps.	5	12%	3	7%	1	2%	41
Other	23	12%	14	7%	4	2%	200

TABLE 11. DISTRIBUTION OF DRIVERS BY BAC, NUMBER OF REPORTED DRINKING EPISODES ON DAY OF INTERVIEW, AND YEAR

Number Drinking Episodes	BAC						Total		
	.00-.01		.02-.04		.05-.09			.10+	
<u>1971</u>									
0	474	99%	5	1%	1	0	0	0	480
1	77	88%	8	9%	3	3%	0	0	88
2	30	57%	13	24%	7	13%	3	6%	53
3	13	37%	13	37%	4	11%	5	14%	35
4+	11	13%	25	29%	30	35%	19	22%	85
<u>1972</u>									
0	639	99%	2	1%	0	0	0	0	641
1	183	60%	58	19%	38	12%	27	9%	306
2	17	32%	14	26%	11	21%	11	21%	53
3	2	17%	3	25%	5	42%	2	17%	12
4+	1	16%	0	0	1	16%	4	67%	6
<u>1973</u>									
0	553	99%	1	<1%	1	<1%	0	0	555
1	155	65%	43	18%	31	13%	11	4%	240
2	12	32%	11	30%	6	16%	8	22%	37
3	0	0	4	40%	3	30%	3	30%	10
4+	0	0	0	0	2	50%	2	50%	4

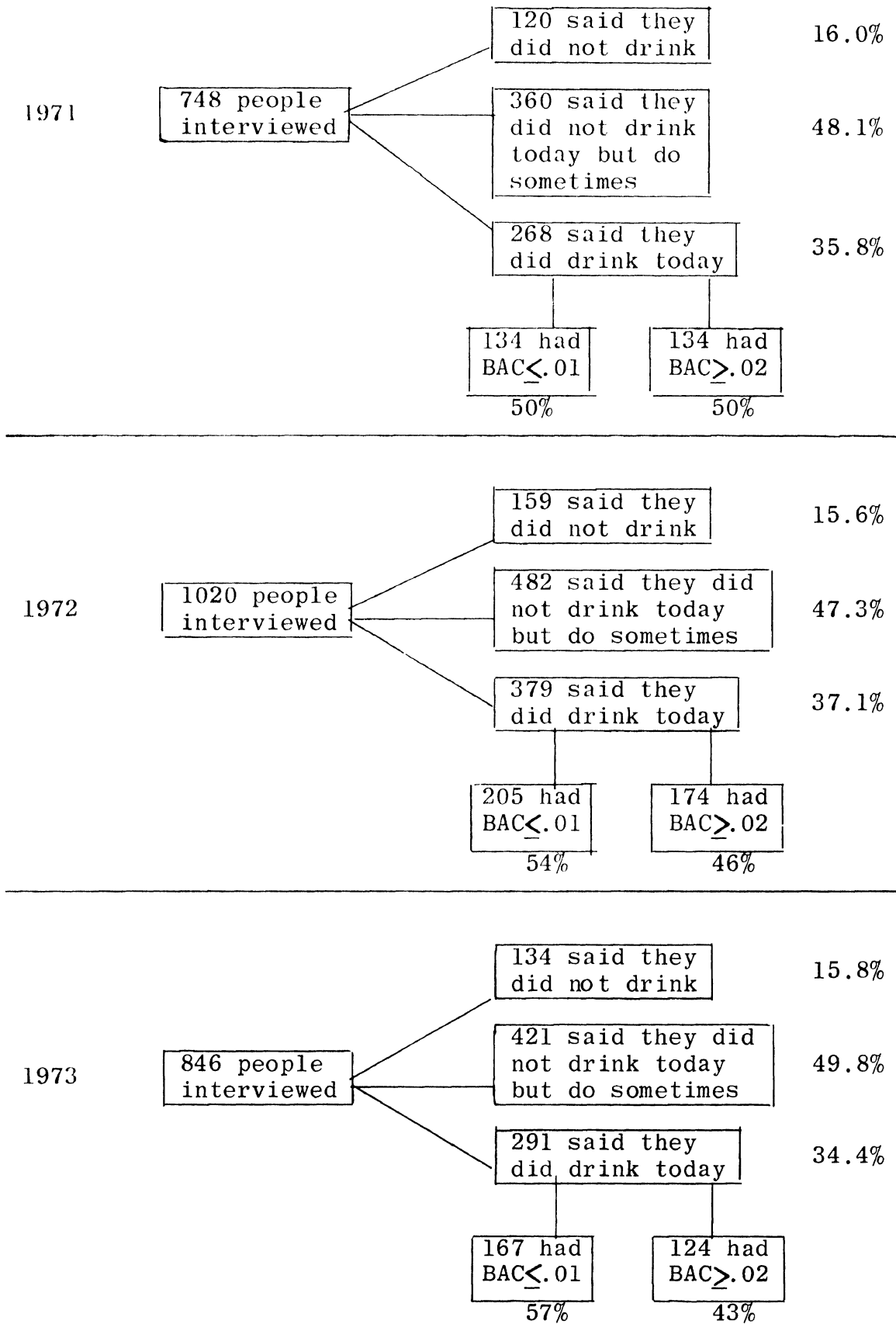


FIGURE 5. DRINKING PATTERNS OF PERSONS INTERVIEWED IN ROADSIDE SURVEYS

drivers with higher BAC. Other data from the 1972 survey reveal that 37% of the persons with BAC of .05 or higher stated that they had been drinking in bars prior to their interview. This rose slightly to 46% in 1973. In both years, drinking at the home of friends was the next most frequent response of drivers with BAC of .05 or higher.

3.4 KNOWLEDGE OF WCASAP ACTIVITIES

When the Washtenaw ASAP program began in the spring of 1971, a public information and education campaign was initiated in an effort to increase county residents' awareness of the problem drinker on the highway. This campaign involved newspaper articles and radio public service announcements about the program and related activities. One of the first questions asked of the drivers participating in the survey was whether they had heard of the BAC Roadside Survey. As Table 12 indicates, the proportion of drivers who had heard of the survey increased slightly over the three year period, from 23% to 34%.

The percentage of respondents who said they had heard of the WCASAP program to reduce alcohol-related traffic accidents more than doubled from 23% in 1971 to 49% in 1973. This increase indicates that knowledge of the ASAP program has reached more people, either through media messages or word of mouth.

Participants were also asked if during the last year they had noticed or were aware of more police patrols on the alert for drinking drivers. The percentage of drivers answering "yes" to this question increased from 46% in 1971 to 56% in 1973, indicating that the police have become somewhat more visible to county residents. When this question was asked in 1971, the program of special police patrols had in fact not formally begun although Washtenaw County and the state as a whole were quite vigorous in enforcing a relatively new (November 1967) Implied Consent Law. The data suggest that subsequent ASAP police activities and publicity about them may have accounted for the 10% increase in reported awareness.

Drivers were also questioned regarding their awareness of drinking/driving media messages. The percentage of drivers who

TABLE 12. SUMMARY OF PUBLIC AWARENESS RESPONSES BY BAC AND YEAR

BAC	Heard of BAC Survey		Heard of WASAP Program		Aware of More Police Patrols		Noticed Media Messages	
	%	Number Observed	%	Number Observed	%	Number Observed	%	Number Observed
<u>1971</u>								
.00-.01	23%	601	23%	602	46%	597	90%	600
.02-.04	16%	64	19%	63	43%	63	89%	64
.05-.09	30%	46	35%	46	50%	46	91%	45
.10+	33%	30	33%	30	52%	29	90%	30
Total	23%	741	23%	741	46%	735	90%	739
<u>1972</u>								
.00-.01	30%	839	35%	843	52%	802	87%	843
.02-.04	45%	76	39%	77	42%	73	77%	77
.05-.09	35%	55	40%	55	54%	52	84%	55
.10+	33%	43	36%	44	44%	43	75%	44
Total	32%	1013	36%	1019	51%	970	86%	1019
<u>1973</u>								
.00-.01	32%	716	48%	718	54%	690	87%	719
.02-.04	39%	59	53%	59	60%	57	83%	59
.05-.09	49%	43	49%	43	76%	41	86%	43
.10+	54%	24	57%	23	68%	22	92%	24
Total	34%	842	49%	843	56%	810	87%	845

have noticed messages through various media has decreased slightly, although it was very high in 1971 (90%) and continued to be high in 1973 (87%). Table 13 indicates that sources of these messages have remained fairly constant over the three survey years, with television continuing to reach the largest audience. (It should be noted that Washtenaw County has no local television station and therefore the local information campaign has relied primarily on other media outlets.)

Table 12 also reveals little consistency in the relationship between BAC levels and public awareness. The most that can be said is that in general public awareness was as high or higher for those respondents who had $BAC \geq .10$ compared to respondents with a $BAC \leq .02$.

3.5 ANALYSIS OF DRIVERS REFUSING TO PARTICIPATE

In view of the voluntary nature of the surveys and the fact that a positive BAC could be incriminating or a source of personal embarrassment, it is vital to examine the potential effects of refusals on the conclusions of the study. As can be seen from Table 14 the survey participation rates were comparable over the three years, ranging from 87.3% to 90.4%.

In order to analyze the refusals, a classification system was used whereby the survey interviewers estimated the drinking status of all in-county drivers on initial contact, prior to knowing whether the driver would be a participant or a refuser. Drivers were rated as "had not been drinking", "had a little", or "had a lot". For drivers who participated in the study, the BAC distributions were compared to the interviewer estimate. As Table 15 indicates, the interviewers correctly identified participants as having "not been drinking" in 90-94% of the cases each year. There was a greater tendency for the interviewers to incorrectly estimate drinking (false positive) than to incorrectly estimate non-drinking (false negative). In 1973, 67% of the participants classified as "had a little" in fact had BAC of negative to .01. Twenty-three percent of those classified as "had a lot" also had

TABLE 13. SOURCE OF DRINKING/DRIVING MEDIA MESSAGES BY YEAR

Year	Number Responses	T.V.	Newspaper	Magazines	Radio	Billboards	Pamphlets	Other
1971	1058	50%	14%	8%	16%	6%	1%	5%
1972	1266	53%	14%	7%	16%	3%	1%	6%
1973	1106	52%	15%	7%	13%	3%	2%	8%

TABLE 14. PARTICIPATION RATES FOR ROADSIDE SURVEYS

Year	Total in-county Drivers stopped	Number Interviewed	Percent Interviewed	Total number out-of-County drivers stopped
1971	857	748	87.3%	144
1972	1132	1023	90.4%	420
1973	969	847	87.4%	332

TABLE 15. PRE TEST ESTIMATE OF DRINKING BY BAC
FOR PARTICIPATING DRIVERS

Interviewer Classification	.00-.01		.02-.04		.05-.09		.10+		Total
<u>1971</u>									
Had not been drinking	472	90%	30	6%	15	3%	6	1%	523
Had a little	90	57%	28	18%	24	15%	15	10%	157
Had a lot	3	18%	2	12%	4	23%	8	47%	17
Total	565	81%	60	9%	43	6%	29	4%	697
<u>1972</u>									
Had not been drinking	642	91%	39	6%	15	2%	8	1%	704
Had a little	49	45%	18	16%	25	23%	18	16%	110
Had a lot	1	10%	1	10%	2	20%	6	60%	10
Total	692	84%	58	7%	42	5%	32	4%	824
<u>1973</u>									
Had not been drinking	591	94%	18	3%	15	2%	3	1%	627
Had a little	114	67%	32	19%	17	10%	8	4%	171
Had a lot	9	23%	8	20%	10	25%	13	32%	40
Total	714	85%	58	7%	42	5%	24	3%	838

BACs \leq .02. Although the two types of errors do not completely balance each other out, it is true that the cut off point of .02 BAC rather than .01 BAC would tend to raise the false positive error. The proportion of error due to use of drugs other than alcohol is not known.

Once the proportion of participating drivers at the various BAC levels for each drinking classification was calculated, it was possible to make some assumptions about the refusers. Since the drinking estimate was made by the interviewers prior to knowing whether the driver would be a participant or a refuser, it follows that the distribution of BACs within each classification is independent of whether or not the driver participated. Based on this assumption, an estimate of the distribution of BACs for the refusers within each drinking classification can be made (see Figures 6, 7 and 8).

The next step is to obtain an estimate of the distribution of BACs for the combined population of participants and refusers and compare it with the distribution of BACs for the participants alone. As Table 16 indicates, the major difference

TABLE 16. DERIVED DISTRIBUTION OF BACs INCLUDING REFUSALS

BAC	Classified* Participants Only	Classified* Participants and Refusers
1971	N=697	N= 800
.02-.04	8.6%	8.8%
.05-.09	6.2%	6.4%
≥.10	4.2%	5.3%
1972	N=824	N=921
.02-.04	7.0%	7.2%
.05-.09	5.1%	5.4%
≥.10	3.9%	4.7%
1973	N=838	N=957
.02-.04	6.9%	6.8%
.05-.09	5.0%	4.9%
≥.10	2.9%	2.9%

*BAC distributions given only for cases where an estimate of drinking was made by the interviewer. The distributions of classified participants differ only slightly from those of the total sample presented in Table 1.

in percentages appears in 1971 for those persons with a BAC $\geq .10$. Using participants only, the observed distribution is 4.2% whereas including refusals, the percentage $\geq .10$ rises to 5.3%. The percentage increase for these high BAC people narrows in 1972 (observed = 3.9% and estimated = 4.7%) and shows no difference at all in 1973 (both observed and estimated = 2.9%). The latter may be explained by the fact that in 1973 only 11% of the persons in the "had a lot" category refused (Figure 8) compared to approximately one-half such subjects in 1971 and 1972 (Figures 6 and 7). Thus the inclusion of estimated BAC for refusals with the BAC distributions of participants, supports the major conclusion that there has been a significant decrease in drinking when 1973 data are compared to 1971 data.

With regard to the experimental design variables, a worst case analysis was performed on 1973 refusals. It was hypothetically assumed that all of the refusers had a BAC of at least 0.05. The proportions of drivers with BAC $\geq .05$ were recalculated for each cell

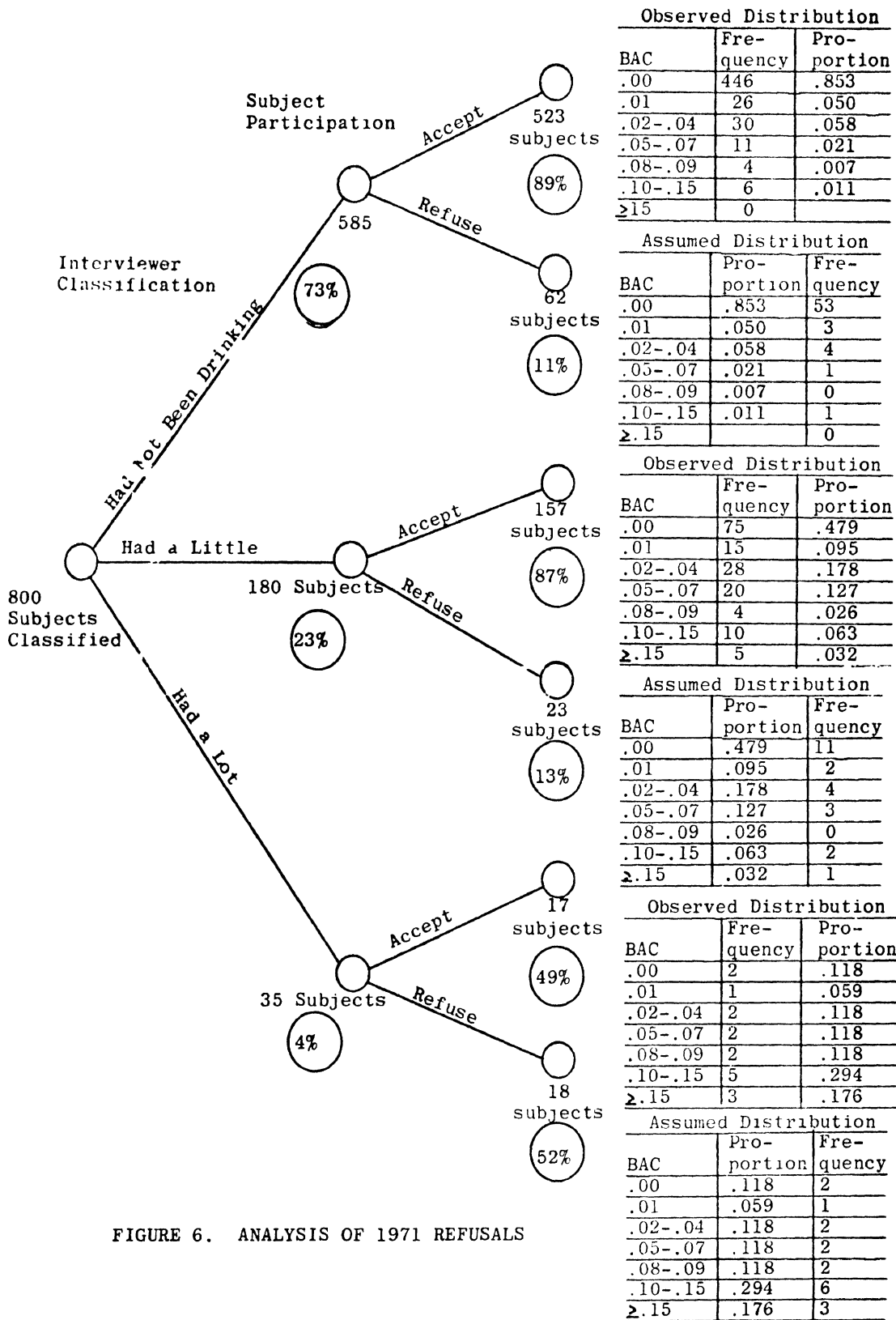


FIGURE 6. ANALYSIS OF 1971 REFUSALS

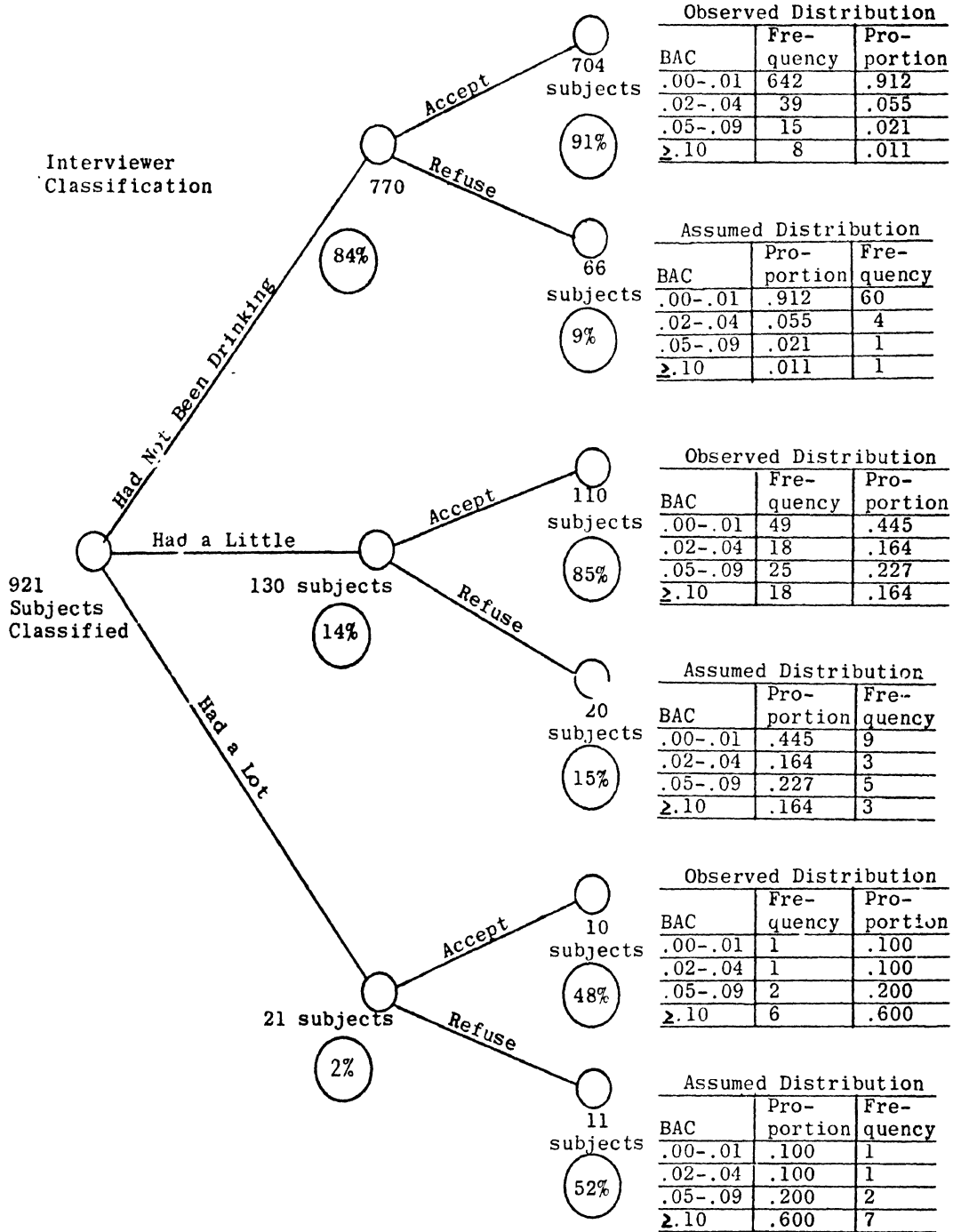


FIGURE 7. ANALYSIS OF 1972 REFUSALS

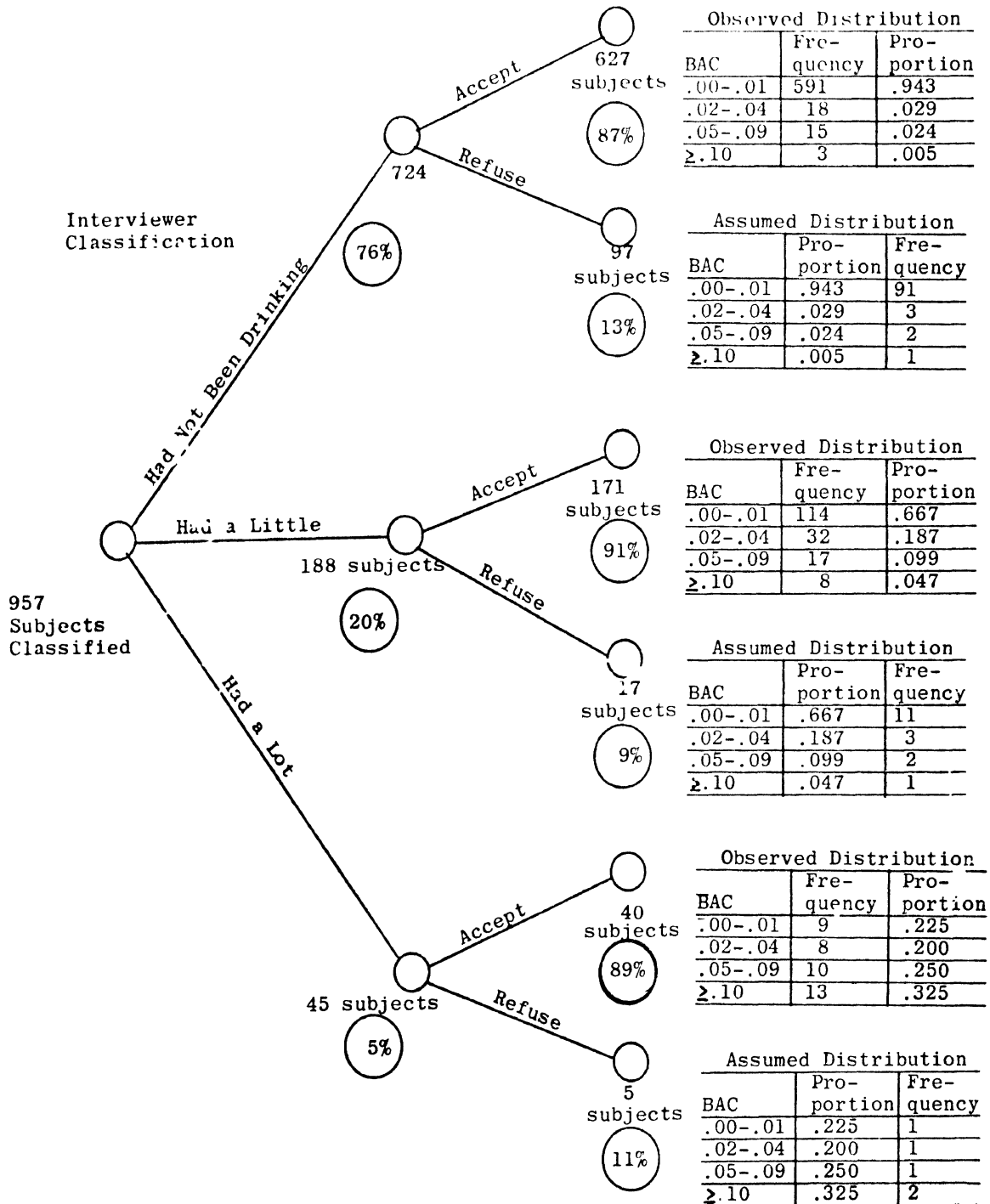


FIGURE 8. ANALYSIS OF 1973 REFUSALS

in the experimental design, including in these calculations all refusers. Although not statistically significant, the main effect for the traffic volume factors was increased, indicating that most of the refusers were on medium volume roads. The worst case analysis provided assurance that the conclusions of the analysis of variance would be no different had there been no problem of non-response.

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APPENDIX A

ROADSIDE SURVEY QUESTIONNAIRES

- A1. 1971 Washtenaw County BAC Roadside Survey
- A2. 1972 Washtenaw County BAC Roadside Survey
- A3. 1973 Washtenaw County BAC Roadside Survey

1971

WASHTENAW COUNTY BAC ROADSIDE SURVEY

Questionnaire # _____

_____ Time subject entered van (Four digit military time)

_____ Breathalyzer Reading

Time of Breath test

(1) _____ Before interview

(2) _____ After interview

Estimate of drinking

(1) _____ Had not been drinking

(2) _____ Had a little

(3) _____ Had a lot

(4) _____ Not known if drinking

Evidence of drinking (Check only if "Had a little" or "Had a lot"
was marked)

(1) _____ glassy, bloodshot eyes

(2) _____ Slurred speech

(3) _____ Odor of alcohol

(4) _____ Open bottle

(5) _____ Other reason

Sex

(1) _____ Male

(2) _____ Female

Heard about BAC Roadside Survey

(1) _____ Yes

(2) _____ No

(3) _____ Doesn't know

1. In which city or township do you live?

- | | |
|-----------------------------|-------------------------|
| (01) ___ Ann Arbor City | (14) ___ Lodi Twp |
| (02) ___ Ypsilanti City | (15) ___ Lyndon Twp |
| (03) ___ Saline City | (16) ___ Manchester Twp |
| (04) ___ Milan City | (17) ___ Northfield Twp |
| (05) ___ Chelsea Village | (18) ___ Pittsfield Twp |
| (06) ___ Dexter Village | (19) ___ Salem Twp |
| (07) ___ Manchester Village | (20) ___ Saline Twp |
| (08) ___ Ann Arbor Twp | (21) ___ Scio Twp |
| (09) ___ Augusta Twp | (22) ___ Sharon Twp |
| (10) ___ Bridgewater Twp | (23) ___ Superior Twp |
| (11) ___ Dexter Twp | (24) ___ Sylvan Twp |
| (12) ___ Freedom Twp | (25) ___ Webster Twp |
| (13) ___ Lima Twp | (26) ___ York Twp |
| | (27) ___ Ypsilanti Twp |

2. How old are you?

_____ years

3. What is the highest educational level you've obtained?

- (1) ___ Less than 7 grades
- (2) ___ 8 - 11 grades
- (3) ___ High school diploma
- (4) ___ Business, trade school
- (5) ___ 1 - 3 years college
- (6) ___ College degree
- (7) ___ 1 year or more graduate work
- (8) ___ Refused to answer

4. What is your marital status?

- (1) ___ Married
- (2) ___ Divorced
- (3) ___ Separated
- (4) ___ Widowed
- (5) ___ Single
- (6) ___ Refused to answer

5. What kind of work do you do? (Refer to occupation check list)

(01) ___ Professional

(02) ___ Managerial

(03) ___ Clerical

(04) ___ Craftsman

(05) ___ Operative

(06) ___ Service

(07) ___ Laborer

_____ write in for later coding

(08) ___ Housewife

(09) ___ Retired

(10) ___ Student

(11) ___ Unemployed

(12) ___ Refused to answer

6. Do you ever drink alcoholic beverages?

(1) ___ No

(2) ___ Yes

↓
(GO TO
Q. 12)

6b. Have you had anything to drink today?

(1) ___ No

(2) ___ Yes

↓
(GO TO
Q. 9)

LOCATION CODES	EPISODE TIME CODES	MISSING DATA CODES
01 Bar, club	Round back to nearest	
02 Restaurant	military hour (6:30PM=	
03 Own home	6:00PM= 18)	
04 Friend's or relative's	1:00PM= 13 7:00PM= 19	97 Refused
05 Sport or rec. building	2:00PM= 14 8:00PM= 20	to answer
06 In vehicle	3:00PM= 15 9:00PM= 21	98 Doesn't
07 Outdoors	4:00PM= 16 10:00PM= 22	know
08 Other - write in	5:00PM= 17 11:00PM= 23	
	6:00PM= 18 12:00PM= 24	

7. Where did you first begin drinking today?
 - a. Approximately what time did you arrive? Leave?
 - b. What kind of beverage were you drinking and how many drinks did you have of each?
 - c. Did you drive after your last drink?
 - d. After your last drink, how long was it before you drove?
 8. Where else did you drink today? (Repeat 7a - 7d)
- PROBE: Anywhere else? (Continue to probe until negative response)

Location	Episode	Time	Quantity/Kind	Drive	How long
1st Episode			___ Beer ___ Spirit (1) ___ No ___ Wine ___ Total (2) ___ Yes ___ hr ___ min.		
2nd Episode			___ Beer ___ Spirit (1) ___ No ___ Wine ___ Total (2) ___ Yes ___ hr ___ min.		
3rd Episode			___ Beer ___ Spirit (1) ___ No ___ Wine ___ Total (2) ___ Yes ___ hr ___ min.		
4th Episode			___ Beer ___ Spirit (1) ___ No ___ Wine ___ Total (2) ___ Yes ___ hr ___ min.		
5th Episode			___ Beer ___ Spirit (1) ___ No ___ Wine ___ Total (2) ___ Yes ___ hr ___ min.		
6th Episode			___ Beer ___ Spirit (1) ___ No ___ Wine ___ Total (2) ___ Yes ___ hr ___ min.		

13. Do you remember seeing or hearing any recent advertisements, spot commercials, articles, films, or other items about the effects of drinking on driving?

(1) ___ No (2) ___ Yes

13b. Where did you see or hear these?

- (1) ___ TV
- (2) ___ Newspapers
- (3) ___ Magazines
- (4) ___ Radio
- (5) ___ Billboards
- (6) ___ Pamphlets
- (7) ___ Other _____
- (9) ___ Don't know

13c. What do you remember most?

(SKIP Q. 13d IF R IS NON-DRINKER)

13d. Has that information influenced your own driving after drinking habits a lot, some, not at all?

- (1) ___ A lot
- (2) ___ Some
- (3) ___ Not at all
- (4) ___ Don't know

14. Have you heard of the special new program in Washtenaw County to reduce alcohol-related traffic accidents?

(1) ___ No (2) ___ Yes

14b. Do you happen to know what group is in charge of this program?

- (1) ___ No
- (2) ___ Yes What group? _____

14c. Can you tell me anything about what this program is doing? (Check all that are mentioned)

- (1) ___ No, nothing
- (2) ___ Increased police enforcement
- (3) ___ Roadside breath tests
- (4) ___ Disulfiram (Antabuse)
- (5) ___ Public information campaign
- (6) ___ Treatment services for problem drinkers
- (7) ___ Strict court sentences
- (8) ___ Strict driver license rules
- (9) ___ Alcohol and driving safety education course
- (10) ___ Other _____

THANK YOU VERY MUCH FOR YOUR COOPERATION. YOUR BREATHALYZER READING IS READY IF YOU WOULD LIKE TO SEE IT.

_____ Time interview completed

INTERVIEW SCHEDULE - 1

TIME ENTERED TRAILER _____ (4-digit military time)

Now I have a few background questions.

1. In which city or township do you live in Washtenaw County?

- | | |
|-------------------------------|-----------------------------|
| (1) ___ Ann Arbor City | (5) ___ Ann Arbor Township |
| (2) ___ Ypsilanti City | (6) ___ Pittsfield Township |
| (3) ___ Ypsilanti Township | (7) ___ Scio Township |
| (4) ___ Rest of County: _____ | |

2. How old are you? _____ (years)

3. What is the highest education level you have completed?

- | | |
|-----------------------------|---|
| (1) ___ 7 grades or less | (5) ___ business, trade school |
| (2) ___ 8 grades | (6) ___ 1-3 yrs. of college |
| (3) ___ 9-11 grades | (7) ___ college degree |
| (4) ___ high school diploma | (8) ___ 1 or more yrs. of graduate work |

4. What is your present marital status?

- | | |
|-------------------|------------------------|
| (1) ___ married | (4) ___ widowed |
| (2) ___ divorced | (5) ___ single |
| (3) ___ separated | (8) ___ refused to say |

5. What kind of work do you do? (OBTAIN SUFFICIENT DETAIL TO PERMIT LATER CODING)

6. About how many miles do you yourself drive in a year?

- | | |
|------------------------|-----------------------|
| (1) ___ less than 1000 | (5) ___ 10,000-14,999 |
| (2) ___ 1000-2999 | (6) ___ 15,000-24,999 |
| (3) ___ 3000-4999 | (7) ___ 25,000 & Over |
| (4) ___ 5000-9999 | (8) ___ no guess |

7. About what percent of your total driving time would you estimate takes place at night (between 7 PM and 6 AM)?

_____ %

INTERVIEW SCHEDULE - 2

8. Is your driver license from Washtenaw County, somewhere else in Michigan, or from another state?

- (1) ___ Washtenaw County
- (2) ___ elsewhere in Michigan
- (3) ___ another state

9. Where are you coming from now? I mean what kind of place were you at before you drove here?



10. And where are you going now?

COMING
FROM

GOING
TO

- | | |
|--|-------|
| _____ (0) Own home | _____ |
| _____ (1) Friend's or relative's home | _____ |
| _____ (2) Shopping place (incl. mailbox) | _____ |
| _____ (3) Work or class | _____ |
| _____ (4) Restaurant, drive-in | _____ |
| _____ (5) Bar, club | _____ |
| _____ (6) Sport or recreational facility | _____ |
| _____ (7) Cultural event, lecture, meeting, church, etc. | _____ |
| _____ (8) Other (hospital, professional appointment, etc.) | _____ |
| _____ (9) Just riding around | _____ |

11. Now I have a few questions about your use of alcohol? Do you ever drink alcoholic beverages?

- (1) ___ Yes (5) ___ No → SKIP TO Q. 14. P.3

12. About how many times in a month would you say you have four or more drinks at a time? (BY "DRINK" IS MEANT A GLASS OF WINE, A BOTTLE OR CAN OF BEER, A SINGLE SHOT OF WHISKEY, ETC.)

(ENTER 00 FOR NONE AND GO TO Q.13)

(NUMBER OF TIMES)



12a. About how many times in a month do you have 8 or more drinks at a time?

INTERVIEW SCHEDULE - 3

(FOR NON-ABSTAINERS ONLY)

13. Have you had anything to drink today?

(1) Yes (5) No → SKIP TO Q.14

- ↓
- 13a. Where were you when you had your first drink today?
- 13b. About what time did you arrive and leave there? (IF AT OWN HOME: about what time did you begin drinking and what time did you finish?)
- 13c. How many drinks did you have during that time?
- 13d. Did you have anything else to drink after that? (IF YES: Where was that? REPEAT 13b and 13c)
- 13e. How about after that? (CONTINUE TO PROBE UNTIL NEGATIVE & GO TO 13f AT BOTTOM)

LOCATION	FIRST EPISODE	SECOND EPISODE	THIRD EPISODE	FOURTH EPISODE	FIFTH EPISODE
(1) Bar, club	___	___	___	___	___
(2) Restaurant	___	___	___	___	___
(3) Own home	___	___	___	___	___
(4) Friend's or relative's	___	___	___	___	___
(5) Sport or Rec. building	___	___	___	___	___
(6) In vehicle	___	___	___	___	___
(7) Outdoors	___	___	___	___	___
(8) Other (EXPLAIN)	___	___	___	___	___
TIME (nearest military hour)					
Beginning time	___	___	___	___	___
Ending time	___	___	___	___	___
NUMBER OF DRINKS	___	___	___	___	___

13f. How long ago did you finish your last drink ? ___ hr. ___ min.

14. Would you say that your drinking, & driving after drinking, habits have changed at all in the past year?

(1) Yes (5,000) No → GO TO Q.15

↓

14a. In what way have they changed? _____

14b. Is there any special reason for this change? _____

INTERVIEW SCHEDULE - 1

15. Have you heard of the special new program in Washtenaw County to reduce alcohol-related accidents?

(1) Yes (50000000) No → GO TO Q.16

15a. How did you hear about it?

(1) newspaper

(2) radio

(3) acquaintances

(4) Other source: _____

15b. Can you tell me anything about what this program is doing?
(CHECK ALL THAT R MENTIONS)

0.No,nothing/ 1.Increased police enforcement/

2.Roadside breath tests/ 3.Antabuse drug/ 4.Public

information campaign/ 5.Treatment services for problem

drinkers/ 6.Strict court sentences/ 7.Strict driver

license rules/ 8.Driver course/ Other

16. During the past year have you read about, or noticed, more police on the alert for drivers who have been drinking?

(1) Yes (5) No

17. Do you remember seeing or hearing any recent advertisements, spot commercials, articles, films, or other items about the effects of drinking on driving?

(1) Yes (500000) No → GO TO Q.18

17a. Where did you see or hear these? 1.TV/ 2.Newspapers/
(CHECK ALL THAT R SAYS)

3.Magazines/ 4.Radio/ 5.Billboards/ 6.Pamphlets/

7.Other: _____

17b. What do you remember most from what you heard or saw?

INTERVIEW SCHEDULE - 5

18. Do you agree or disagree with the suggestion that breath tests to determine blood alcohol concentrations should be required in any accident in which the police suspect drinking involvement?

(1) ___ Agree

(2) ___ Disagree

19 If an expanded government program could cut down on alcohol-related traffic accidents by as much as one third or one half, would you personally be willing to pay more taxes to support such a program?

(1) ___ Yes

(5) ___ No

THANK YOU VERY MUCH FOR YOUR COOPERATION. HERE IS YOUR BREATHALYZER READING.

Time Interview & Breath Test Completed _____ Total Time _____

Final BAC reading _____ % Number of Breath Tests Taken _____

ANY COMMENTS ABOUT INTERVIEW OR RESPONDENT:

1973 WASHTENAW COUNTY BAC ROADSIDE SURVEY

Cover Sheet

1-5 _____ Interview #

6 Sex of Driver

- (1) ___ Male (9) ___ MD
 (2) ___ Female

7 Race of Driver

- (1) ___ White (5) ___ Amer. Indian
 (2) ___ Black (6) ___ Other
 (3) ___ Oriental (7) ___ Unknown
 (4) ___ Latin (9) ___ MD

8 Number of Adult Male Passengers in Car.

- 1 2 3 4 5 6 7 8 or more 9 MD

9 Number of Adult Female Passengers in Car.

- 1 2 3 4 5 6 7 8 or more 9 MD

10 Number of Child Passengers in Car.

- 1 2 3 4 5 6 7 8 or more 9 MD

11 Seat Belt Use by Driver.

- (1) ___ Shoulder harness used (4) ___ Not sure if using a belt
 (2) ___ Lap belt used only (9) ___ MD
 (3) ___ Not using a belt

12 Estimate of Driver's Drinking

- (1) ___ Had not been drinking (4) ___ Not known
 (2) ___ Had been drinking a little (9) ___ MD
 (3) ___ Had been drinking a lot

13 Have you heard of this Roadside Survey?

- (1) ___ Yes (3) ___ Don't know
 (2) ___ No (9) ___ MD

INTERVIEW SCHEDULE

14-17 Time interview started _____
four digit military time

18-19 In which city or township do you live?

- | | |
|-----------------------------|-------------------------|
| (01) ___ Ann Arbor City | (14) ___ Lodi Twp |
| (02) ___ Ypsilanti City | (15) ___ Lyndon Twp |
| (03) ___ Saline City | (16) ___ Manchester Twp |
| (04) ___ Milan City | (17) ___ Northfield Twp |
| (05) ___ Chelsea Village | (18) ___ Pittsfield Twp |
| (06) ___ Dexter Village | (19) ___ Salem Twp |
| (07) ___ Manchester Village | (20) ___ Saline Twp |
| (08) ___ Ann Arbor Twp | (21) ___ Scio Twp |
| (09) ___ Augusta Twp | (22) ___ Sharon Twp |
| (10) ___ Bridgewater Twp | (23) ___ Superior Twp |
| (11) ___ Dexter Twp | (24) ___ Sylvan Twp |
| (12) ___ Freedom Twp | (25) ___ Webster Twp |
| (13) ___ Lima Twp | (26) ___ York Twp |
| | (27) ___ Ypsilanti Twp |

20-21 What is your age?

22 Highest Grade Completed?

- | | |
|-----------------------------|----------------------------------|
| (1) ___ Less than 7 | (5) ___ Business or trade school |
| (2) ___ 8 grades | (6) ___ 1-3 yrs. college |
| (3) ___ 9-11 | (7) ___ College degree |
| (4) ___ High school diploma | (8) ___ 1 or more graduate work |

23 Marital Status?

- | | |
|-------------------|------------------------|
| (1) ___ Married | (4) ___ Widowed |
| (2) ___ Divorced | (5) ___ Single |
| (3) ___ Separated | (6) ___ Refused to say |
| | (9) ___ MD |

24-25 Occupation?

- | | |
|-----------------------|----------------------------|
| (01) ___ Professional | (07) ___ Laborer |
| (02) ___ Managerial | (08) ___ Housewife |
| (03) ___ Clerical | (09) ___ Retired |
| (04) ___ Craftsman | (10) ___ Student |
| (05) ___ Operative | (11) ___ Unemployed |
| (06) ___ Service | (12) ___ Refused to answer |
| | (99) ___ MD |

26 About how many miles do you, yourself drive in a year?

- | | |
|------------------------|-----------------------|
| (1) ___ Less than 1000 | (5) ___ 10,000-14,999 |
| (2) ___ 1000-2999 | (6) ___ 15,000-24,999 |
| (3) ___ 3000-4999 | (7) ___ Over 25,000 |
| (4) ___ 5000-9999 | (8) ___ No guess |
| | (9) ___ MD |

27-28 Where are you coming from?

- | | |
|---|---------|
| ___ (0) Own home | ___ (0) |
| ___ (1) Friend or relatives | ___ (1) |
| ___ (2) Shopping (include mail box) | ___ (2) |
| ___ (3) Work or class | ___ (3) |
| ___ (4) Restaurant, drive-in | ___ (4) |
| ___ (5) Bar, club | ___ (5) |
| ___ (6) Sport or recreational facility | ___ (6) |
| ___ (7) Cultural event, lecture,
meeting, church | ___ (7) |
| ___ (8) Other (hospital, professional
appointment, etc.) | ___ (8) |
| ___ (9) MD | ___ (9) |

Where are you going?

29 Do you ever drink alcoholic beverages?

- (1) ___ Yes
(2) ___ No (if no go to column #50)
(9) ___ MD

30 Which of these do you drink most often?

- | | |
|-----------------------|----------------------------|
| (1) ___ Beer | (6) ___ Wine & liquor |
| (2) ___ Wine | (7) ___ Beer, wine, liquor |
| (3) ___ Liquor | (8) ___ NA |
| (4) ___ Beer & wine | (9) ___ MD |
| (5) ___ Beer & liquor | |

- 31 About how many times a week?
_____ (8) ___ NA (9) ___ MD
- 32-33 What is the most number of drinks in any one day you might drink?
_____ (88) ___ NA (99) ___ MD
- 34 At the present time, do you consider yourself to be a?
(1) ___ Very light drinker (5) ___ Heavy drinker
(2) ___ Fairly light drinker (8) ___ NA
(3) ___ Moderate drinker (9) ___ MD
(4) ___ Fairly heavy
- 35 Have you had anything to drink today?
(1) ___ Yes (8) ___ NA
(2) ___ No (if no, go to #50) (9) ___ MD
- 36 What did you drink today?
(1) ___ Beer (6) ___ Wine & liquor
(2) ___ Wine (7) ___ Beer, wine, liquor
(3) ___ Liquor (8) ___ NA
(4) ___ Beer & wine (9) ___ MD
(5) ___ Beer & liquor
- 37 How many drinks? _____ (best estimate)
1 2 3 4 5 6 7 or more (8) ___ NA (9) ___ MD
- 38 Anything alcoholic in the last two hours?
(1) ___ Yes (8) ___ NA
(2) ___ No (if no, go to #41) (9) ___ MD
- 39 How many in the last two hours? _____ (best estimate)
1 2 3 4 5 6 7 or more (8) ___ NA (9) ___ MD
- 40 What did you drink in the last two hours?
(1) ___ Beer (6) ___ Wine & liquor
(2) ___ Wine (7) ___ Beer, wine, liquor
(3) ___ Liquor (8) ___ NA
(4) ___ Beer & wine (9) ___ MD
(5) ___ Beer & liquor

41 Where did you first begin drinking today?

- | | |
|---|----------------------------|
| (01) ___ Bar, club | (07) ___ Outdoors |
| (02) ___ Restaurant | (08) ___ Other |
| (03) ___ Own home | (09) ___ Refused to answer |
| (04) ___ Friends or relatives | (98) ___ NA |
| (05) ___ Sport or recreational building | (99) ___ MD |

42 Did you drink anywhere else today?

- | | |
|-------------|------------|
| (1) ___ Yes | (8) ___ NA |
| (2) ___ No | (9) ___ MD |

43-48 Where? Check as many as apply (can check an item more than once)

- | | | | | |
|------|-----|-----|-----|--------------------------------|
| (01) | ___ | ___ | ___ | Bar or club |
| (02) | ___ | ___ | ___ | Restaurant |
| (03) | ___ | ___ | ___ | Own home |
| (04) | ___ | ___ | ___ | Friend or relatives |
| (05) | ___ | ___ | ___ | Sport or recreational building |
| (06) | ___ | ___ | ___ | In vehicle |
| (07) | ___ | ___ | ___ | Outdoors |
| (08) | ___ | ___ | ___ | Other |
| (09) | ___ | ___ | ___ | Refused to answer |
| (98) | ___ | ___ | ___ | NA |
| (99) | ___ | ___ | ___ | MD |

(43-44) (45-46) (47-48)

49 How long ago did you finish your last drink?

- | | |
|--------------------------------|------------|
| (1) ___ Less than 20 minutes | (8) ___ NA |
| (2) ___ 20 minutes to 1/2 hour | (9) ___ MD |
| (3) ___ Longer than 1/2 hour | |

50 Have you heard of the program in Washtenaw County to reduce alcohol-related accidents?

- | | |
|-------------|------------|
| (1) ___ Yes | (9) ___ MD |
| (2) ___ No | |

51 In the last two years have you read about or noticed more police on the alert for drivers who have been drinking?

- | | |
|-------------|----------------------|
| (1) ___ Yes | (3) ___ Doesn't know |
| (2) ___ No | (4) ___ MD |

52 Have you heard of the expression or term - Blood Alcohol Level?

- | | |
|-------------------------|----------------------|
| (1) ___ Yes | (3) ___ Doesn't know |
| (2) ___ No (Skip to 54) | (9) ___ MD |

53 If yes - What do you think it means?

- (1) ___ Respondents answer completely correct
- (2) ___ Respondents answer fairly correct
- (3) ___ Respondents answer wrong
- (4) ___ Doesn't know
- (9) ___ MD

54 Do you remember seeing or hearing any recent advertisements, spot commercials, articles, films or anything else about the effects of drinking on driving?

- (1) ___ Yes
- (2) ___ No (Skip to #58)
- (3) ___ Doesn't know
- (9) ___ MD

55-57 Where did you see or hear these? (Check all that apply)

- (1) ___ TV
- (2) ___ Newspapers
- (3) ___ Magazines
- (4) ___ Radio
- (5) ___ Billboards
- (6) ___ Pamphlets
- (7) ___ Other
- (8) ___ NA
- (9) ___ MD

58 If a government program could cut down on alcohol-related traffic accidents by as much as 1/3 or 1/2, would you personally be willing to pay more taxes to support such a program?

- (1) ___ Yes
- (2) ___ No
- (3) ___ Don't know
- (9) ___ MD

59-61 What is your approximate weight? (Interviewer estimate if necessary)

_____ lbs.

62 Have you ever had a Breathalyzer test before?

- (1) ___ Yes
- (2) ___ No
- (8) ___ Don't know
- (9) ___ MD

THANK YOU VERY MUCH FOR YOUR TIME. YOUR BREATHALYZER READING IS

63-65 _____

66 # breath tests taken _____

67-70 Time in military time at end of interview _____

71-72 Site # _____ (01, 02, 03, etc.)

73-78
MO DAY YR
(03) (13) (73)

APPENDIX B

ANALYSIS OF VARIANCE TABLES

TABLE B1. OBSERVED FRACTIONS OF SUBJECTS AT OR ABOVE .02 AND .05 BAC CLASSIFIED BY CELLS IN THE EXPERIMENTAL DESIGN MODEL 1971

		W E E K D A Y								W E E K E N D							
		Medium				High				Medium				High			
		Site No.	Traffic Rep 1	Site No.	Volume Rep 2	Site No.	Traffic Rep 1	Site No.	Volume Rep 2	Site No.	Traffic Rep 1	Site No.	Volume Rep 2	Site No.	Traffic Rep 1	Site No.	Volume Rep 2
Urban 7-9 P.M.	% \geq .02	28	.07	37	.07	4	.15	16	.12	7	.05	22	.00	34	.13	43	.11
	% \geq .05		.00		.00		.05		.06		.00		.00		.07		.00
	N		15		15		20		17		20		14		15		18
10-12 P.M.	% \geq .02	5	.15	17	.18	29	.16	38	.10	35	.12	44	.25	8	.05	23	.00
	% \geq .05		.08		.06		.11		.05		.00		.25		.05		.00
	N		13		17		19		19		16		20		20		17
1-3 A.M.	% \geq .02	6	.33	18	---	30	.06	39	.35	36	.47	45	.44	9	.20	24	.40
	% \geq .05		.20		---		.06		.06		.35		.31		.07		.20
	N		15		---		16		17		17		16		15		15
Rural 7-9 P.M.	% \geq .02	1	.14	13	.08	25	.20	40	.06	31	.07	46	.31	10	.12	14	.07
	% \geq .05		.07		.08		.07		.06		.07		.19		.06		.07
	N		15		12		15		17		15		16		16		14
10-12 P.M.	% \geq .02	26	.20	41	.05	2	.14	14	.00	11	.20	20	.25	32	.19	47	.21
	% \geq .05		.07		.00		.00		.00		.07		.20		.00		.05
	N		15		19		15		15		15		20		16		19
1-3 A.M.	% \geq .02	27	.50	42	.41	3	.17	15	.33	12	.50	21	.38	33	.31	48	.27
	% \geq .05		.40		.24		.08		.27		.25		.23		.19		.27
	N		10		17		12		15		12		13		16		11

0=site number

TABLE B2. OBSERVED FRACTIONS OF SUBJECTS AT OR ABOVE .02 AND .05 BAC CLASSIFIED BY CELLS IN THE EXPERIMENTAL DESIGN MODEL 1972

		W E E K D A Y								W E E K E N D							
		Medium				High				Medium				High			
		Site No.	Traffic Rep 1	Site No.	Volume Rep 2	Site No.	Traffic Rep 1	Site No.	Volume Rep 2	Site No.	Traffic Rep 1	Site No.	Volume Rep 2	Site No.	Traffic Rep 1	Site No.	Volume Rep 2
Urban 7-9 P.M.	% \geq .02	28	.00	37	.10	4	.06	16	.04	7	.10	22	.07	34	.04	43	.06
	% \geq .05		.00		.07		.00		.04		.05		.00		.04		.06
	N		18		29		17		28		20		29		26		16
10-12 P.M.	% \geq .02	5	.14	17	.03	29	.09	38	.10	35	.10	44	.20	8	.12	23	.10
	% \geq .05		.00		.00		.04		.03		.03		.10		.08		.07
	N		21		29		23		30		30		20		26		29
1-3 A.M.	% \geq .02	6	.40	18	.32	30	.50	39	.26	36	.43	45	.46	9	.65	24	.33
	% \geq .05		.27		.16		.43		.07		.36		.46		.45		.19
	N		15		19		14		27		14		13		20		27
Rural 7-9 P.M.	% \geq .02	1	.07	13	.18	25	.18	40	.04	31	.13	46	.07	10	.26	19	.04
	% \geq .05		.00		.14		.12		.04		.00		.03		.13		.04
	N		14		22		17		25		15		30		23		27
10-12 P.M.	% \geq .02	26	.32	41	.07	2	.16	14	.17	11	.04	20	.10	32	.13	47	.10
	% \geq .05		.21		.00		.100		.17		.00		.03		.00		.06
	N		19		15		19		24		24		30		30		30
1-3 A.M.	% \geq .02	27	.43	42		3	.25	15	.18	12	.41	21	.42	33	.38	48	.38
	% \geq .05		.36		---		.25		.14		.12		.11		.31		.06
	N		14				10		28		17		12		13		16

0=site number

TABLE B3. OBSERVED FRACTIONS OF SUBJECTS AT OR ABOVE .02 AND .05 BAC CLASSIFIED BY CELLS IN THE EXPERIMENTAL DESIGN MODEL 1973

		W E E K D A Y								W E E K E N D							
		Medium				High				Medium				High			
		Site No.	Traffic Rep 1	Site No.	Volume Rep 2	Site No.	Traffic Rep 1	Site No.	Volume Rep 2	Site No.	Traffic Rep 1	Site No.	Volume Rep 2	Site No.	Traffic Rep 1	Site No.	Volume Rep 2
Urban 7-9 P.M.	% \geq .02	28	.10	37	.15	4	.00	16	.10	7	.05	22	.00	34	.05	43	.00
	% \geq .05		.10		.10		.00		.05		.00		.00		.00		.00
	N		20		20		20		20		20		20		20		20
10-12 P.M.	% \geq .02	5	.00	17	.00	29	.10	38	.15	35	.00	44	.17	8	.15	23	.05
	% \geq .05		.00		.00		.00		.05		.00		.08		.10		.00
	N		20		20		20		02		20		12		20		20
1-3 A.M.	% \geq .02	6	.40	18	.36	30	.11	39	.24	36	.30	45	.53	9	.15	24	.45
	% \geq .05		.25		.21		.00		.12		.10		.29		.05		.20
	N		20		14		9		17		20		17		20		20
Rural 7-9 P.M.	% \geq .02	1	.06	13	.05	25	.05	40	.00	31	.15	46	.05	10		19	.20
	% \geq .05		.00		.05		.00		.00		.05		.05		---		.05
	N		17		20		19		20		20		20				20
10-12 P.M.	% \geq .02	26	.15	41	.19	2	.10	14	.20	11		20	.20	32	.05	47	.00
	% \geq .05		.10		.13		.00		.10		---		.15		.05		.00
	N		20		16		20		20				20		20		20
1-3 A.M.	% \geq .02	27	.24	42	.10	3	.25	15	.30	12		21	.20	33	.60	48	.21
	% \geq .05		.24		.05		.05		.20		---		.10		.53		.14
	N		17		20		20		20				20		15		14

0=site number

TABLE B4. PERCENTAGE OF DRIVERS WITH BAC GREATER THAN OR EQUAL TO 0.02 AS A FUNCTION OF EXPERIMENTAL DESIGN VARIABLES 1971

Variable	Level	Mean
Traffic Volume	1 Medium	23.1%
	2 High	16.5%
Time of Night	1 (7PM - 9PM)	11.3%
	2 (10PM - 12PM)	14.1%
	3 (1AM - 3AM)	34.1%
Urban vs Rural	1 Urban	17.9%
	2 Rural	21.7%
Weekday vs Weekend	1 Weekday	18.3%
	2 Weekend	21.2%
Grand Mean		19.8%

TABLE B5. ANALYSIS OF VARIANCE FOR PERCENTAGE OF DRIVERS AT OR ABOVE 0.02 BAC - 1971

Source of Variation	Sums of Squares	Degrees of Freedom	Mean Squares	Ratio
A (time of night)	.4951	2	.2476	33.0067 ^(a)
B (urban vs. rural)	.0176	1	.0176	
AB	.0009	2	.0005	
C (traffic volume)	.0533	1	.0533	7.1107 ^(a)
AC	.0694	2	.0347	4.6269 ^(a)
BC	.0024	1	.0024	
ABC	.0133	2	.0066	
D (weekday vs weekend)	.0102	1	.0102	
AD	.0105	2	.0052	
BD	.0033	1	.0033	
ABD	.0326	2	.0163	
CD	.0027	1	.0027	
ACD	.0027	2	.0014	
BCD	.0004	1	.0004	
ABCD	.0146	2	.0073	
Within Cells	.1736	23	.0075	
Total	.9028	46		

^(a) Significant at $p \leq 0.05$

NOTE: 1. The missing site was handled by assigning it the same value as the other observation in that cell of the complete factorial model. This results in the replacement of the missing value by its expected value. However, it removes one degree of freedom from the mean square for error.

2. Table values are rounded to the nearest whole number.

TABLE B6. PERCENTAGE OF DRIVERS WITH BAC GREATER THAN OR EQUAL TO 0.05 AS A FUNCTION OF EXPERIMENTAL DESIGN VARIABLES - 1971

Variable	Level	Mean
Traffic Volume	1 Medium	13.8%
	2 High	7.9%
Time of Night	1 (7PM - 9PM)	5.3%
	2 (10PM - 12PM)	6.2%
	3 (1AM - 3AM)	21.1%
Urban vs Rural	1 Urban	9.3%
	2 Rural	12.5%
Weekday vs Weekend	1 Weekday	9.5%
	2 Weekend	12.3%
Grand Mean		10.9%

TABLE B7. ANALYSIS OF VARIANCE FOR PERCENTAGE OF DRIVERS AT OR ABOVE 0.05 BAC - 1971

Source of Variation	Sums of Squares	Degrees of Freedom	Mean Squares	Ratio
A (time of night)	.2528	2	.1264	29.3909 ^(a)
B (urban vs. rural)	.0120	1	.0120	
AB	.0201	2	.0101	
C (traffic volume)	.0420	1	.0420	9.7693 ^(a)
AC	.0319	2	.0159	3.7067 ^(a)
BC	.0001	1	.0001	
ABC	.0155	2	.0078	
D (weekday vs weekend)	.0096	1	.0096	
AD	.0027	2	.0013	
BD	.0001	1	.0001	
ABD	.0185	2	.0092	
CD	.0027	1	.0027	
ACD	.0089	2	.0044	
BCD	.0030	1	.0030	
ABCD	.0066	2	.0033	
Within Cells	.1000	23	.0043	
Total	.5265	46		

^(a) Significant at $p \leq 0.05$

NOTE: 1. The missing site was handled by assigning it the same value as the other observation in that cell of the complete factorial model. This results in the replacement of the missing value by its expected value. However, it removes one degree of freedom from the mean square for error.

2. Table values are rounded to the nearest whole number.

TABLE B8. PERCENTAGE OF DRIVERS WITH BAC GREATER THAN OR EQUAL TO 0.02 AS A FUNCTION OF EXPERIMENTAL DESIGN VARIABLES - 1972

Variable	Level	Mean
Traffic Volume	1 Medium	20.9%
	2 High	19.2%
Time of Night	1 (7PM - 9PM)	8.9%
	2 (10PM - 12PM)	12.3%
	3 (1AM - 3AM)	38.9%
Urban vs Rural	1 Urban	19.6%
	2 Rural	20.6%
Weekday vs Weekend	1 Weekday	18.8%
	2 Weekend	21.3%
Grand Mean		20.1%

TABLE B9. ANALYSIS OF VARIANCE FOR PERCENTAGE OF DRIVERS AT OR ABOVE 0.02 BAC - 1972

Source of Variation	Sums of Squares	Degrees of Freedom	Mean Squares	Ratio
A (time of night)	.8619	2	.4310	55.2518 ^(a)
B (urban vs. rural)	.0012	1	.0012	
AB	.0309	2	.0155	
C (traffic volume)	.0033	1	.0033	
AC	.0053	2	.0026	
BC	.0033	1	.0033	
ABC	.0232	2	.1160	
D (weekday vs weekend)	.0075	1	.0075	
AD	.0025	2	.0013	
BD	.0085	1	.0085	
ABD	.0083	2	.0042	
CD	.0056	1	.0056	
ACD	.0053	2	.0026	
BCD	.0120	1	.0120	
ABCD	.0004	2	.0002	
Within Cells	.1787	23	.0078	
Total	1.1807	46		

^(a) Significant at $p \leq 0.05$

- NOTE: 1. The missing site was handled by assigning it the same value as the other observation in that cell of the complete factorial model. This results in the replacement of the missing value by its expected value. However, it removes one degree of freedom from the mean square for error.
2. Table values are rounded to the nearest whole number.

TABLE B10. PERCENTAGE OF DRIVERS WITH BAC GREATER THAN OR EQUAL TO 0.05 AS A FUNCTION OF EXPERIMENTAL DESIGN VARIABLES - 1972

Variable	Level	Mean
Traffic Volume	1 Medium	12.2%
	2 High	11.7%
Time of Night	1 (7PM - 9PM)	4.7%
	2 (10PM - 12PM)	5.1%
	3 (1AM - 3AM)	26.0%
Urban vs Rural	1 Urban	12.5%
	2 Rural	11.4%
Weekday vs Weekend	1 Weekday	12.1%
	2 Weekend	12.0%
Grand Mean		11.9%

TABLE B11. ANALYSIS OF VARIANCE FOR PERCENTAGE OF DRIVERS AT OR ABOVE 0.05 BAC - 1972

Source of Variation	Sums of Squares	Degrees of Freedom	Mean Squares	Ratio
A (time of night)	.4733	2	.2367	25.7237 ^(a)
B (urban vs. rural)	.0014	1	.0014	
AB	.0271	2	.0136	
C (traffic volume)	.0002	1	.0271	
AC	.0103	2	.0052	
BC	.0002	1	.0002	
ABC	.0029	2	.0014	
D (weekday vs weekend)	.0001	1	.0001	
AD	.0009	2	.0005	
BD	.0547	1	.0547	5.9429 ^(a)
ABD	.0222	2	.0111	
CD	.0030	1	.0030	
ACD	.0011	2	.0006	
BCD	.0140	1	.0140	
ABCD	.0142	2	.0071	
Within Cells	.2117	23	.0092	
Total	.8374	46		

^(a) Significant at $p \leq 0.05$

NOTE: 1. The missing site was handled by assigning it the same value as the other observation in that cell of the complete factorial model. This results in the replacement of the missing value by its expected value. However, it removes one degree of freedom from the mean square for error.

2. Table values are rounded to the nearest whole number.

TABLE B12. PERCENTAGE OF DRIVERS WITH BAC GREATER THAN OR EQUAL TO 0.02 AS A FUNCTION OF EXPERIMENTAL DESIGN VARIABLES - 1973

Variable	Level	Mean
Traffic Volume	1 Medium	16.0%
	2 High	15.4%
Time of Night	1 (7PM - 9PM)	7.5%
	2 (10PM - 12PM)	10.7%
	3 (1AM - 3AM)	28.9%
Urban vs Rural	1 Urban	15.0%
	2 Rural	16.5%
Weekday vs Weekend	1 Weekday	14.2%
	2 Weekend	17.3%
Grand Mean		15.7%

TABLE B13. ANALYSIS OF VARIANCE FOR PERCENTAGE OF DRIVERS AT OR ABOVE 0.02 BAC - 1973

Source of Variation	Sums of Squares	Degrees of Freedom	Mean Squares	Ratio
A (time of night)	.4292	2	.2146	21.4581 ^(a)
B (urban vs.rural)	.0024	1	.0024	
AB	.0295	2	.0148	
C (traffic volume)	.0004	1	.0004	
AC	.0004	2	.0002	
BC	.0161	1	.0161	
ABC	.1164	2	.0582	5.6326 ^(a)
D (weekday vs weekend)	.0120	1	.0120	
AD	.0161	2	.0081	
BD	.0030	1	.0030	
ABD	.0328	2	.0164	
CD	.0014	1	.0014	
ACD	.0357	2	.0178	
BCD	.0000	1	.0000	
ABCD	.0013	2	.0006	
Within Cells	.2106	21	.0100	
Total	.9073	44		

^(a) Significant at $p \leq 0.05$

NOTE: 1. The missing sites were handled by assigning them the same value as the other observation in that cell of the complete factorial model. This results in the replacement of the missing value by its expected value. However, it removes three degrees of freedom from the mean square for error.

2. Table values are rounded to the nearest whole number.

TABLE B14. PERCENTAGE OF DRIVERS WITH BAC GREATER THAN OR EQUAL TO 0.05 AS A FUNCTION OF EXPERIMENTAL DESIGN VARIABLES - 1973

Variable	Level	Mean
Traffic Volume	1 Medium	9.6%
	2 High	7.2%
Time of Night	1 (7PM - 9PM)	3.1%
	2 (10PM - 12PM)	5.6%
	3 (1AM - 3AM)	16.4%
Urban vs Rural	1 Urban	7.1%
	2 Rural	9.7%
Weekday vs Weekend	1 Weekday	7.5%
	2 Weekend	9.3%
Grand Mean		8.4%

TABLE B15. ANALYSIS OF VARIANCE FOR PERCENTAGE OF DRIVERS AT OR ABOVE 0.05 BAC - 1973

Source of Variation	Sums of Squares	Degrees of Freedom	Mean Squares	Ratio
A (time of night)	.1597	2	.0798	10.3671 ^(a)
B (urban vs. rural)	.0085	1	.0085	
AB	.0064	2	.0032	
C (traffic volume)	.0065	1		
AC	.0021	2	.0011	
BC	.0065	1		
ABC	.0585	2	.0293	3.7990 ^(a)
D (weekday vs weekend)	.0040	1	.0040	
AD	.0075	2	.0038	
BD	.0065	1		
ABD	.0088	2		
CD	.0120	1		
ACD	.0234	2	.0117	
BCD	.0003	1		
ABCD	.0068	2	.0034	
Within Cells	.1613	21	.0077	
Total	.4789	44		

^(a) Significant at $p \leq 0.05$

NOTE: 1. The missing sites were handled by assigning them the same value as the other observation in that cell of the complete factorial model. This results in the replacement of the missing value by its expected value. However, it removes three degrees of freedom from the mean square for error.

2. Table values are rounded to the nearest whole number.

TABLE B16. PERCENTAGE OF DRIVERS WITH BAC GREATER THAN OR EQUAL TO 0.02 BY TIME OF NIGHT AND TRAFFIC VOLUME - 1971

Time of Night	Traffic Volume	
	1 Medium	2 High
1 (7PM - 9PM)	9.9%	12.6%
2 (10PM - 12PM)	17.5%	10.6%
3 (1AM - 3AM)	42.0%	26.1%

TABLE B17. ANALYSIS OF 1971 0.02 BAC DATA TABLE OF INTERACTION MEANS

TUKEY SIGNIFICANCE TEST ON FACTOR: TIME OF NIGHT
 FIRST FACTOR TO BE HELD CONSTANT IS: TRAFFIC VOLUME
 LEVEL OF FIRST CONSTANT FACTOR, TRAFFIC VOLUME = MEDIUM
 ORDER OF LEVEL MEANS IS: 1 2 3
 VALUES OF STUDENTIZED RANGE (Q) STATISTIC.
 **=SIGNIFICANT .01 LEVEL.

Time of Night	Traffic Volume	
	1 Medium	2 High
2 (10PM - 12PM)	2.54	
3 (1AM - 3AM)	10.68**	8.15**

LEVEL OF FIRST CONSTANT FACTOR, TRAFFIC VOLUME = HIGH
 ORDER OF LEVEL MEANS IS: 2 1 3
 VALUES OF STUDENTIZED RANGE (Q) STATISTIC.
 **=SIGNIFICANT .01 LEVEL.

Time of Night	Traffic Volume	
	2 Medium	1 High
1 (7PM - 9PM)	0.67	
3 (1AM - 3AM)	5.15**	4.49**

TABLE B18. PERCENTAGE OF DRIVERS WITH BAC GREATER THAN OR EQUAL TO 0.05 BY TIME OF NIGHT AND TRAFFIC VOLUME - 1971

Time of Night	Traffic Volume	
	1 Medium	2 High
1 (7PM - 9PM)	5.1%	5.5%
2 (10PM - 12PM)	9.1%	3.3%
3 (1AM - 3AM)	27.3%	15.0%

TABLE B19. ANALYSIS OF 1971 0.05 BAC DATA TABLE OF INTERACTION MEANS

TUKEY SIGNIFICANCE TEST ON FACTOR: TIME OF NIGHT
FIRST FACTOR TO BE HELD CONSTANT IS: TRAFFIC VOLUME

LEVEL OF FIRST CONSTANT FACTOR, TRAFFIC VOLUME = MEDIUM
ORDER OF LEVEL MEANS IS: 1 2 3
VALUES OF STUDENTIZED RANGE (Q) STATISTIC.
**=SIGNIFICANT .01 LEVEL.

Time of Night	Traffic Volume	
	1 Medium	2 High
2 (10PM - 12PM)	1.75	
3 (1AM - 3AM)	9.69**	7.94**

LEVEL OF FIRST CONSTANT FACTOR, TRAFFIC VOLUME = HIGH
ORDER OF LEVEL MEANS IS: 2 1 3
VALUES OF STUDENTIZED RANGE (Q) STATISTIC.
*=SIGNIFICANT .05 LEVEL: **=SIGNIFICANT .01 LEVEL.

Time of Night	Traffic Volume	
	2 High	1 Medium
1 (7PM - 9PM)	0.99	
3 (1AM - 3AM)	5.15**	4.16*

TABLE B20. PERCENTAGE OF DRIVERS WITH BAC GREATER THAN OR EQUAL TO 0.02 BY TIME OF NIGHT AND TRAFFIC VOLUME - 1972

Time of Night	Traffic Volume	
	1 Medium	2 High
1 (7PM - 9PM)	9.0%	9.0%
2 (10PM - 12PM)	12.5%	12.1%
3 (1AM - 3AM)	41.3%	36.6%

TABLE B21. ANALYSIS OF 1972 0.02 BAC DATA TABLE OF INTERACTION MEANS

TUKEY SIGNIFICANCE TEST ON FACTOR: TIME OF NIGHT
 FIRST FACTOR TO BE HELD CONSTANT IS: TRAFFIC VOLUME

LEVEL OF FIRST CONSTANT FACTOR, TRAFFIC VOLUME = MEDIUM
 ORDER OF LEVEL MEANS IS: 1 2 3
 VALUES OF STUDENTIZED RANGE (Q) STATISTIC.
 **=SIGNIFICANT .01 LEVEL.

Time of Night	Traffic Volume	
	1 Medium	2 High
2 (10PM - 12PM)	1.15	
3 (1AM - 3AM)	10.57**	9.42**

LEVEL OF FIRST CONSTANT FACTOR, TRAFFIC VOLUME = HIGH
 ORDER OF LEVEL MEANS IS: 1 2 3
 VALUES OF STUDENTIZED RANGE (Q) STATISTIC.
 **=SIGNIFICANT .01 LEVEL.

Time of Night	Traffic Volume	
	1 Medium	2 High
2 (10PM - 12PM)	1.02	
3 (1AM - 3AM)	9.05**	8.03**

TABLE B22. PERCENTAGE OF DRIVERS WITH BAC GREATER THAN OR EQUAL TO 0.05 BY TIME OF NIGHT AND TRAFFIC VOLUME - 1972

Time of Night	Traffic Volume	
	1 Medium	2 High
1 (7PM - 9PM)	3.6%	5.9%
2 (10PM - 12PM)	4.6%	5.6%
3 (1AM - 3AM)	28.3%	23.8%

TABLE B23. ANALYSIS OF 1972 0.05 BAC DATA TABLE OF INTERACTION MEANS

TUKEY SIGNIFICANCE TEST ON FACTOR: TIME OF NIGHT
FIRST FACTOR TO BE HELD CONSTANT IS: TRAFFIC VOLUME

LEVEL OF FIRST CONSTANT FACTOR, TRAFFIC VOLUME = MEDIUM
ORDER OF LEVEL MEANS IS: 2 1 3
VALUES OF STUDENTIZED RANGE (Q) STATISTIC.
**=SIGNIFICANT .01 LEVEL.

Time of Night	Traffic Volume	
	2 High	1 Medium
1 (7PM - 9PM)	0.30	
3 (1AM - 3AM)	7.42**	7.11**

LEVEL OF FIRST CONSTANT FACTOR, TRAFFIC VOLUME = HIGH
ORDER OF LEVEL MEANS IS: 1 2 3
VALUES OF STUDENTIZED RANGE (Q) STATISTIC.
**=SIGNIFICANT .01 LEVEL.

Time of Night	Traffic Volume	
	1 Medium	2 High
2 (10PM - 12PM)	0.08	
3 (1AM - 3AM)	5.46**	5.38**

TABLE B24. PERCENTAGE OF DRIVERS WITH BAC GREATER THAN OR EQUAL TO 0.02 BY TIME OF NIGHT AND TRAFFIC VOLUME - 1973

Time of Night	Traffic Volume	
	1 Medium	2 High
1 (7PM - 9PM)	7.6%	7.5%
2 (10PM - 12PM)	11.4%	9.9%
3 (1AM - 3AM)	29.1%	28.9%

TABLE B25. ANALYSIS OF 1973 0.02 BAC DATA TABLE OF INTERACTION MEANS

TUKEY SIGNIFICANCE TEST ON FACTOR: TIME OF NIGHT
 FIRST FACTOR TO BE HELD CONSTANT IS: TRAFFIC VOLUME

LEVEL OF FIRST CONSTANT FACTOR, TRAFFIC VOLUME = MEDIUM
 ORDER OF LEVEL MEANS IS: 1 2 3
 VALUES OF STUDENTIZED RANGE (Q) STATISTIC.
 **=SIGNIFICANT .01 LEVEL.

Time of Night	Traffic Volume	
	1 Medium	2 High
2 (10PM - 12PM)	1.13	
3 (1AM - 3AM)	6.49**	5.36**

LEVEL OF FIRST CONSTANT FACTOR, TRAFFIC VOLUME = HIGH
 ORDER OF LEVEL MEANS IS: 1 2 3
 VALUES OF STUDENTIZED RANGE (Q) STATISTIC.
 **=SIGNIFICANT .01 LEVEL.

Time of Night	Traffic Volume	
	1 Medium	2 High
2 (10PM - 12PM)	0.75	
3 (1AM - 3AM)	6.45**	5.70**

TABLE B26. PERCENTAGE OF DRIVERS WITH BAC GREATER THAN OR EQUAL TO 0.05 BY TIME OF NIGHT AND TRAFFIC VOLUME - 1973

Time of Night	Traffic Volume	
	1 Medium	2 High
1 (7PM - 9PM)	4.4%	1.9%
2 (10PM - 12PM)	7.6%	3.8%
3 (1AM - 3AM)	16.7%	16.1%

TABLE B27. ANALYSIS OF 1973 0.05 BAC DATA TABLE OF INTERACTION MEANS

TUKEY SIGNIFICANCE TEST ON FACTOR: TIME OF NIGHT
FIRST FACTOR TO BE HELD CONSTANT IS: TRAFFIC VOLUME

LEVEL OF FIRST CONSTANT FACTOR, TRAFFIC VOLUME = MEDIUM
ORDER OF LEVEL MEANS IS: 1 2 3
VALUES OF STUDENTIZED RANGE (Q) STATISTIC.
*=SIGNIFICANT .05 LEVEL.

Time of Night	Traffic Volume	
	1 Medium	2 High
2 (10PM - 12PM)	1.12	
3 (1AM - 3AM)	4.27*	3.15

LEVEL OF FIRST CONSTANT FACTOR, TRAFFIC VOLUME = HIGH
ORDER OF LEVEL MEANS IS: 1 2 3
VALUES OF STUDENTIZED RANGE (Q) STATISTIC.
**=SIGNIFICANT .01 LEVEL.

Time of Night	Traffic Volume	
	1 Medium	2 High
2 (10PM - 12PM)	0.65	
3 (1AM - 3AM)	4.92**	4.27**

