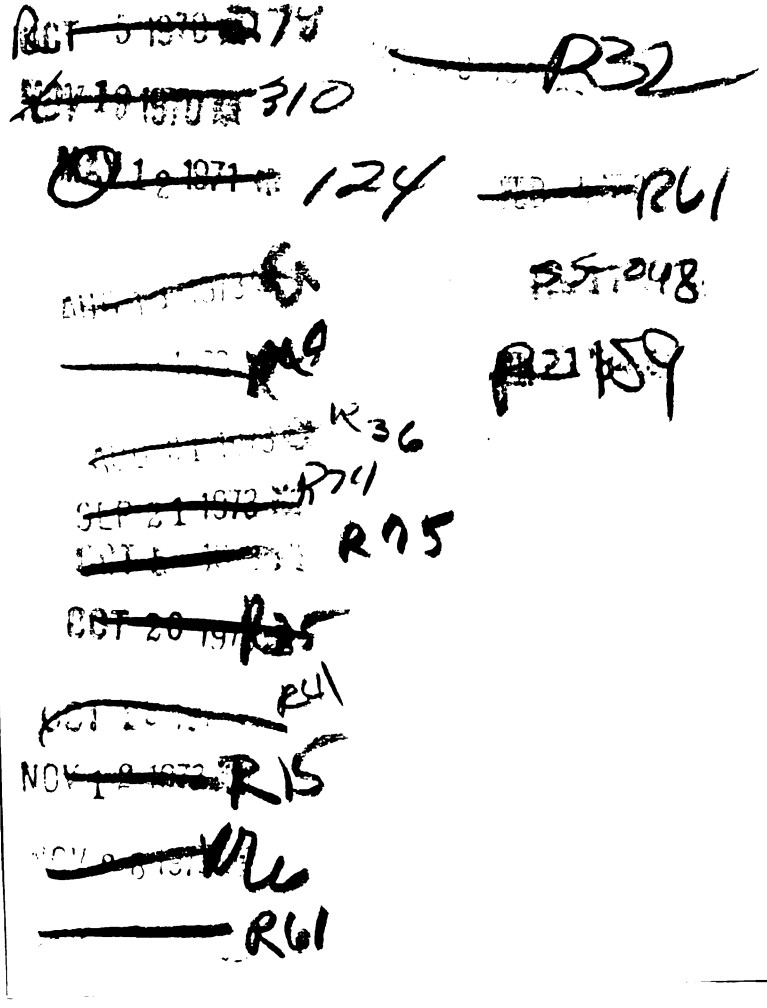
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ABSTRACT

A STUDY OF CERTAIN FACTORS RELATED TO THE PATTERNS OF DRIVING, ACCIDENT AND VIOLATION RATES OF 436, 17 AND 18 YEAR-OLD LICENSED DRIVERS FROM TWO LANSING CATHOLIC SCHOOLS

By

Sister Marie Therese Emery, O.P.

The purpose of this investigation was to determine the relationship between certain facets of driving exposure, (i.e., total driving per week, total hours of night driving per week, mileage and parental control) with factors of age, sex and car-ownership. The following subproblems were considered: (1) to determine if a relationship existed between accident and violation rates with the factors of age, sex and car-ownership; (2) to determine if a relationship existed between the combined effect of two or more of the exposure variables with age, sex and car-ownership.

Four hundred thirty-six high school students from two Lansing, Catholic high schools served as subjects. The subjects were 17 and 18 year-old males and females holding a valid Michigan drivers license.

A questionnaire was used to obtain the information concerning the variables under consideration in the study. A personal interview with each subject was used to obtain a more accurate account as to the geographic location and frequency of the driving exposure. A driving record of each subject was obtained from the Department of State, Lansing, Michigan.

The data collected were analyzed statistically. Simple correlations between the driving factors of exposure (i.e. driving hours per week, night driving hours per week, total miles per week, accidents, violations and parental control) were made with the variables (i.e. age, sex and car-ownership). A significant F indicated the presence of significant correlations. A multiple regression was computed on various combination of variables to determine where significant correlations of variables existed with age, sex and car-ownership. In all cases of statistical analysis the .05 level of significance was selected as the criterion for rejecting the null hypothesis.

The information gleaned from the questionnaire and personal interview concerning the location and frequency of each subjects driving was analyzed descriptively. Each subjects pattern of driving as represented by location and frequency was recorded and placed on a spot map

to determine if a significant relationship existed between these factors and other variables being considered.

Within the limitations of this study, the following conclusions were made:

1. Total driving hours per week, night driving per week, and total mileage showed strong correlation with age. Eighteen year-olds drove more hours per week, more hours per night and more mileage than 17 year-olds.

2. There is a significant negative correlation between sex and violations. Males had more violations.

3. There is a significant correlation between total miles and violations. As mileage increased, violations increased.

4. There is a significant correlation between total driving hours per week, night driving per week and total mileage. Total driving hours per week and night driving per week increased as mileage increased.

5. There is a significant correlation between accicents and violations. As accidents increased, violations increased.

6. There is a significant negative correlation between accident rate and parental control. As accident rates decreased, parental control became stricter.

7. There is a significant negative correlation between sex and car-ownership. Males owned more cars.

8. Total driving time, total miles driven and violations were the major contributors as predictors of attributes of sex. Males drove more hours, more at night and more miles than females.

9. Night driving, violations and parental control were the major contributors as predictors of age. Eighteen year-olds drove more miles, had more violations and less parental control than 17 year-olds.

10. Accident rate and parental control are the major contributors as predictors of car-ownership. Seventeen year-olds had more (69) accidents and less parental control than 18 year-olds (56).

11. Exposure as to location and frequency showed that the 17 and 18 year-old drivers in this sampling frequented a ten mile radius of Lansing, and had most of their accidents and violations within this area. The spot map reinforced this idea.

A STUDY OF CERTAIN FACTORS RELATED TO THE PATTERNS OF DRIVING, ACCIDENT AND VIOLATION RATES OF 436, 17 AND 18 YEAR-OLD LICENSED DRIVERS FROM TWO LANSING CATHOLIC SCHOOLS

By

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DEDICATION

THIS STUDY IS DEDICATED TO BLANCHE F. EMERY

MOTHER, TEACHER, AND COUNSELOR

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CHAPTER I

INTRODUCTION

According to information compiled by the Michigan Department of State Police for the year 1968, there were 305,495 reported accidents of which 100,237 were personal injury and 203,243 were property damage accidents. This record included 2,015 fatal accidents. Of these fatal accidents, 16.3% of these drivers were under twenty years of age.[1] Records indicate that 12,204 accidents occured in Ingham County: 35 were listed as fatal; 3,386 were personal injuries and 8,784 were property damage.[2] Ingham County was one of the 49 Counties of the State of Michigan that showed a decided increase in accident rates in the past year, and of 83 Counties in Michigan, Ingham is listed among the top sixteen in regard to accident rates.[3]

There is much available data establishing young drivers under 25 years of age as an extraordinary high-risk

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[1]Department of State Police, Michigan Traffic Accident Facts 1968 (Michigan: The Department of State Police, pp. 5-38.

[2]Ibid., p. 38.

[3]Ibid., p. 11.

group.[4] Pelz and Schuman[5] stated that some groups of drivers are distinctly more dangerous than others. They conclude that young males, ages 15 to 25, constitute a high-risk group with an accident-death rate that far exceeds any other age group. Klein[6], reports in a survey of drivers, that the proportion of violations, fatalities, and reportable accidents involving licensed teen-agers was significantly higher than any other group of drivers. However, he stated that a true picture of accident and violation rates could not be acquired without a complete study of the young drivers' types and amount of exposure to risk. Gesteland[7], in an article on teen-age driving, indicated that the teen-age boy did most of his driving at night. He pointed out that the traffic death rate for teen-age males was about two and two-thirds higher at night. Gesteland infers that the young driver is a high risk because he needs to be trained how to cope with night driving situations.

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[4] Ibid., p. 7.

[5] Donald C. Pelz and Stanley H. Schuman, "Dangerous Young Drivers," The Society of Automotive Engineers Journal, LXXVI (October, 1968), pp. 61-68.

[6] David Klein, "A Reappraisal of the Violation and Accident Data on Teen-age Drivers," Traffic Quarterly, XX (October, 1966), pp. 502-510.

[7] Norman Gesteland, "Let's Teach the Teen-ager How to Drive When They Drive the Most Often at Night," Traffic Digest, XV (November, 1967), pp. 3-7.

National and local statistics support the opinion of authorities in the field of traffic safety who label the young driver a dangerous driver.

Since the young driver of today comprises an important part of the driving population, it was the purpose of this study to investigate a segment of the population of young drivers in Lansing in order to observe some of their driving patterns.

It has been a rewarding experience to work with, and teach young drivers. This study was selected to get a sharper focus of the young drivers' problems and their pattern of driving.

An in-depth study of 436, 17 and 18 year-old licensed drivers from two Lansing, Catholic high schools was selected. These subjects came from middle-class socio-economic groups. The geographic location of their homes would be classified as urban. This sampling was taken from a selected group and does not claim to be a sampling of an average population.

Total behind-the-wheel driving experience for the 17 year-old drivers was one year. Actual experience of the 18 year-old subjects was approximately two years. In some cases, these subjects used the car for business purposes. However, the majority of driving was done for recreational purposes. It was noted that the young drivers drove most frequently within a ten mile

radius from the center of Lansing. Most of their driving involved travel to and from eating establishments and places of entertainment. With this information at hand, it was possible to study certain exposure factors confronting the young driver as he drove more miles and more hours under a variety of conditions. Exposure factors considered were, total hours driven, total night driving hours, miles driven and degrees of parental control. Accident and violation rates of the subjects were studied, as were factors of exposure recorded to further assist in determining their driving patterns.

The Problem

Statement of the Problem

It was the purpose of this study to determine the relationships between certain facets of driving exposure, namely: total hours the subject actually drove, total hours of night driving, miles driven, and parental-control, with factors of sex, age and car-ownership of a group of 436, 17 and 18 year-old licensed drivers from two Catholic high schools in the city of Lansing, Michigan.

Importance of the Study

To obtain an accurate picture of the 17 and 18 year-old licensed driver, it was necessary to do an in-depth study of their patterns of driving.

Each young driver is a priceless commodity in our society. Each has dignity and worth that should not be measured in monetary values. In order to save the lives and limbs of these young drivers, a closer look at the difficulties they face on the highway must be considered. It is imperative that through research studies, ways and means be found to assist these young drivers in making useful and safe decisions. Hence, the inspiration for this study came from teen-age drivers themselves, as they participated in driver education courses conducted by the author.

It was believed that this study would provide a better understanding of the depth and complexity of the exposure problem. In addition, it was hoped that this study would identify some unique problems in the driving patterns established by 17 and 18 year-old licensed drivers. Since driving habits may reflect the nature of a driver education program, a significant contribution of this study would be the assistance it would provide driver education teachers in their search for a more meaningful curriculum.

Sub-problem

The following sub-problems were considered:

1. To determine if there was a relationship between accident and violation rates and the factors of age, sex, and car-ownership.

2. To determine if there was a relationship where variables such as: total hours driven per week, total night hours of driving per week, mileage, and parental control were combined and compared with such factors as age, sex, and car-ownership.

For the purpose of stating the null-hypotheses, the following variables are referred to as predictive variables (i.e., total hours driven, total night driving hours, violations, accidents and parental control). It was hypothesized that:

1. There is no relationship between each dependent variable (i.e., age, sex and car-ownership) with the predictive variables.
2. Total hours driven, total night driving, total mileage are not predictors of age.
3. Car-ownership is not related to sex.
4. There is no interaction between violations and total miles driven as predictors of sex.
5. There is no interaction among total night driving hours, violations and parental control as predictors of age.
6. There is no correlation between accident rates and parental control.
7. There is no relationship between total miles driven and the number of violations received.

8. There is no interaction among total hours driven, total night driving hours, violation rates and parental control as predictors of accident rates.
9. There is no interaction between accident rates and car-ownership when considered in combination with the predictive variables.
10. There is no correlation between car-ownership and parental control.

Delimitations

Driving exposure as referred to in this study did not consider all factors inclusive in the concept of exposure. This investigation was therefore limited to the following areas of exposure: total hours driven per week; total miles driven per week; total hours of night driving per week and the locations to which each subject drove and pertinent degrees of parental control. It is recognized that factors of driving exposure are extremely complex. The major limitation of this study is that it deals with one small segment of the vast exposure problem.

The 436 subjects were taken from two Catholic high schools in the city of Lansing, Michigan. The numbers of each group of students comprising the population were as follows: 18 year-old male car-owners, 50; 18 year-old male non-car-owners, 50; 18 year-old female car-owners, 26; eighteen year-old female non-car-owners, 50; 17 year-old

male car-owners, 50; 17 year-old male non-car-owners, 50; seventeen year-old female car-owners, 50; 17 year-old female non-car-owners, 110.

Definition of Terms Used

Exposure

For the purpose of this study, the term exposure will be applied only to that small segment of the total exposure problem dealt with in this investigation. Exposure is in this sense the total hours driven per week by the subject, the total night driving per week, the total miles driven per week, and the locations to which the subject drives.

Night-driving

Night driving is the amount of driving hours the subject drives after sunset and before sunrise and the locations to which the subject drives.

Parental Control

Parental control included the permission and restrictions enforced strictly, moderately, or never by the parent as considered by the subjects.

Basic Assumptions

For the purpose of this study, it was assumed that:

1. The use of the questionnaire was appropriate for the kind of information needed. The questionnaire was designed to reveal information from 17 and 18 year-old drivers in the following areas: sex, age, car-ownership, parents' occupations, miles driven, night driving, car-usage, restrictions, violations and accidents.

2. The interview technique was used to supplement the questionnaire. The interview further explored in-depth driving patterns that the questionnaire did not cover. A spot map was used in conjunction with the personal interview. Specific locations to which the students drove and the number of times these locations were frequented were recorded.

Organization of the Chapters

Chapter I introduces the nature of the driving problem of a limited number of 17 and 18 year-old drivers representing a segment of the total population of licensed drivers in Lansing, Michigan.

Chapter II reviews some of the related literature pertinent to this specific study.

Chapter III considers the procedures conducive to an in-depth study of the driving performance of the chosen segment of the population of Lansing, Michigan.

Chapter IV includes both a statistical and descriptive analysis of the data.

Chapter V contains the summary, discussion, conclusions and recommendations of the findings.

CHAPTER II

REVIEW OF RELATED LITERATURE

A review of the literature revealed that many of the previous studies conducted on the young driver emphasized attitudinal behavior of this group and attempted to compare its accident rate with the rate for older drivers. Recently, however, there has been an attempt to present a more accurate picture of the young driver by studying the type and amount of driving exposure that he has and comparing this to the types and amount of exposure had by the older driver in relation to the accident rates of each. The references selected for this review were concerned with the accident status of the young driver, and with the needs and methods of more accurately delineating his driving exposure.

According to Accident Facts, accident rates in twenty-four states for the year 1968 shows that drivers under the age of twenty comprise only 9.5% of the driving population, but are involved in 14.1% of fatal accidents and 14.9% of all accidents.[1]

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[1]National Safety Council, Accident Facts, 1968 Edition (Chicago: The Council, 1968), p. 8.

Klein[2] felt that such statistics are misleading and have a tendency to relate accident rates directly with age. It is his opinion that such evidence does not stand up under scrutiny. To get a true picture, it is necessary to thoroughly evaluate the problem of exposure. Klein believes that a valid picture of accident and violation rates must be based upon the amount and the types of exposure while taking into account such factors as total mileage, road and traffic conditions, roadside characteristics, number of occupants in the car and similar important items.

In an earlier study Lauer[3] used a round-the-clock sampling technique to distinguish the driving habits of the licensed population with regard to age, sex, speed and other related factors. The investigation covered over a six month period and included some 11,000 subjects of all ages. As a result of the study, Lauer concluded that the driving habits of men and women were quite different and that the women represented a slightly better actuarial risk than did the men. His study also indicated

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[2]David Klein, "A Reappraisal of the Violation and Accident Data on Teen-age Drivers." Traffic Quarterly, XX (October, 1966), pp. 502-510.

[3]A. R. Lauer, "A Sampling Survey of Drivers on the Highway for the Twenty-four Hour Period - Driver Characteristics and Accidents," Highway Research Board Bulletin, LXXIII, 1953, pp. 14-25.

that the teen-age driver was likely to drive during the hours when traffic conditions and weather were the most hazardous. Both Klein and Lauer supported the idea that when more accurate means of measuring exposure are obtained and are used in research, the teen-age driver will be found to have no higher accident and violation rates than any other driver.

Pelz and Schuman[4] in a study of 288 drivers between the ages of 16 and 25, found that young males between the ages of 16 and 25 have a death rate from automobile accidents that exceeds any other age group, and that the death rate is lower for females of the same age group. The data in their study indicated that there were some factors operating within this age group that predisposed them to involvement in accidents. They conducted a follow-up study at drive-ins and similar locations through the use of interviews with the same age group. They saw the picture of the young driver gradually change from the initially inexperienced, emotional, impulsive driver to the cautious driver, with numerous, but minor accidents. As the young drivers became more self-confident, the accidents became more serious in degree. Pelz and Schuman postulated that this increase in self-confidence was accompanied by tensions associated with maturation into

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[4]Donald C. Pelz and Stanley C. Schuman, "Dangerous Young Drivers," The Society for Automotive Engineers, (October, 1968), LXXVI, pp. 61-68.

adulthood. They therefore concluded that the highest rate of accidents was in the 19-20 year-old male group. The rate of accidents then leveled off as they become reformed drivers. The reformation filtered over into their improved driving behavior. Following 20 years of age, even though the accident rate decreased, the severity in type of accident increased. The 15-25 year-old male far exceeds any other group in accident death rate.

A study by Stewart[5] concluded that the subjects with records of citations or accidents failed to show significantly higher mileage figures, based on exposure factors, than other subjects. Stewart studied 178 students at the University of Colorado in 1955-56 in regard to exposure, citations and accidents. Exposure constituted such factors as total driving time, the hours exposed, traffic conditions and location. Boek[6] disagreed with Stewart and stated that total mileage and sex were associated with accident status. She recommended that information on driving exposure be supplemented with some detailed description of driving experiences under various conditions which one might evaluate in terms of

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[5]Roger G. Stewart, "Driving Exposure: What Does It Mean, How Is It Measured?", Traffic Safety, IV (March, 1960), pp. 9-11.

[6]Jean K. Boek, "Driver Behavior and Accidents," (A Paper presented to American Public Health Association), Atlantic City, N. J., (November, 1956).

potential danger. Both Stewart and Boek agreed, however, that in the total mileage reports by the University of California it also failed to have substantial correlation with specific incidences that were the causes of traffic citations and violations. They both suggested that total mileage for any given time interval was an inadequate and unrealistic evaluation of driving exposure. In another article Klein[7] evidenced the same idea when he stated that the size or even the existence of the teen-age driving problem could not be determined until a refined idea of driving exposure was formulated and used effectively in research.

There have been relatively few studies concerned with the influence of the automobile on specific elements of teen-age life. One such study conducted by Kavanaugh, Kemper and Klamm[8] in a Skokie, Illinois high school explored the relationship of grades, jobs and car-usage at the high school level and concluded that parental control was an influencing factor in exposure. They concluded in their study that parents who allowed their students the unrestricted use of the family car, or the student's own car, could expect the student's scholastic standing to drop.

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[7]David Klein, "The Teen-age Driver-A Research Paradigm," Traffic Quarterly, XXII (January, 1968) pp. 97-107.

[8]J. Keith Kavanaugh, Warren A. Kemper, Edward R. Klamm, "The High School Student and the Automobile," Traffic Safety Research Review, IV (June, 1960), pp. 4-8.

They also found that the degree of parental control was a significant factor in determining how much the car was used. As parental control lessened, car-usage increased.

A study that emphasized the importance of the exposure problems was conducted by Campbell[9]. He studied the records of 32,387 drivers involved in injury-producing automobile accidents. His purpose was to determine the types of accidents in which drivers were involved and the time of day of these accidents occurred. The study revealed that young drivers actually have more of their accidents, in fact 58% of them, at night. By night he refers to that half of the 24 hour period extending from six P.M. until five-fifty-nine A.M. The older driver had only 20% of his accidents during the same period. He concluded that exposure and involvement was not the same for all drivers. In an article concerning the teen-ager and night driving, Gesteland[10] contended that the student who graduated from the typical high school driver education course was not adequately prepared to cope with large parts of the dangerous situations they encountered in every day driving. He noted that of the 53,000 deaths in a given period, 28,000 occurred at night. The traffic

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[9]B. J. Campbell, "Driver Age and Sex Related to Accident Time and Type," Traffic Safety Research Review, X, (June, 1966.), pp. 36-40.

[10]Norman Gesteland, op. cit., XV, p. 37.

death rate was about two and two-thirds higher at night, and the young male did most of his driving at night.

Gutshall[11] referred to a study in which he used driving exposure as one of the important factors for consideration in the variation of analyses. The driver's exposure record was tabulated from personal interviews in which he noted the total number of miles driven each day and the time of day each subject traveled. He concluded that intelligence and socio-economic status when taken in combination do not appear to be predictive of the number of violations a driver would commit. He also included in his study accidents, points and miles. Socio-economic status tends to predict the proportion of points for speeding. Intelligence tends to predict proportion of violation points for moving violations, other than speeding violations.

In a study of 7,430 California drivers to determine whether prediction of recorded accidents and convictions could be made on the basis of driver characteristics, Levonian[12] concluded that from four variables

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[11]Robert W. Gutshall, "An Exploratory Study of the Interrelations Among Driving Ability, Driving Exposure and Socio-Economic Status of Low, Average and High Intelligence Males." (Unpublished Doctoral Dissertation), Michigan State University, 1967.

[12]Edward Levonian, "Prediction of Accidents and Convictions," Traffic Safety Research Review, XI (September, 1967), pp. 75-79.

there were significant predictors of the negligent operators. The significant factors were found to be age, sex, driving exposure and marital status. Peck and Coppin[13] did an extensive survey of driver record data to determine if such records were significant for the prediction of accident involvement. Their results showed statistically significant relationships between some convictions and accidents. They found variation between the sexes driving patterns to be among the violation variables that were significant.

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[13]Raymond C. Peck and Ronald S. Coppin, "The Prediction of Accident Involvement Using Concurrent Driving Record Data," Traffic Safety Research Review, XI (June, 1967), pp. 34-41.

CHAPTER III

PROCEDURES

The purpose of this study was to determine the relationship between specific facets of driving exposure, namely: total hours the subject actually drove, total hours of night driving, mileage driven per week, and parental control, with factors of sex, age and car-ownership of a group of 436, 17 and 18 year-old licensed drivers from two Catholic high schools in the city of Lansing, Michigan. It was also the purpose of this study to determine the relationship of accident and violation rates with factors of age, sex and car-ownership. The relationship of the combined effect of the predictor variables (i.e., total hours driven, night driving, mileage, accidents, violations and parental control), were considered with age, sex and car-ownership.

For the purpose of stating the null-hypotheses, the following variables are referred to as predictive variables (i.e., total hours driven, total night driving hours, violations, accidents and parental control). It was hypothesized that:

1. There is no relationship between each dependent variable (i.e., age, sex and car-ownership) with the predictive variables.
2. Total hours driven, total night driving, total mileage are not predictors of age.
3. Car-ownership is not related to sex.
4. There is no interaction between violations and total miles driven as predictors of sex.
5. There is no interaction among total night driving hours, violations and parental control as predictors of age.
6. There is no correlation between accident rates and parental control.
7. There is no relationship between total miles driven and the number of violations received.
8. There is no interaction among total hours driven, total night driving hours, violation rates and parental control as predictors of accident rates.
9. There is no interaction between accident rates and car-ownership when considered in combination with the predictive variables.
10. There is no correlation between car-ownership and parental control.

The computer was used to find the simple correlations and the multiple regression analysis. The simple correlation

between the variables of exposure time in hours per week, night driving hours per week, miles driven per week, accidents, violations and parental control were compared with age, sex and car-ownership. To help clarify the information resulting from the computerization, descriptive analysis was made by use of graphs. Any information that showed significant correlation on the tables of the computerized information was given an asterisk. An explanation of each table, figure and graph was noted on the preceeding page. Multiple correlation coefficients were obtained in order to determine the effect of various combinations of the predictor variables of total hours, total night driving, mileage, violations, accidents and parental control upon sex, age and car-ownership. The multiple regression was used to determine relationships between specific combinations of predictor variables with sex, age and car-ownership.

Subjects

Four hundred thirty-six Lansing high school students served as subjects for this study. The sampling included all 17 and 18 year-old licensed drivers at Monsignor John A. Gabriel, and Monsignor John W. O'Rafferty High Schools. The numbers of each group within the population were as follows: 50, 18 year-old male car-owners; 50, 18 year-old male non-car-owners; 26, 18 year-old female car-owners; 50, 18 year-old female non-car-owners; 50,

17 year-old male car-owners; 50, 17 year-old male non-car-owners; 110, 17 year-old female non-car-owners; 50, 17 year-old female car-owners.

Procedures for Collecting Data

Questionnaire

Information concerning the subjects' age, car-ownership, sex, car-usage and parental control was obtained through a questionnaire. Car-usage was categorized as being total driving hours per week, night driving hours per week, night driving hours per week, and mileage covered per week. The questions on the questionnaire were categorized according to the degrees of the subjects' use of the car. The degrees used were: always, frequently, sometimes, rarely and never. Accident and violation rates were itemized in detail and the data were recorded. Pertinent questions concerning parental control were asked and the responses qualified as to strict control, moderate control or no control. This included permissions and restrictions by the parents. A pilot study conducted on 175 high school drivers indicated that the questionnaire was a suitable tool for obtaining part of the data required to conduct the investigation. The questionnaire covered such questions as sex, age, car-ownership, parents' occupation, miles driven, hours of day and night driving per week, car-usage, restrictions, violations, and accidents.

However, the need for a supplementary means of acquiring greater information concerning factors of exposure became evident. The original questionnaire used in the pilot study was given to a group of 25 driver educators for revision. The revised instrument which was used in the final study appears in Appendix A.

Interview

A personal interview with each subject was used to obtain more accurate account of the locations of the subjects' driving exposure. The limits of each subject's driving were determined. It included locations to which they traveled and roads used, as well as the frequency of trips of this exposure. In this interview, questions were asked and check sheets used to obtain the exact location and frequency of trips of each subject's driving patterns during a year of driving. This helped to establish the kinds of environmental conditions which exerted an influence on the subjects' driving exposure. Appendix B contains a list of questions asked in the interview and an item check list.

Driving Records

A driving record for the year studied, 1968-1969, was obtained for each subject from the Department of State, Lansing, Michigan. A copy of the Driving Record appears in Appendix C.

Method of Collecting Data

The questionnaire was administered to all of the 17 and 18 year-old licensed drivers, both male and female, in two Catholic high schools in the city of Lansing, Michigan. Information concerning subjects' age, car-ownership, car-usage, and parental control was tallied according to the following classification of subjects:

1. 17 year-old males who own a car.
2. 17 year-old males who do not own a car.
3. 17 year-old females who own a car.
4. 17 year-old females who do not own a car.
5. 18 year-old males who own a car.
6. 18 year-old males who do not own a car.
7. 18 year-old females who own a car.
8. 18 year-old females who do not own a car.

As a result of the personal interviews, information concerning the locations of driving exposure was obtained, as well as the frequency of this exposure. This information was recorded on a spot map for each of the selected groups of subjects in the study. This information was recorded according to the frequency of exposure within the following geographic limits:

1. A locus of 10 miles from the center of Lansing.
2. A locus of 11-25 miles from the center of Lansing.
3. A locus of 26-50 miles from the center of Lansing.
4. A locus of 51-200 miles from the center of Lansing.
5. A locus of 201 miles and beyond the center of Lansing.

The driving record for each subject for the year 1968 was obtained and recorded for each of the eight groups in the study. The locations of accidents were also plotted on the spot map in order to determine the places of accidents with the eight classes of subjects studied.

Method of Analysis of Data

Data were collected from a group of 436, 17 and 18 year-old licensed drivers from two Catholic high schools in Lansing, Michigan. The subjects were classified as to age, sex and car-ownership. Information was tabulated for all subjects concerning violation and accident rates and the following factors influencing driving patterns: (1) total driving hours per week; (2) night driving hours per week; (3) total mileage driven; (4) location or geographic limits of driving exposure and (5) parental control. Driving time was expressed in average hours per week. Geographic limits of driving exposure for each student were noted on a spot map which included specific locations that characterized the yearly driving patterns of the groups studied. Parental control was recorded for each subject on the basis of response to items in the questionnaire and recorded as: (1) no parental control; (2) moderate parental control and (3) strict parental control.

The data collected for the 436 students were analyzed statistically. Simple correlations between the driving factors of exposure time, night driving, miles of driving, accidents, violations and parental control were made with the variables of age, sex and car-ownership.

A multiple regression was computed to determine whether multiple, significant differences of mileage, total hours and night driving, accident, violation rates and parental control existed with each of age, sex and car-ownership. In all cases of statistical analysis the .05 level of significance was selected as the criterion for rejecting the null hypothesis. A significant F indicated the presence of significant correlations.

CHAPTER IV

ANALYSIS OF DATA

Introduction

This study was designed to determine the relationship between certain facets of driving exposure, (i.e., total driving time in hours per week, night driving time in hours per week, miles driven per week and parental control), with factors of sex, age, and car-ownership of a group of licensed drivers from two Lansing, Catholic high schools. The relationship of accident and violation rates with age, sex and car-ownership was also determined, as well as the relationship of the combined effects of two or more of the exposure variables with age, sex and car-ownership.

The data collected from the 436 subjects in the study included the variables of age, sex and car-ownership. Information was tabulated for the following dependent variables: (1) total driving time, (2) night driving time, (3) total miles driven, (4) location or geographic limits of driving exposure, (5) parental control, (6) accident and violation rate. The data were analyzed statistically and descriptively to determine significant relationships. Since the location or geographic limits of driving expo-

sure appeared to be a constant among all groups studied, it was eliminated in the statistical analysis and considered only in the descriptive analysis. A summary of the data collected for the study appears in Appendix D.

Preparation of Data for Statistical Analysis

A computer, number 3600 was used for control data at Michigan State University. Four hundred thirty-six computer cards were punched for simple and multiple correlation regression analysis. The data were prepared for simple correlations and multiple regression analysis for computer processing.

Results of the Statistical Analysis

Simple correlations between the predictor variable of exposure time, night driving, miles driven, accidents, violations and parental control were made with the age, sex and car-ownership. A correlation coefficient of ± .194 was required for significance at the .05 level of confidence. A significant F ratio indicated a difference existed in the magnitude of relationships between the items in a particular group of variables and the criterion measured. All sets of variables showed a significant F ratio for each of the criterion measured. Multiple correlations were computed to determine the relationship of groups or sets of predictor variables with age, sex and car-ownership, and the relative contribution of each

predictor variable toward the predictive efficiency of the group. A t value of more than 1.96 indicated a significant correlation of the group of predictor variables with age, sex and car-ownership variable. The size of the beta weights indicated the relative contribution of each predictor variable in the group to the strength of correlation between the group and each of the variables of age, sex and car-ownership.

Simple Correlations

Hypothesis 1.--There is no relationship between each dependent variable of age, sex and car-ownership with the predictive variables of total driving hours, total night driving, total mileage, violations, accidents and parental control.

The results of significance of the simple correlations of each exposure factor with sex, age and car-ownership appear in Table I. Therefore, the null hypotheses was rejected. Significant r was the coefficient of correlations which was evident between the three highly related predictor variables (i.e., total driving hours, night driving hours and total miles driven per week) and showed relationship to age. This indicated that the 18 year-old drove more hours per week, drove more hours at night and drove more miles than the 17 year-old driver. The number of violations received showed a significant relationship with sex, indicating

that males had a higher violation rate than females. None of the exposure variables showed any significant correlation with car-ownership in the statistical analysis. The degree of parental control did not show any significant correlation with age, sex or car-ownership statistically.

TABLE 1

Simple correlations between driving factors with age, sex and car-ownership

Driving Factors	Sex	Age	Car-ownership
Total Driving Time	-.074	+.273 *	+.048
Night Driving Time	-.053	+.287 *	+.047
Total Miles	-.152	+.272 *	+.042
Accidents	-.080	+.032	+.175
Violations	-.221 *	+.165	+.112
Parental Control	+.098	+.135	-.161

* Significant at .05 level

Coded:
1. 1 = males, 2 = females
2. In relationships with sex, the negative correlations (males) seemed to have higher scores than females.
3. A positive correlation indicated females had higher scores than males.
4. In relationship with age, the positive correlation (18 year-olds) had higher scores than 17 year-olds (negative scores).
5. In relationship with car-ownership, the car owners seemed to have higher scores than non-car owners.

Hypothesis 2.--Total driving hours, total night driving, total mileage are not related to age. The statistical Table 2 shows that a relationship does exist between the predictor variables when 17 year-olds are compared to 18 year-olds. Therefore, the null hypotheses is rejected. As age increases, driving time, night driving and mileage increases.

There was a significant correlation in the relationship between the following: (1) total driving hours per week and night driving per week; (2) total driving hours per week and total miles driven per week; (3) night driving per week and total miles driven per week.

There was a significant correlation between the following: (1) total driving time and violations; (2) between night driving and violations; (3) between total miles driven and accident rate; (4) total miles driven and violation rate. The increase in total driving time was associated with accident and violation rates. There was a significant negative correlation between accident rate and parental control. As parental control was stricter, accident rates decreased.

Hypothesis 3.--Car-ownership is not related to age or sex. The results of the simple correlations between the variables of age, sex and car-ownership appear in Table 3. Two statistically significant correlations were evident. There was a significant negative

TABLE 2

Simple correlation between each predictor variable

Predictor Variables	T.D.H.	N.D.H.	T.M.	A.	V.	P.C.
1. Total Driving Hours (T.D.H.)	-	+.913*	+.614*	+.183	+.247*	-.108
2. Night Driving Hours (N.D.H.)	+.913*	-	+.605*	+.147	+.220*	-.067
3. Total Miles (T.M.)	+.614*	+.605*	-	+.205*	+.223*	-.019
4. Accidents (A.)	+.183	+.147	+.205*	-	+.596*	-.242*
5. Violations (V.)	+.247*	+.220*	+.223*	+.596*	-	-.173
6. Parental Control (P.C.)	-.109	-.067	-.020	-.671*	-.020	-

* Significant correlation at .05 level

correlation between sex and car-ownership. More males than females were car-owners. There was a significant correlation between age and car-ownership. The study revealed that a greater number of 17 year-old drivers owned cars than did the 18 year-old drivers. Therefore, the null hypothesis was rejected.

TABLE 3

Simple correlations between the specific variables of sex, age and car-ownership

Specific Variables	Sex	Age	Car-ownership
Sex	-	-.181	-.302 *
Age	-.181	-	-.388 *
Car-ownership	-.302 *	-.388 *	-

* Significant at .05 level

Multiple Correlations

Multiple correlation coefficients were obtained in order to determine the effect of various combinations of the predictor variables upon sex, age and car-ownership. The multiple regression revealed that significant correlations between specific combinations of predictor variables and sex existed. A multiple regression equation indicated the following significant correlations between groups of predictor variables with sex.

There was a significant negative correlation between violations and sex, when violations were considered in combination with time, night, miles, accidents and parental control. The violation rate of males was higher than females when this group of variables was considered.

There was a significant negative correlation between total miles driven and sex, when miles were considered in combination with total driving time, night driving, accidents, violations and parental control.

Miles alone did not have a significant correlation with sex, but in combination with any other driving factor, it was significant.

There was a significant correlation between acci- and sex when accidents were considered in combination with total driving time, night driving, miles driven, violations and parental control. Accidents lose a significant correlation with sex when total driving time and night driving are dropped from consideration. A summary of the multiple correlation coefficients between groups of driving factors with sex, age and car-ownership appears in Tables 4, 5, 6, and 7.

Hypothesis 4.--There is no interaction between violations and total miles driven as predictors of sex. Total driving time, total miles driven and violation rates were the major contributors as predictors of sex.

TABLE 4

Multiple regression of the predictor combinations of variables with sex

Source of Variation due to Regression	df	SS	MS	F
T, N, M, A, V, P	6	8.416	1.403	6.027*
Error	429	99.841	0.233	
Total	435	108.257		
N, M, A, V, P	5	8.403	1.681	7.238*
Error	430	99.853	0.232	
Total	435	108.257		
M, A, V, P	4	7.735	1.933	8.291*
Error	431	100.522	0.233	
Total	435	108.257		
M, A, V	3	7.085	2.362	10.084*
Error	432	101.172	0.234	
Total	435	108.257		
M, V	2	6.488	3.244	13.803*
Error	433	101.768	0.235	
Total	435	108.247		
V	1	5.278	5.278	22.242*
Error	434	102.980	0.237	
Total	435	108.257		

* F significant at .05 level (F-a statistical term that denotes the presence of significant correlation or differences which are not due to chance. Hence, the null hypotheses must be rejected.)

T - Exposure (Total Driving Time)
N - Exposure (Night Driving Time)
M - Total Miles Driven
A - Accidents
V - Violations
P - Parental Control
SS - Sum of the Square
MS - Mean Squared
df - Degrees of Freedom

Violations is the best predictor of sex.

TABLE 5

Multiple regression of combinations of predictor variables with age

Source of Variation due to Regression	df	SS	MS	F
T, N, M, A, V, P	6	14.650	2.44	11.599*
Error	429	90.305	.210	
Total	435	104.954		
N, M, A, V, P	5	14.612	2.93	13.909*
Error	430	90.342	.210	
Total	435	104.954		
N, M, V, P	4	14.111	3.528	16.738*
Error	431	90.842	.211	
Total	435	104.954		
N, V, P	3	12.986	4.329	20.333*
Error	432	91.968	.213	
Total	435	104.954		

* F significant at .05 level (F-a statistical term that denotes the presence of significant correlation or differences which are not due to chance. The null hypothesis must be rejected.)

T - Exposure (Total Driving Time)
N - Exposure (Night Driving Time)
M - Exposure (Total Miles Driven)
A - Accidents
V - Violations
P - Parental Control

SS - Sum of the Square
MS - Mean Squared
df - Degrees of Freedom

Total night driving, violations and parental control are best predictors of age.

TABLE 6

Multiple regression of combination of predictor variables with car-ownership

Source of Variation due to Regression	df	SS	MS	F
T, N, M, A, V, P	6	4.577	0.763	3.488*
Error	429	93.818	0.219	
Total	435	98.304		
T, N, A, V, P	5	4.575	.915	4.193*
Error	430	93.819	.218	
Total	435	98.394		
T, N, A, P	4	4.573	1.143	5.252*
Error	431	93.821	.217	
Total	435	98.394		
N, A, P	3	4.537	1.51	6.960*
Error	432	93.858	.217	
Total	435	98.394		
A, P	2	4.506	2.253	10.390*
Error	433	93.889	.217	
Total	435	98.394		

* F significant at .05 level (F-a statistical term that denotes the presence of significant correlation or difference which are not due to chance. The null hypotheses must be rejected at an .05 level of confidence.)

T - Exposure (Total Driving Time)
N - Exposure (Night Driving Time)
M - Exposure (Total Miles Driven)
A - Accidents
V - Violations
P - Parental Control

SS - Sum of the Square
MS - Mean Squared
df - Degrees of Freedom

Accidents and parental control are best predictors of car-ownership.

TABLE 7

Correlation of multiple factors of driving with sex

	Source of Variation due to Regression	Regression Coefficients	Beta Weights	t
First Solution	Time	+.001	-.027	-.226*
	Night	+.010	+.122	+1.054
	Miles	+.000	-.175	-2.912*
	Accidents	+.130	+.059	+1.964*
	Violations	+.162	+.059	-4.371*
	Parental Control	+.063	+.048	+1.739
Second Solution	Night	+.008	+.010	+1.697
	Miles	-.001	-.177	-3.004*
	Accidents	+.129	+.116	+1.960*
	Violations	-.163	-.257	-4.392*
	Parental Control	+.064	+.085	+1.772
Third Solution	Miles	-.000	-.118	-2.475*
	Accidents	+.123	+.110	+1.872
	Violations	-.156	-.246	-4.221*
	Parental Control	+.061	+.080	+1.670
Fourth Solution	Miles	+.000	-.115	-2.410*
	Accidents	+.104	+.092	+1.595
	Violations	-.158	-.250	-4.283*
Fifth Solution	Miles	+.000	-.108	-2.270*
	Violations	.124	-.196	-4.110*

r of + .194 required for significance at .05 level
t of +1.96 required for significance at .05 level

* Significant correlations at .05 level

Miles and violations are best predictors of sex.

Males drove more hours, more miles, and had more violations than females. Therefore, the null hypothesis is rejected.

Hypothesis 5.--There is no interaction among total night driving hours, violations and parental control as predictors of age. Total driving time, total miles driven, violation rates and parental control were major contributors as predictors of age. As driving hours, night driving and violation rates increased, parental control decreased. Seventeen year-olds drove less and had stricter parental control, and less violations. Therefore, the null hypothesis was rejected.

Hypothesis 6.--There is no correlation between accident rates and parental control. There was a significant negative correlation between accident rates and parental control. As parental control increased, accidents decreased. Therefore, the null hypothesis was rejected.

Hypothesis 7.--There is no relationship between total miles driven and the number of violation rates received. There was a significant correlation between total miles and violation rates. As mileage increased, violations increased. Therefore, the null hypothesis was rejected.

Hypothesis 8.--There is no interaction among total hours driven, total night driving hours, violation rates

and parental control as predictors of accident rates. There was a significant correlation between total hours driven, total night driving hours, violation rates and parental control as predictors of accident rates. As total driving hours increased, total night driving hours increased, violation rates increased, parental control decreased and accidents increased. Therefore, the null hypothesis was rejected.

Hypothesis 9.--There is no interaction between accident rates and car-ownership when considered in combination with the predictor variables. There was a significant correlation between accident rates and car-ownership when considered in combination with the predictor variables. As accident rates and car-ownership increased, total hours driven, total night driving hours, night driving hours, accident and violation rates increased. Therefore, the null hypothesis was rejected.

A multiple regression equation indicated the following significant correlations between groups of independent variables and age:

1. There was a significant correlation between miles and age when miles were considered in combination with total driving time, night driving, accidents, violations and parental control.

2. There was a significant correlation between violations and age when violations were considered in

combination with total driving time, night driving, miles, accidents and parental control.

3. There was a significant correlation between parental control and age, when parental control was considered in combination with total driving time, night driving, miles, accidents and violations.

4. Night driving, miles driven, violations and parental control showed a significant correlation with age when considered in combination with each other and with accident rates. A summary of the multiple correlation coefficients between groups of predictor factors and age appears in Table 8.

5. A multiple regression equation indicated significant correlations between groups of predictor variables and car-ownership. There was a significant negative correlation between parental control and car-ownership when parental control was considered in combination with total driving hours per week, night driving hours per week, miles driven, violations or with any one single variable.

6. There was a significant correlation between accidents and car-ownership when accidents were considered in combination with total driving time, night driving, miles driven, violations or in combination with any one single variable. A summary of the multiple

correlation coefficients between groups of predictor variables and car-ownership appears in Table 9.

TABLE 8

Correlation of multiple predictor variables with age

	Driving Factors	Regression Coefficients	Beta Weights	t
First Solution	Time	+.002	+.047	- .420
	Night	+.012	+.147	+1.317
	Miles	+.000	+.136	+2.350*
	Accidents	-.097	+.088	-1.554*
	Violations	+.016	+.171	+3.014*
	Parental Control	+.120	+.161	+3.460*
Second Solution	Night	+.160	+.188	+3.312*
	Miles	+.000	+.140	+2.467*
	Accidents	-.097	-.087	-1.543
	Violations	+.107	+.172	+3.041*
	Parental Control	+.119	+.159	+3.438*
Third Solution	Night	+.016	+.192	+3.390*
	Miles	+.000	+.131	+2.311*
	Violations	+.077	+.123	+2.623*
	Parental Control	+.128	+.172	+3.776*
Fourth Solution	Night	+.022	+.269	+5.825*
	Violations	+.850	+.136	+2.913*
	Parental Control	+.132	+.176	+3.867*

r of + .194 required for a significance at .05 level
t of +1.96 required for significance at .05 level

* Significant correlations at .05 level

Total night violations, and parental control are best predictors of age.

TABLE 9

Correlation of multiple driving factors with car-ownership

	Driving Factors	Regression Coefficients	Beta Weights	t
First Solution	Exposure - Time	-.002	-.050	- .422
	Exposure - Night	+.004	+.060	+ .508
	Exposure - Miles	+.000	+.005	+ .086
	Accidents	+.149	+.140	+ .335
	Violations	+.003	+.005	+ .088
	Parental Control	-.093	+.128	-2.614*
Second Solution	Exposure - Time	-.002	-.049	- .414
	Exposure - Night	+.005	+.061	+ .526
	Accidents	+.150	+.140	+2.359*
	Violations	+.003	+.005	+ .091
	Parental Control	+.092	-.128	-2.619*
Third Solution	Exposure - Time	-.002	-.048	- .410
	Exposure - Night	+.005	+.061	+ .528
	Accidents	+.153	+.143	+2.926*
	Parental Control	-.092	-.127	-2.626*
Fourth Solution	Exposure - Night	+.001	+.018	+ .377
	Accidents	+.151	+.141	+2.902*
	Parental Control	-.091	+.126	-2.601*
Fifth Solution	Accidents	+.154	+.144	+2.984*
	Parental Control	-.096	-.126	-2.618*

r of ± .194 required for significance at .05 level
t of ± 1.96 required for significance at .05 level

* Significant Correlations

Accidents and parental control are best predictors of car-ownership.

Results of Descriptive Analysis of Data

The data were analyzed visually to show important relationships between the variables being studied.

A personal interview with each of the subjects in the study revealed information concerning the location of their driving exposure and the frequency of this exposure. Specific questions were asked to determine the exact places to which the subjects drove and the estimated number of times per week, or year, each situation occurred for one year's time. The interview was designed to include vacation and weekend driving performance, as well as routine daily driving. Each subject's pattern of exposure, as represented by location and frequency, was recorded and placed on a spot map. Distinctive markings were placed in the appropriate spot on a map for each of the eight groups studied, namely:

1. 17 year-old male car-owners.
2. 17 year-old male non-car-owners.
3. 18 year-old male car-owners.
4. 18 year-old male non-car-owners.
5. 17 year-old female car-owners.
6. 17 year-old female non-car-owners.
7. 18 year-old female car-owners.
8. 18 year-old female non-car-owners.

The exposure data were recorded on the spot map in the following categories.

1. Within a locus of 0-10 miles from the center of Lansing.
2. Within a locus of 11-25 miles from the center of Lansing.
3. Within a locus of 26-50 miles from the center of Lansing.

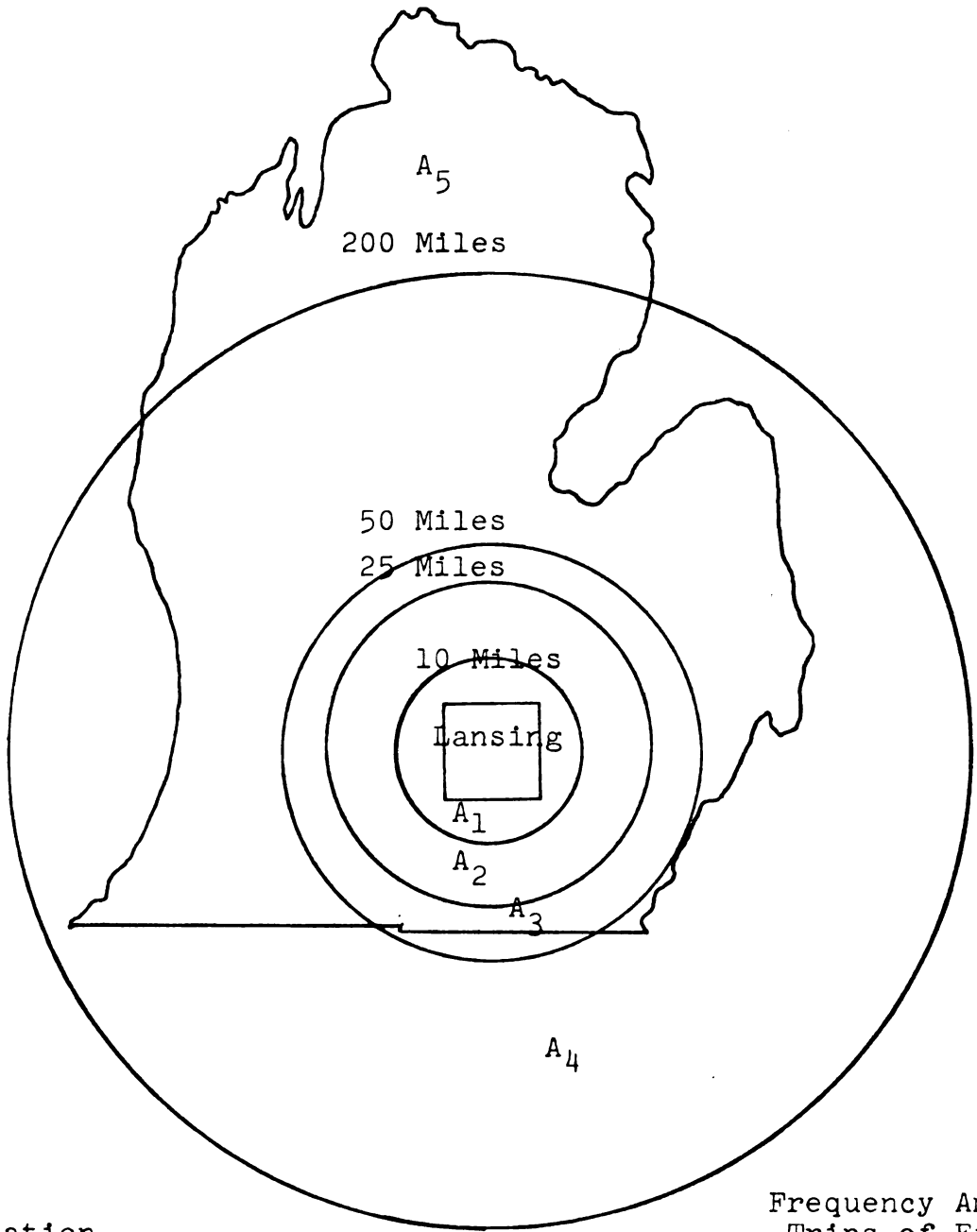
4. Within a locus of 51-200 miles from the center of Lansing.
5. Beyond a locus of 200 miles from the center of Lansing.

A record of driving habits of the subjects studied, as reflected by the location (places) and frequency (trips) of exposure, is shown in Figure 1.

Locations frequented the most were places of entertainment and eating.

The results of this descriptive analysis of driving exposure indicated that for all groups the greatest portion of their driving exposure was limited to a circle of 0-10 miles radius from the center of Lansing. The next most frequented areas of exposure included locations within a circle of 51-200 miles radius from the center of Lansing and locations beyond a 200 mile radius from the center of Lansing. A study of the information gathered would indicate that most driving by the 17 and 18 year-old drivers, whether alone or with members of a peer group, was confined to the area of the 10 mile radius on the spot map. Driving beyond that area was largely associated with family weekends or vacation trips. This fact was substantiated by the information obtained from the interviews with the subjects regarding the location of their exposure.

The accident and violation citations acquired by each of the groups of 17 and 18 year-old drivers studied

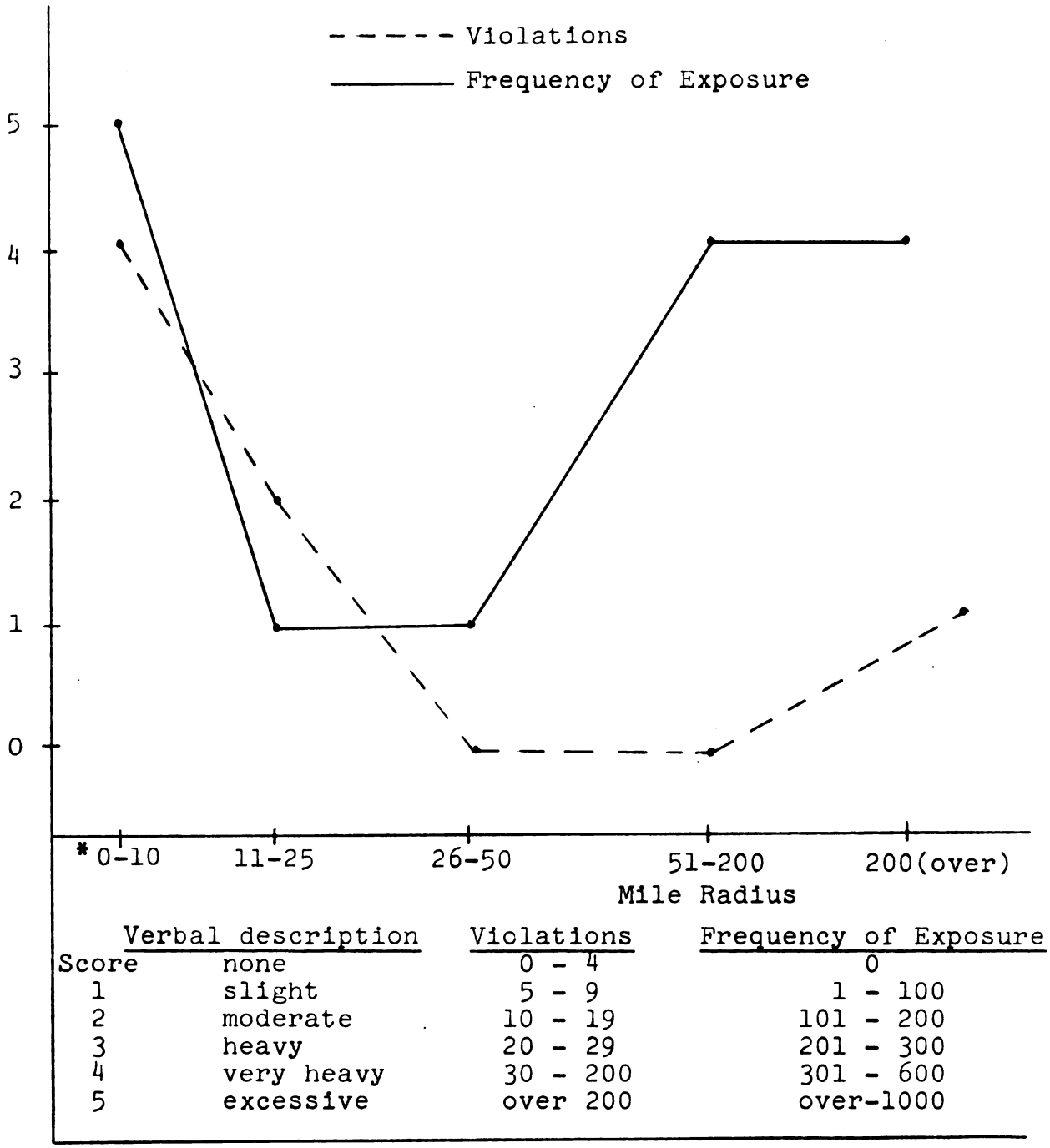


Location			Frequency Amount of Trips of Exposure
A_1 - Radius	0 - 10 Miles	_____	113,912
A_2 - Radius	11 - 25 Miles	_____	69
A_3 - Radius	26 - 50 Miles	_____	87
A_4 - Radius	51 -200 Miles	_____	388
A_5 - Radius	201 + Miles	_____	563

Figure 1.--Locaton and Frequency of Driving Exposure for a group of 17 and 18 Year-old Drivers.

were given in the locale of the greatest driving concentration, namely, the 0-10 mile circle from the center of Lansing.

The frequency of exposure in each of the geographic areas was studied and arbitrarily rated in order to show the magnitude of exposure in each area. The violations were studied in regard to the geographic area in which they occurred. They were arbitrarily rated to determine the extent of violation received in each area. Graph 1 depicts this qualitative analysis of the relationship between the location of driving exposure and the number of violations received. The graph shows a heavy concentration of violations in the area within a 10 mile circle from the center of Lansing. The graph indicated an excessive frequency of exposure in that same area. It was discovered through the interview and driving records that the heavy exposure in more distant areas was not accompanied by a correspondingly high violation rate. Exposure in this geographic area was found to be associated with vacation periods. For that reason, greater parental supervision was present. A high percentage of the vacation driving was done with the parents who exerted controls that possibly prevented violations. The number of violations received in the various geographic areas for males and females indicated that other than in the circle of the 10 mile radius from the center



Score	Verbal description	Violations	Frequency of Exposure
	none	0 - 4	0
1	slight	5 - 9	1 - 100
2	moderate	10 - 19	101 - 200
3	heavy	20 - 29	201 - 300
4	very heavy	30 - 200	301 - 600
5	excessive	over 200	over-1000

*Distances from the center of Ingham County

Graph 1.--Frequency of Exposure by Location and Violation Rates.

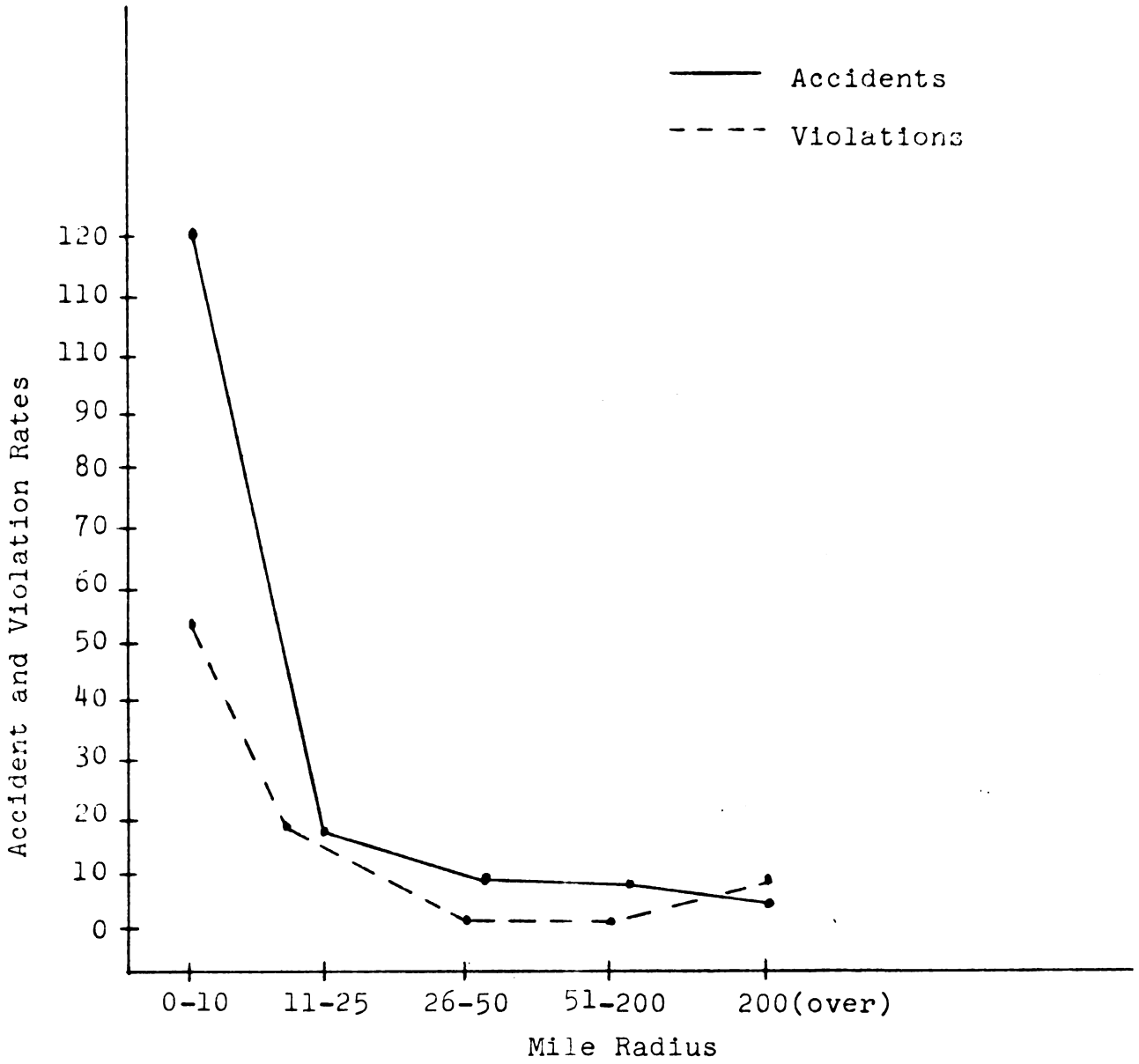
of Lansing the violation rates for both sexes differed negligibly. In the area of greatest exposure the rate of male violations exceeded the rate for female violations. This was in line with the difference in driving exposure for the two groups. The difference in the violation rate in the various areas for males and females is shown in Graph 2. The total violations were seventy-nine, the total accidents were 158 for both groups.

Several additional graphic representations of significant correlations between variables were made to visually depict the relationships. Table 10 and Graph 3 show the average number of hours of night driving per week for 17 and 18 year-old male and female drivers.

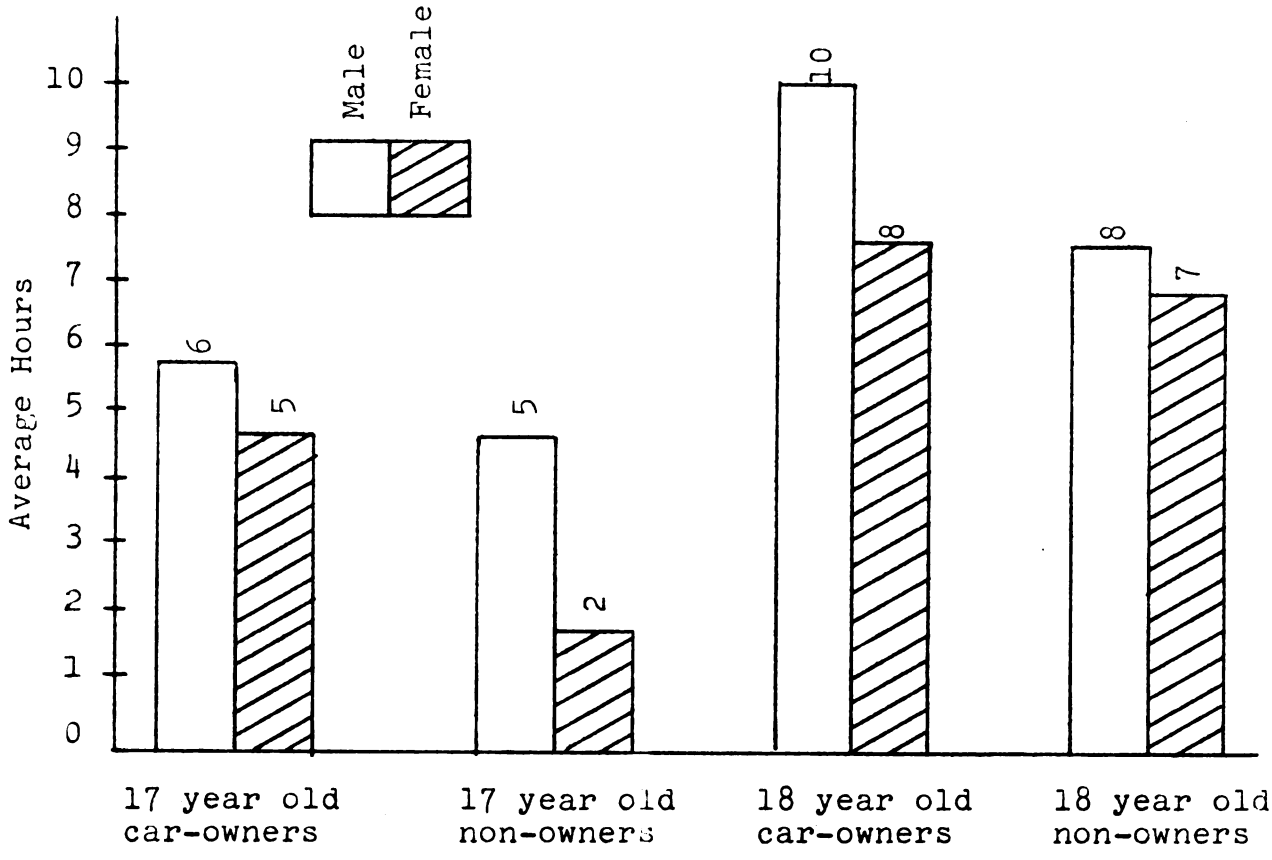
Table 10

Hours/week night driving

		Own		Non-own		Total	
Age	Sex	Hours at Night	Sub Total	Hours at Night	Sub Total	Hours at Night	Sub Total
17	M	6	11	5	7	11	18
	F	5		2		7	
18	M	10	18	8	15	18	33
	F	8		7		15	
Total			29		22		51



Graph 2.--Location and Number of Violations and Accident Rates for 17 and 18 Year-old Licensed Drivers.



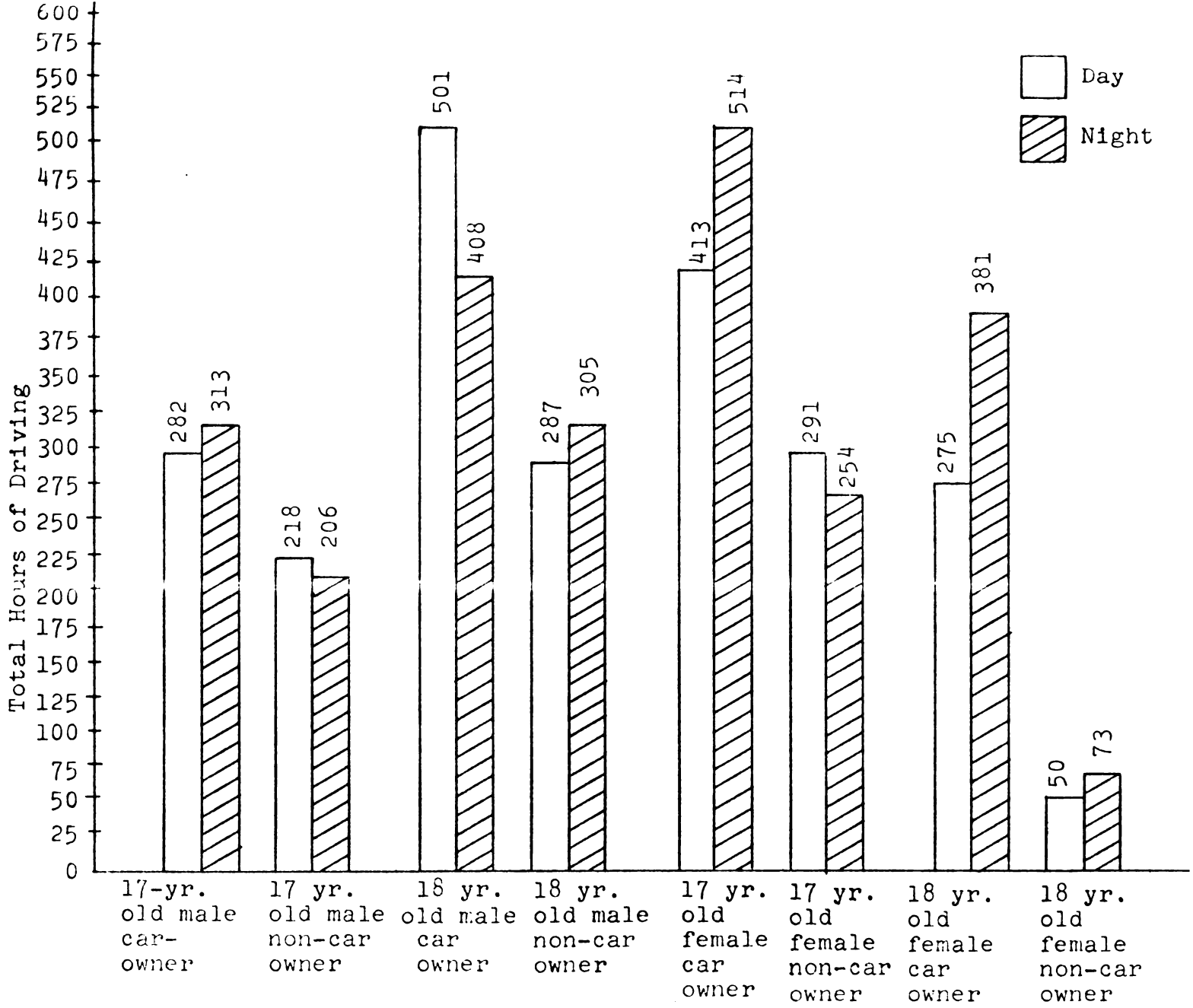
Graph 3.--Average Hours of Night Driving Per Week for 17 and 18 Year-old Drivers.

Since there was a significant correlation between total driving time, night driving time and total miles driven with car-ownership, it might be concluded that the same correlation is true with each of those variables with age and sex. Table 11 and Graph 4 show the relationship between day and night driving of the 17 and 18 year-old licensed drivers. Graph 5 shows the relationship between the accident and violation rates for all groups investigated in the study. For all groups studied, with the exception of the 17 year-old female, non-car-owners, the accident rate was accompanied by a correspondingly high violation rate. Although the non-car-owners had both a higher accident and violation rate than the car-owners, the difference was not great enough to be statistically significant.

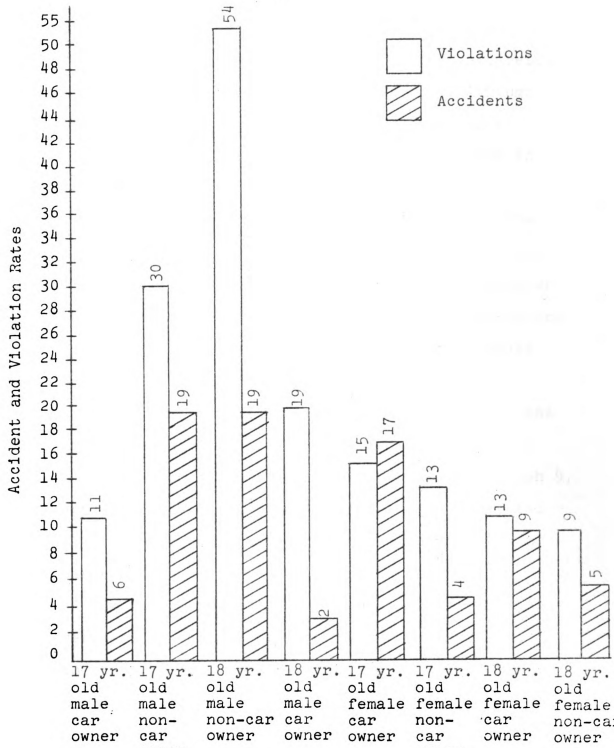
Table 11

Accident and Violation

Age	Sex	Own		Non-own		Total	
		A	V	A	V	A	V
17	M	4	11	19	30	23	41
	F	17	15	4	13	21	28
18	M	2	18	19	54	21	72
	F	9	13	5	9	14	22
Total		32	57	47	106	79	163



Graph 4.--Hours of Day and Night Driving for 17 and 18 Year-old Male and Female Licensed Drivers.



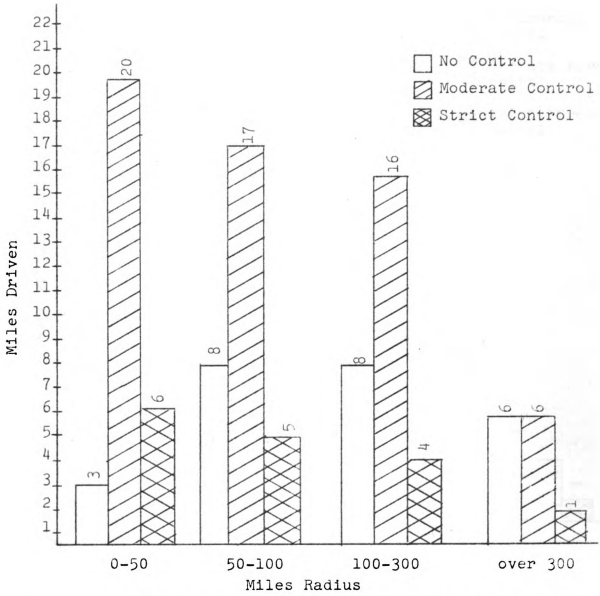
Graph 5.--Accident and Violation Rates for 17 and 18 Year-old Licensed Drivers.

Graph 6 indicated the relationship of parental control with the average miles driven per week for the 17 year-old males. Graph 7 indicates the same relationship for the 17 year-old female drivers. Although a greater amount of parental control was evident, it was still not a statistically significant influence in relation to average miles driven per week.

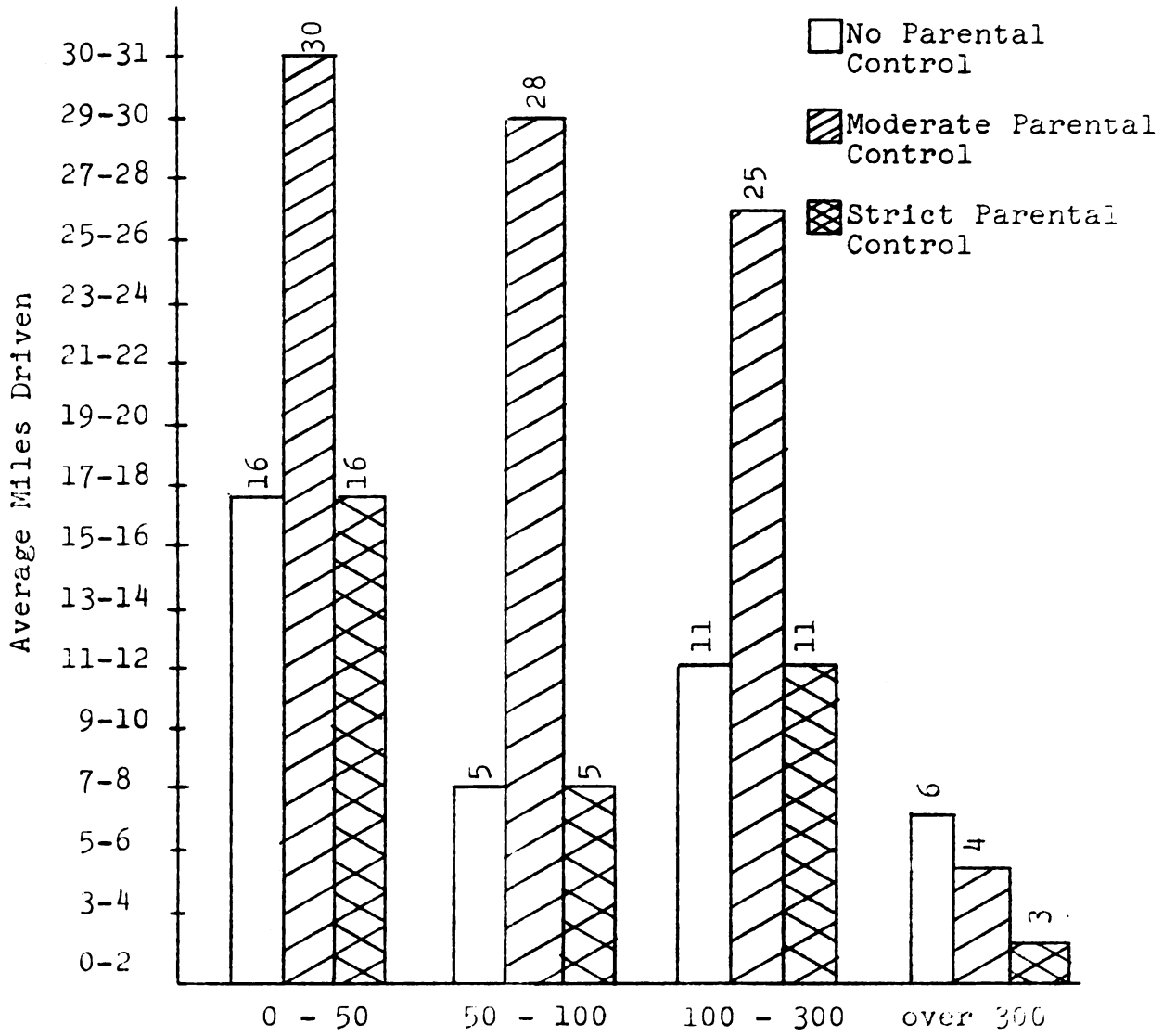
Graph 8 shows the relationship of violation rates to sex, and car-ownership of 17 and 18 year-old drivers. In all instances the violation rate of males was greater than that of females. The violation rates for car-owners was slightly higher than non-car-owners for both males and females.

Another statistically significant relationship was evident between accident rate and parental control. A visual description of this correlation appears in Graph 9. The accident rates of the subjects with strict parental control was noticeably lower than that of drivers with less parental control.

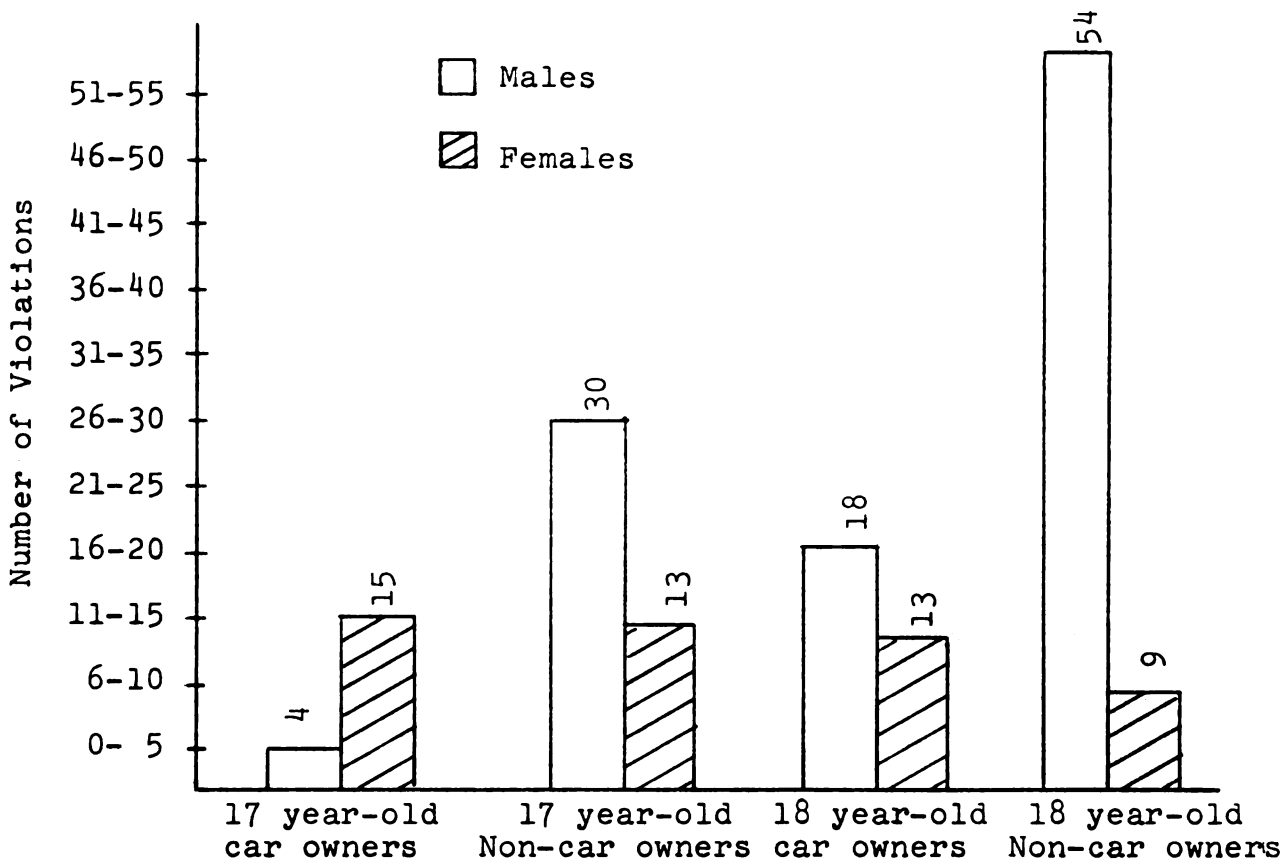
A more complete understanding of the interrelationship between the various factors of exposure and age, sex, and car-ownership was obtained by a study of the multiple correlations. Through an examination of the strength of the statistical correlations the contribution of each factor as a predictor of sex, age and car-ownership was determined. A descriptive analysis



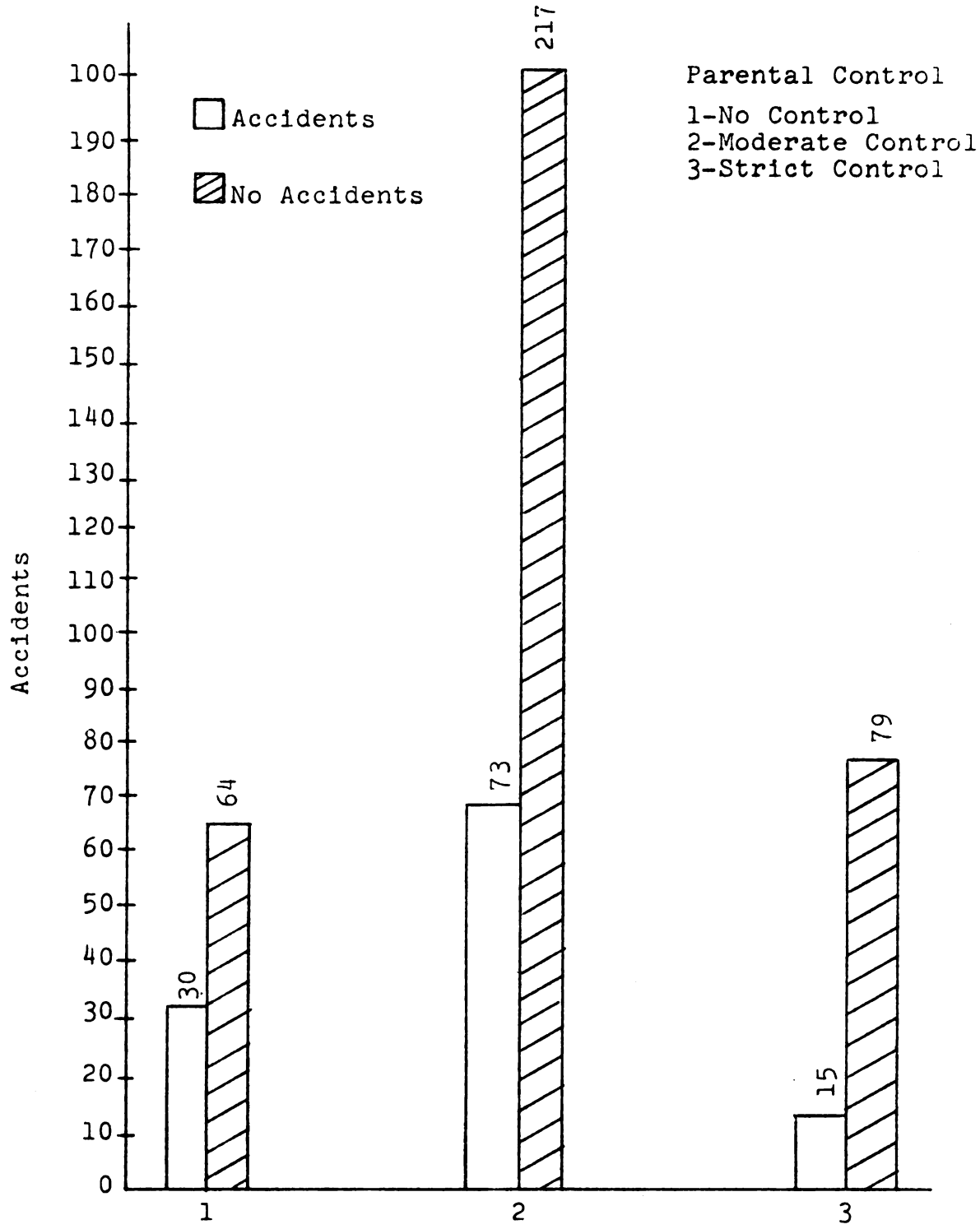
Graph 6.--The Relationship of Parental Control with Average Miles Driven Per Week for 17 Year-old Males.



Graph 7.--The Relationship of Parental Control with Average Miles Driven Per Week for the 17 Year-old Females.



Graph 8.--The Relationship of Violations to Sex and Car Ownership of 17 and 18 Year-old Drivers.



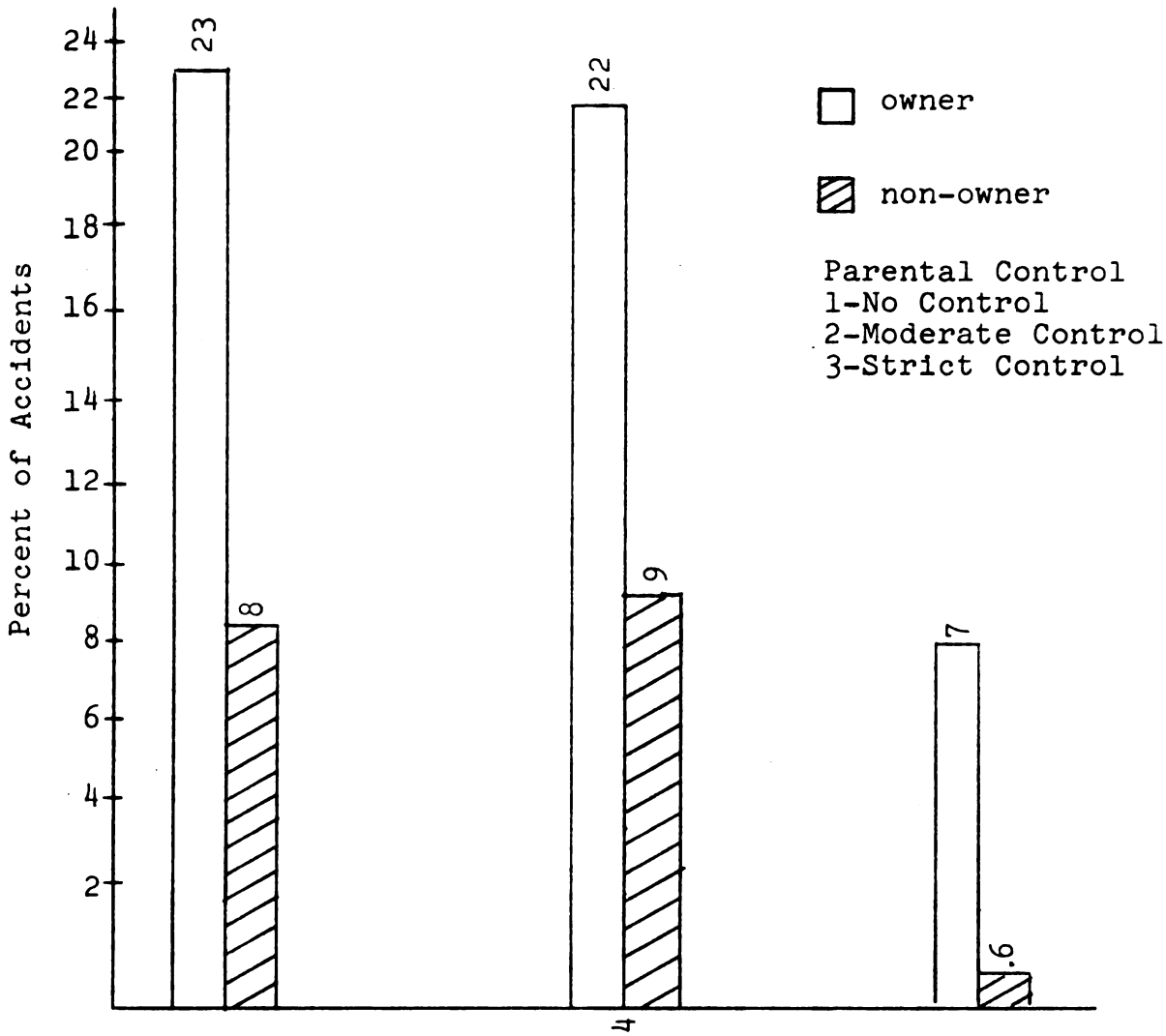
Graph 9.--Accidents Compared to Parental Control for 17 and 18 Year-old Licensed Drivers.

of the predictive strength of these exposure factors was evident in the various graphic representations. In the multiple correlations, accident rate and parental control were the major contributors as predictors of car-ownership. Graphs, 10, 11, 12, 13, 14, 15 portray this statistically significant fact. Car-owners had a higher accident rate than non-car-owners. Both car-owners and non-car-owners with strict parental control had lower accident rate than those with less parental control. Total driving time, total miles driven and violations were the major contributors as predictors of performance of male and female drivers. This finding is portrayed by the visual representation in Graph 2, page 51, Graph 3, page 52, and Graph 4, page 54. Miles driven, violations and parental control were the major contributors as predictors of age. Graph 6, page 57, Graph 7, page 58, Graph 8, page 59 support this finding.

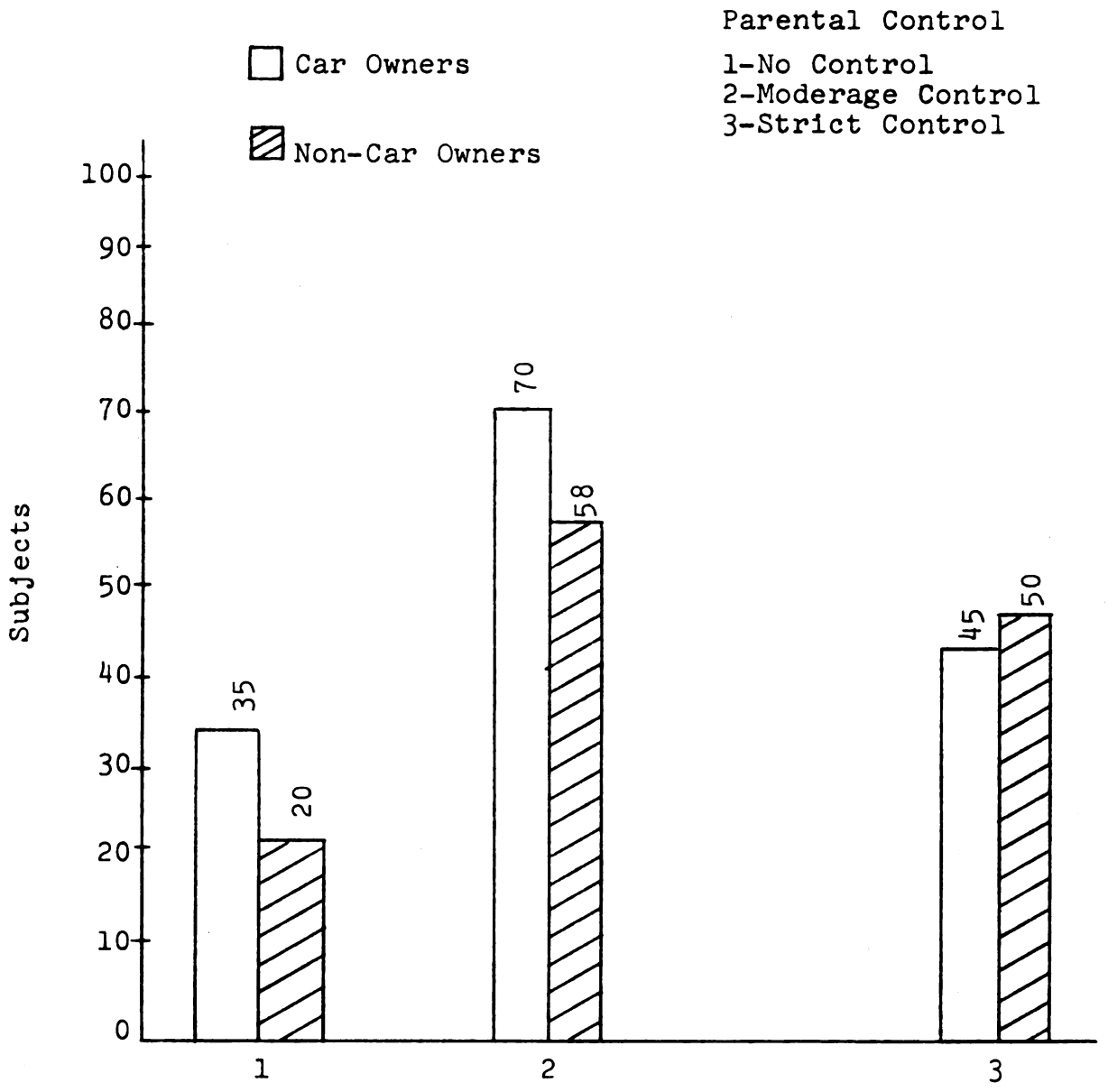
The findings of the descriptive analysis supported the findings of the statistical analysis and provided a visual representation of the relationship of the variables that were meaningful in assessing the importance of the various exposure factors.

Summary of Findings

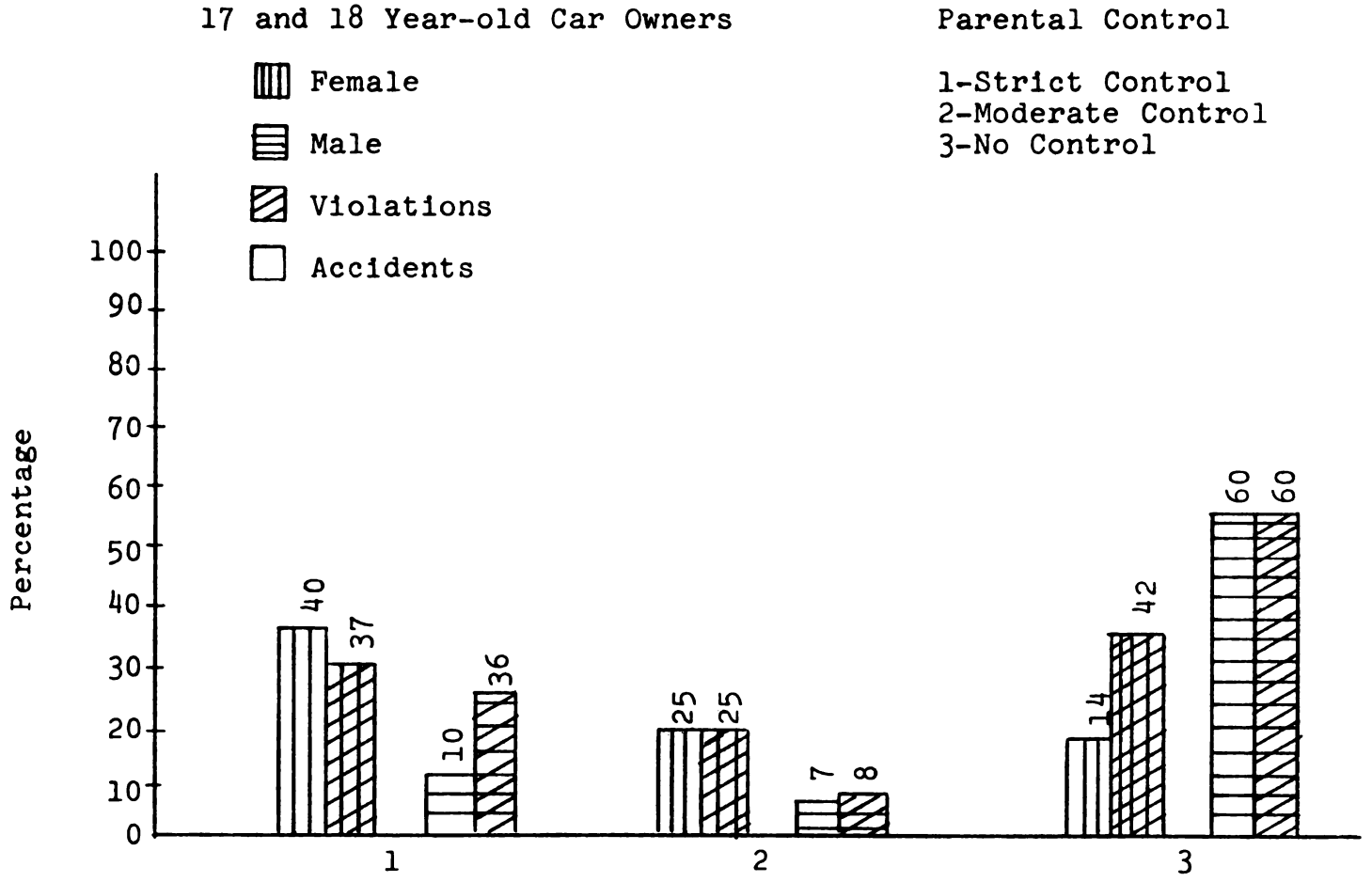
The following results are summarized from the statistical analysis. Therefore, all null hypotheses were rejected.



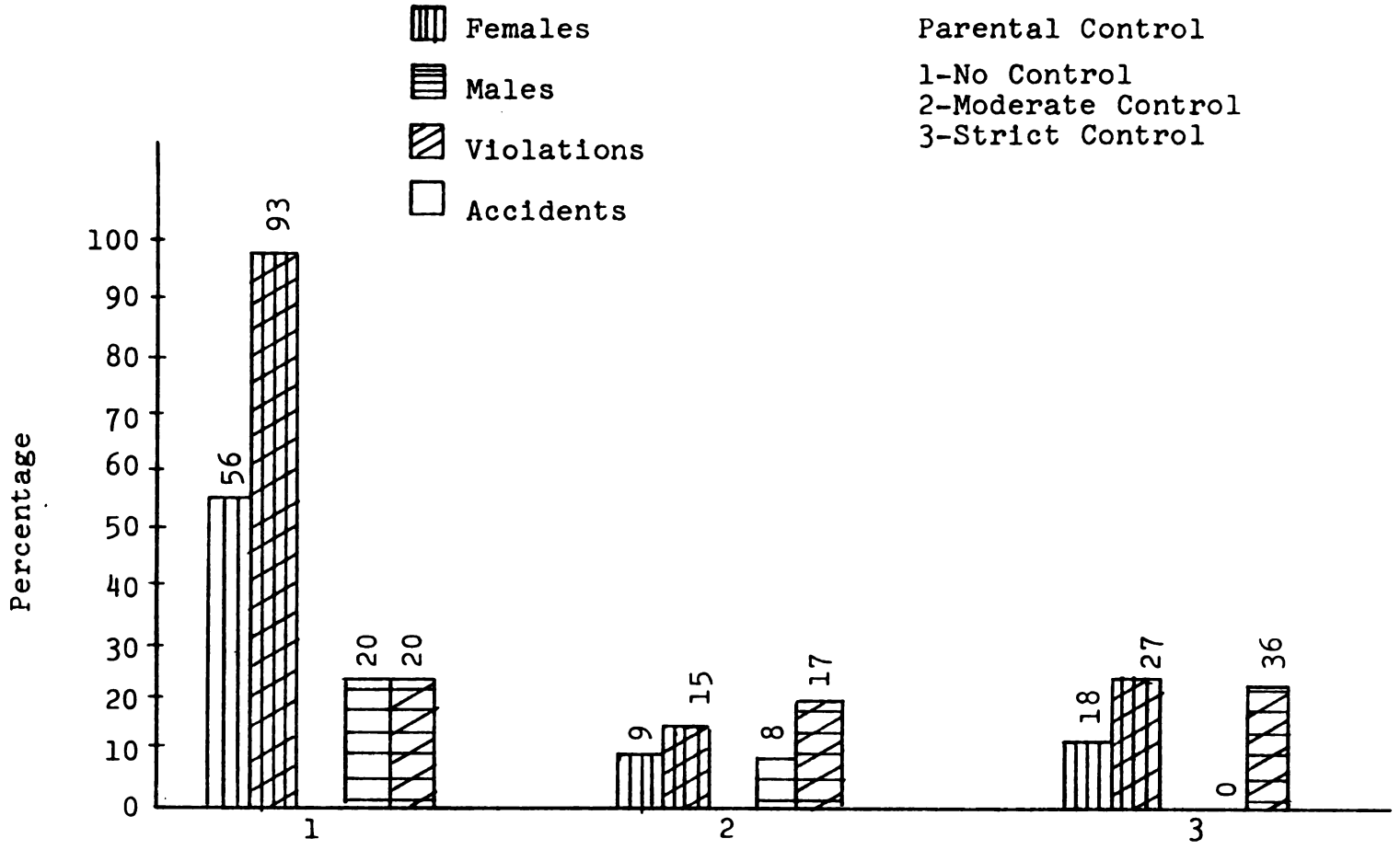
Graph 10.--Percentage of Accidents for Car Owners and Non-Car Owners with Various Degrees of Parental Control.



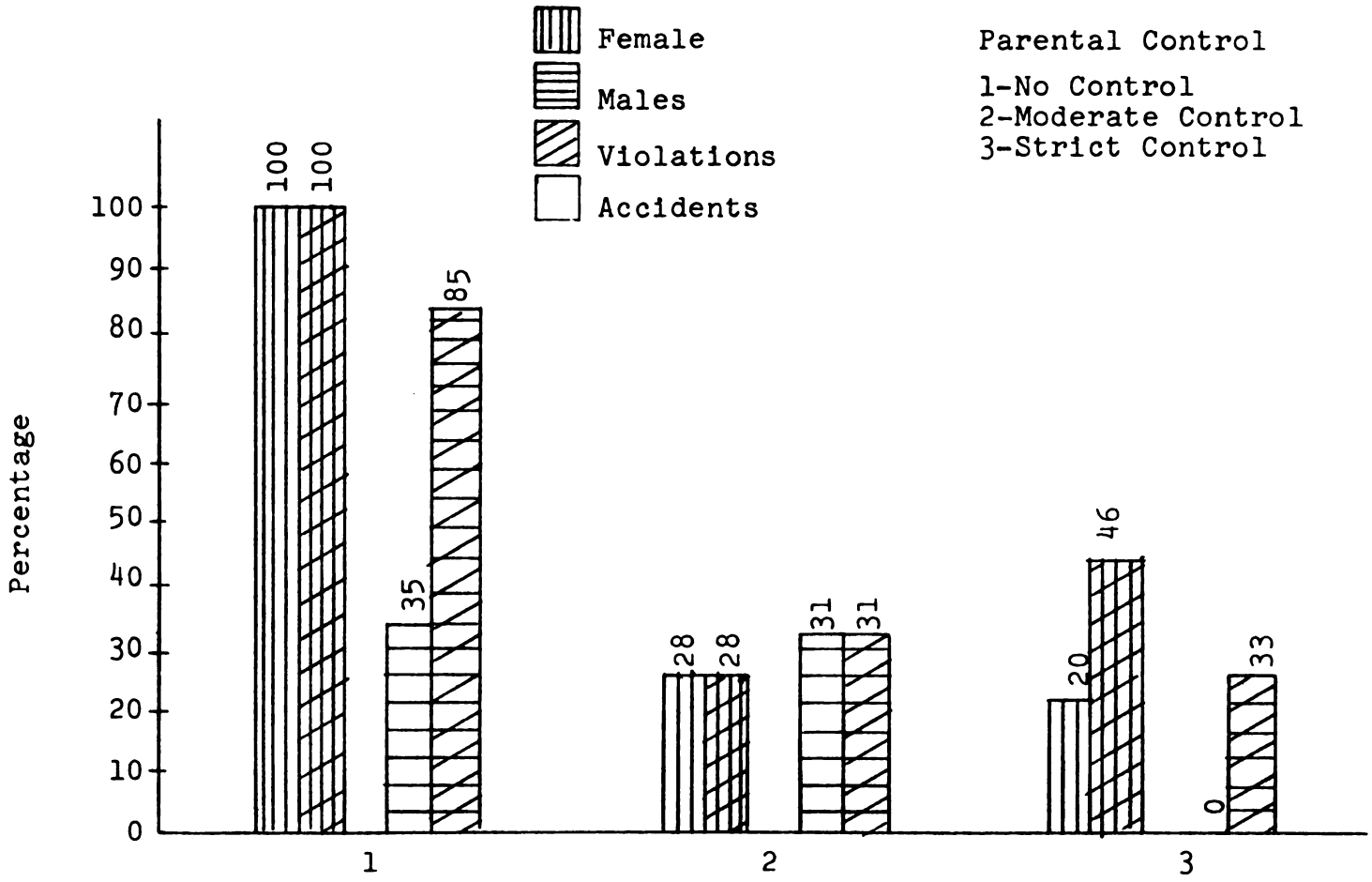
Graph 11.--Number of Car Owners and Non-Car Owners with no Accidents and Various Levels of Parental Control.



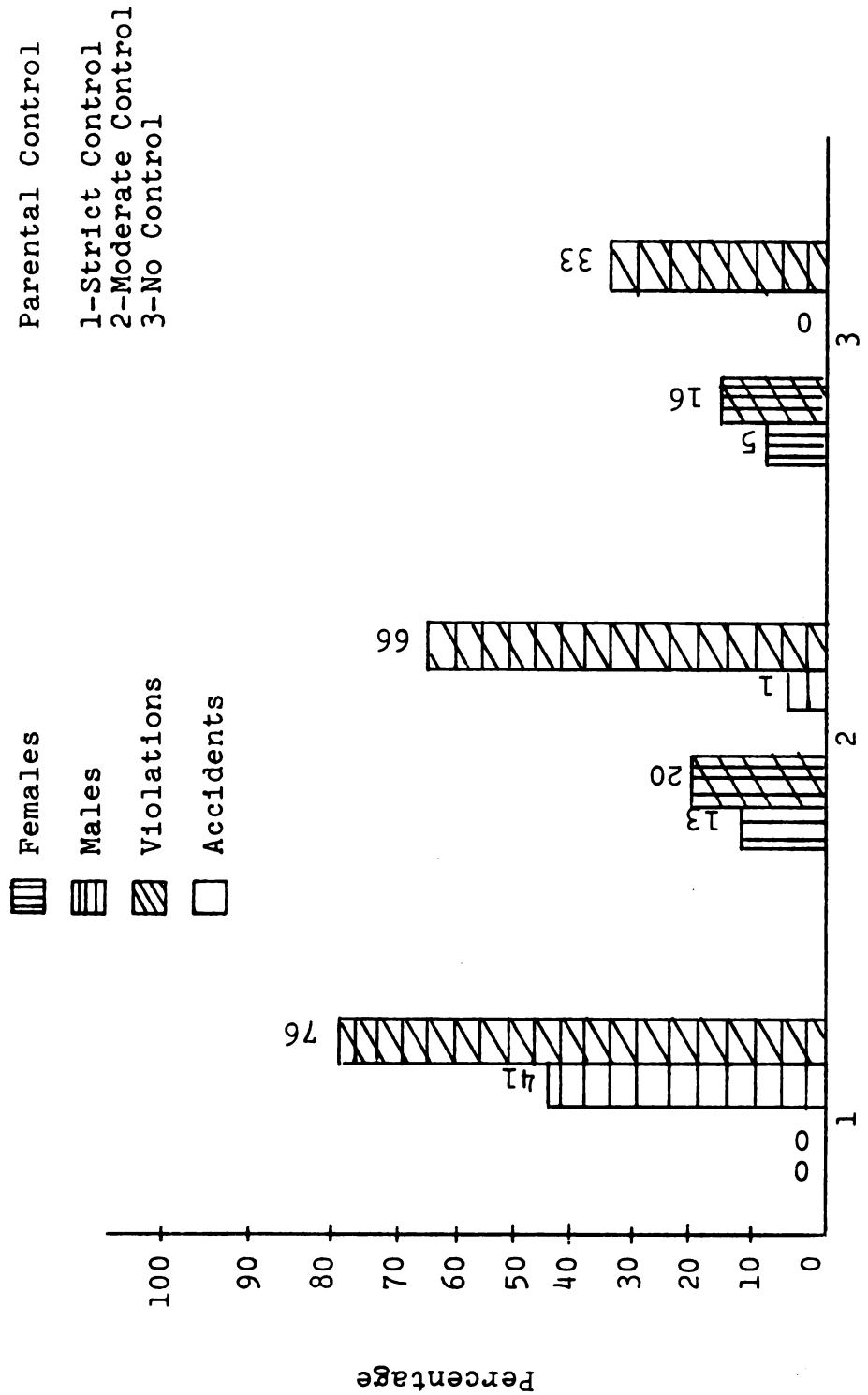
Graph 12.--Percentage of Accident and Violation Rates of 17 and 18 Year-old Male and Female Licensed Drivers and Car Owners Related to the Varied Degrees of Parental Control.



Graph 13.--Percentage of Accidents and Violations of 17 Year-old Licensed Drivers, Non-Car Owners Related to the Varied Degrees of Parental Controls.



Graph 14.--Percentage of Accidents and Violations of 18 Year-old Licensed Drivers, Car Owners Related to the Varied Degrees of Parental Control.



Graph 15.--Percentage of Accident and Violation Rates of 18 Year-old Licensed Drivers, Non-Car Owners Related to the Varied Degrees of Parental Control.

Total driving hours, night driving time, and total miles driven showed strong correlation with age. Eighteen year-olds drove more hours, more hours at night, and more miles than 17 year-old drivers.

Violations showed a significant negative correlation in relationship to males and females. More males had violations than females. There was a significant correlation in the relationship between total driving hours per week and night driving hours per week. More driving was done at night.

There was a significant correlation with a relationship between total driving time and total miles driven. Seventeen and 18 year-olds drove a significant amount of miles and hours.

There was a significant correlation in the relationship between total driving time and violations. Violations increased as driving hours increased.

There was a significant correlation in the relationship between night driving and total miles driven. As mileage increased, night driving increased.

There was a significant correlation in the relationship between night driving and violations. As night driving increased, violations increased.

There was a significant correlation in the relationship between total miles driven and accident rate. As more miles were driven, accident rates increased.

There was a significant correlation in the relationship between total miles driven and violation rates. As mileage increased, violation rates increased.

There was a significant correlation in the relationship between accident rates and violation rates. As accident rates increased, violation rates increased.

There was a significant negative correlation in the relationship between accident rate and parental control. As parental control became stricter, accident rates decreased.

There was a significant negative correlation in the relationship between age and car-ownership. The 17 year-olds owned more cars in this sampling. One hundred, 17 year-olds own cars; 76, 18 year-olds own cars.

A significant negative correlation in the relationship between violations and sex was noted when violations were considered in combination with total driving time, night driving, miles, accidents and parental control. Males did more driving, night driving, drove more miles, and had more violations than females.

A significant negative correlation was evident between total miles driven and sex, when total miles was considered in combination with total driving time, night driving, accidents, violations, and parental control. Males did more driving than females.

There was a significant correlation between accidents and sex, when accidents were considered in combination with total driving time, night driving, miles driven, violations and parental control. Males had more accidents and drove more than females.

There was a significant correlation between total miles driven and age, when miles were considered in combination with total driving time, night driving, accidents, violations and parental control. Eighteen year-olds drove more than 17 year-olds.

There was a significant negative correlation between violations and age when violations were considered in combination with total driving time, night driving, miles, accidents and parental control. Eighteen year-olds had more violations than 17 year-olds.

There was a significant negative correlation between parental control and age, when parental control was considered in combination with total driving time, night driving, miles, accidents and violations. Seventeen year-olds had stricter parental control than 18 year-olds.

Night driving, miles driven, violations and parental control showed a significant correlation with age, when considered in combination with each other. As parental control increased, mileage decreased.

A significant negative correlation between parental control and car-ownership was evident when parental control was considered in combination with total driving time, night driving, miles driven, violations or with any one of the variables. Males and females who had stricter parental control owned fewer cars.

There was a significant correlation between accidents and car-ownership when accidents were considered in combination with total driving time, night driving, miles driven, violations or in combination with any one of the variables. As car-ownership increased, accident rates increased.

The findings of the descriptive analysis supported the findings in the statistical analysis. In addition, the descriptive analysis pictured the relationship between the variables and helped to give a clearer picture of the statistical findings.

CHAPTER V

SUMMARY, DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

Summary

This study investigated the relationship between certain factors of driving exposure (i.e., total driving time, night driving time, total mileage, and parental control) with sex, age and car-ownership of a group of high school drivers. The relationship of accident and violation rate with age, sex and car-ownership was studied, as well as the combined effects of two or more of the variables. The relationship of the location of driving exposure to age, sex and car-ownership was considered.

Four hundred thirty-six, 17 and 18 year-old drivers from two, Catholic high schools in the city of Lansing, Michigan served as subjects for the study. Information concerning age, sex, car-ownership, driving exposure factors, accidents and violation rates were obtained for each subject.

The data were analyzed statistically to determine the differences among the factors being tested. Simple correlations between the different variables of driving

exposure factors and the various variables of age, sex and car-ownership were determined. In those cases where the obtained r was greater than the critical value of r at the .05 level of confidence, a significant correlation was evident. The same simple correlations were obtained for the interrelationship of age, sex and car-ownership and for the interrelationship of total hours, night driving, mileage, accidents, violation rates and parental control.

Multiple correlations were computed to determine the relationship of groups of driving factors and age, sex and car-ownership, and the relative contribution by the variables toward the predictive efficiency of the group. In those cases where the obtained t value was greater than the critical t value at the .05 level of confidence a significant correlation was evident.

A descriptive analysis of the data was made. The geographic limits of each subject's driving, as well as the frequency of this exposure was noted on a spot map. This information was plotted for all groups of drivers that were studied. Difference in location of exposure was observed and compared with other variables. The data collected for the statistical analysis in the study was portrayed graphically in several different combinations.

Discussion of Findings

Simple Correlations

Simple correlations were computed and indicated significant relationships between three highly related factors of the driving exposure patters; namely, sex, age, and car-ownership. Total driving time, total miles driven, and night driving time showed strong correlations with age. Both males and females, the 18 year-old drivers spent a greater amount of time in the car, traveled more miles, and drove more at night than the 17 year-old drivers. This statistically significant fact was also noted in the graphic representation in Graph 2, page 51. Since there was a high correlation between total driving time, night driving, and total miles driven, the relationship expressed for night driving was also applicable to the other two variables. These 17 and 18 year-olds drove more hours per week, more miles per week, and more night driving per week. The number of violations showed a significant negative correlation with sex. It was indicated that male drivers of both age groups had a higher violation rate than female drivers. Graph 6, page 57, represents this relationship and indicates a slightly higher rate of violations for male car-owners when compared with female car-owners. Although these differences were evident in the descriptive analysis, they were not

statistically significant. The factors of exposure (i.e., total hours, total miles driven, night driving and parental control) and car-ownership contributed to the higher violation rate of the male driver. The male drivers drove more miles, had more exposure to the complex driving situations, and owned more cars than females.

There was a significant correlation between the total hours, total night driving, total mileage, accident and violation rates with the exception of parental control with age, sex and car-ownership. It was evident from the interrelationships of the independent variables that total driving time, night driving and total miles driven were all significantly related to each other. As the levels of exposure factors increased, accident and violation rates also increased. It was further evident that there was a strong relationship between accidents and violations. As the accident rate increased, the violation rate increased as well. Graph 3, page 52, shows this relationship which was evident for all groups studied. There was a significant negative correlation between parental control and accidents. There was no significant correlation between parental control and miles driven, night driving, and other factors of exposure. It was evident that those subjects in the study who were involved in accidents, regardless of age and sex, were consistent in their evaluation of parental

restriction. They stated parental control was lacking when they were involved in accidents. Graph 7, page 58, shows this statistically significant finding.

Multiple Correlations

Several significant correlations between groups of predictive variables with age, sex and car-ownership were revealed by the regression analysis. Tables 4, 5, 6, 7 and 8, 9, 10, pages 35-50, show the correlation of multiple predictive variables with sex, age and car-ownership. When exposure time, night driving, miles driven and violations were the major contributors to the prediction of sex, all showed significant correlation with the male drivers. Accident rate showed a lesser tendency to be linked with the female driver. Violation rates and accident rates as predictors of sex were evident in all of the multiple regression equations. For all of the equations analyzed (for the correlations between combinations of independent variables with age, miles driven), violations and parental control were the major contributors to the prediction of age. Table 9, page 44, shows the correlation of multiple independent variables with car-ownership. For all the equations analyzed (for the correlation of various combinations of driving factors with car-ownership), accident rates and parental control were the major contributors to the prediction of car-ownership. There was a significant relationship

between accident rates and car-ownership, and a significant relationship between parental control and car-ownership. As accidents increased, car-ownership increased, and as parental control decreased, car-ownership increased.

Conclusions

Within the limitations of this study, the following conclusions were made. For the purpose of stating the null hypotheses, the following variables are referred to as predictive variables (total hours driven, total night driving hours, violations, accident rates and parental control). It was hypothesized that:

1. There is no relationship between each dependent variable (i.e., age, sex and car-ownership) with the predictive variables. Total driving hours per week, night driving hours per week and total mileage per week showed strong correlation with age and sex. Eighteen year-old males drove more hours and miles than 17 year-old males or females. Therefore, the null hypothesis was rejected.
2. Total hours driven, total night driving, total mileage are not predictors of age. There was a significant correlation between total driving time, night driving hours, and total mileage with age. All of these factors increased

with the 17 and 18 year-old drivers. Therefore, the null hypothesis was rejected.

3. Car-ownership is not related to sex. There was a significant negative correlation between sex and car-ownership. Males owned more cars than females. Therefore, the null hypothesis was rejected.
4. There is no interaction between violations and total miles driven as predictors of sex. Total driving time, total miles driven and violation rates were the major contributors as predictors of sex. Males drove more hours, more miles, and had more violations than females. Therefore, the null hypothesis was rejected.
5. There is no interaction among total night driving hours, violations and parental control as predictors of age. Total driving time, total miles driven, violation rates and parental control were major contributors as predictors of age. As driving hours, night driving and violation rates increased, parental control decreased. Seventeen year-olds drove less and had stricter parental control, and less violations than 18 year-olds. Therefore, the null hypothesis was rejected.

6. There is no correlation between accident rates and parental control. There was a significant negative correlation between accident rates and parental control. As parental control increased, accidents decreased. Therefore, the null hypothesis was rejected.
7. There is no relationship between total miles driven and the number of violation rates received. There was a significant correlations between total miles and violation rates. As mileage increased, violations increased. Therefore, the null hypothesis was rejected.
8. There is no interaction among total hours driven, total night driving hours, violation rates and parental control as predictors of accident rates. There was a significant correlation between total hours driven, total night driving hours, violation rates and parental control as predictors of accident rates. As total driving hours increased, total night driving hours increased, violation rates increased, parental control decreased and accidents increased. Therefore, the null hypothesis was rejected.
9. There is no interaction between accident rates and car-ownership when considered in combination

with the predictor variables. There was a significant correlation between accident rates and car-ownership when considered in combination with the predictor variables. As accident rates and car-ownership increased, total hours driven, total night driving hours, accident and violation rates increased. Therefore, the null hypothesis was rejected.

10. There is no correlation between car-ownership and parental control. Car-ownership showed a significant correlation with parental control. Car-owners with stricter parental control had fewer accidents. Seventeen year-olds owned more cars and had fewer accidents than 18 year-old drivers. Therefore, the null hypothesis was rejected.
11. As regards to exposure to location, it was noted that the 17 and 18 year-old drivers in this sampling frequented the area within a radius of ten miles from the center of the city of Lansing, and had most of their accidents and violations within this area. The spot map, page 47, showed the significance of the location and frequency distribution.
12. Non-car-owners drove 45,017 total mileage, car-owners drove 41,232 total mileage.

(Non-car-owners drove 3,785 more miles than car-owners.)

13. Of the 436 subjects, they had 158 total accidents (36%) and total violations were 79 (13%).

Recommendations

On the basis of the findings from this investigations, it is recommended that:

1. A similar study be conducted using a greater age range.

2. A study similar to this one be conducted in which parental control is more objectively evaluated.

3. A more intensive study be conducted concentrating upon the young driver and the location of his driving in relation to circumstances, conditions, accidents, violation rates, and driving problems.

Implications of the Study

The important point, stressed in all of the related literature cited in regard to the young driver, is that exposure must include factors other than just total mileage. This investigation agrees with this idea of the vast exposure picture which was especially

emphasized in Stewart[1], Boek[2], and Klein[3] in their research. Some important factors influencing exposure that indicated significant implications were parental control, location of driving, and possibly car-ownership. Although parental control indicated an influence in predicting accident rates, age of driver and car-ownership, it was evident that more objective means of assessing this factor was necessary. It was suggested that further study conducted between the young car-owner and non-car-owner might reveal important findings in relation to the total picture of exposure.

The results of the investigation in relation to location of driving indicated that the teen-ager did most of his driving in an area ten miles from the center of the city of Lansing, Michigan. This indicates the nature of conditions to which he was exposed. The study indicated that location of driving was an important part of exposure. A more detailed study of the exposure factor is needed in order to help minimize the severity

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[1]Roger G. Stewart, "Driving Exposure: What Does It Mean, How Is It Measured?," Traffic Quarterly, IV (March, 1966), pp. 9-11.

[2]Jean K. Boek, "Driver Behavior and Accidents" (a paper presented to American Public Health Association, Atlantic City, New Jersey, November, 1956). Secondary source, Traffic Quarterly, IV (March, 1960), p. 11.

[3]David Klein, "The Teen-age Driver-A Research Paradigm," Traffic Quarterly, XXV (January, 1968), pp. 97-107.

and frequency of violation and accident rates. This study might aid in altering the driving environment to the advantage of the young driver's safety.

The instructors of driver education courses might take a closer look at this study, and take into consideration the exposure elements of the 17 and 18 year-old Lansing drivers when presenting various driving attitudes and skills.

BIBLIOGRAPHY

BIBLIOGRAPHY

Books

Aaron, James E. and Strasser, Marland K. Driver and Traffic Safety Education. New York: The Macmillan Company, 1966.

American Automobile Association. Teaching Driver and Traffic Safety Education. New York: McGraw-Hill Book Company, 1965.

Anderson, William G. In-Car Instruction: Methods and Content. Reading: Addison Wesley Publishing Company, 1968.

Center for Safety Education. Driver Education and Traffic Safety. University of New York, New York: Prentice-Hall Inc., 1967.

Garrett, Henry E. Statistics in Psychology and Education. New York: David McKay Company, Inc., 1965.

Good, Carter V., and Scates, Douglas E. Methods of Research. New York: Appleton-Century-Crofts, Inc., 1954.

The Automobile Insurance Industry. Driver Behavior, Cause and Effect. Proceedings of the Second Annual Traffic Safety Research Symposium. Washington, D.C.: Insurance Institute for Highway Safety, 1968.

Periodicals

Boek, Jean K. "Driver Behavior and Accidents." Paper presented to American Public Health Association. Atlantic City, New Jersey, November, 1956.

Campbell, B. J. "Driver Age and Sex Related to Accident Time and Type." Traffic Safety Research Review. X (June, 1966). 36-40.

Department of State Police. Michigan Traffic Accident Digest, 1968. Michigan: Department of State Police, 1968.

Gesteland, Norman. "Let's Teach the Teen-ager How to Drive When They Drive the Most Often at Night." Traffic Digest, XV (November, 1967). 3-7.

Gutshall, Robert. "An Exploratory Study of the Interrelations Among Driving Ability, Driving Exposure and Socio-Economic Status of Low, Average and High Intelligence Males." Unpublished Doctoral Dissertation, Michigan State University, East Lansing, 1967.

Kavanaugh, Keith J.; Kemper, Warren A.; and Klamm, Edward R. "The High School Student and the Automobile." Traffic Safety Research Review, IV (August, 1953). 4-8.

Klein, David. "The Teen Age Driver - A Research Paradigm." Traffic Quarterly, XXII (January, 1968). 97-107.

Lauer, A. R. "A Sampling Survey of Drivers on the Highway for the Twenty-Four Hour Period - Driver Characteristics and Accidents." Highway Research Board Bulletin, LXXIII (1953). 14-25.

Levonian, Edward. "Prediction of Accidents and Convictions." Traffic Safety Research Review, XI (September, 1967). 75-79.

National Safety Council. Accident Facts. Chicago: National Safety Council, 1968.

Peck, Raymond C., and Coppin, Ronald S. "The Prediction of Accident Involvement Using Concurrent Driving Record Data." Traffic Safety Research Review, XI (June, 1967). 34-41.

Pelz, Donald C., and Schuman, Stanley C. "Dangerous Young Drivers." The Society for Automobile Engineers, LXXVI (October, 1968). 61-68.

Stewart, Roger G. "Driving Exposure: What Does it Mean, How Is It Measured?" Traffic Safety, IV (March, 1960). 9-11.

APPENDICES

APPENDIX A

DRIVER EDUCATION - QUESTIONNAIRE

APPENDIX A

DRIVER EDUCATION - QUESTIONNAIRE

Sister Marie Therese Emery, O.P.

Age ____ Male ____ Female ____ Driving experience (months) _____

Parents living: Yes ____ No ____ Separated: Yes ____ No _____

Divorced: Yes ____ No ____ Deceased: Mother ____
Father ____

Father's Occupation: _____

Mother's Occupation: _____

Guardian's Occupation: _____

Approximately how many hours do you drive per week: _____

How many miles do you drive per week: _____

Night driving: _____ Hours per week: _____

Hours per night: _____

Do you own a car: Yes ____ No ____ Comment _____

- -

PLACE A CHECK ON THE BLANK PROVIDED

Always	Frequently	Sometimes	Rarely	Never		
____	____	____	____	____	1.	Is the car yours to use as you see fit?
____	____	____	____	____	2.	Are there any restrictions placed upon your use of the car?
____	____	____	____	____	3.	Must parents approve the destination to which you wish to drive?
____	____	____	____	____	4.	Are you permitted to drive at night?

Always	Frequently	Sometimes	Rarely	Never		
____	____	____	____	____	5.	Are limits placed on distances you are permitted to drive?
____	____	____	____	____	6.	Must you be home by a definite time when using the car?
____	____	____	____	____	7.	Are limits set on the number of people who may ride with you?
____	____	____	____	____	8.	Is your use of the car based upon your academic performance in school?

9. Have you been involved in a collision (or collisions) while driving the car? If so, how many collisions _____
Explain in detail:

_____

_____

_____

Were you at fault? Yes ____ No ____. Did you receive a citation for the collision or collisions? Yes ____ No ____.
How Many _____

10. Have you received a citation for a traffic violation other than a collision? How many? _____
What for: Explain in full detail, please:

_____

_____

_____

11. Please list any restrictions that are placed upon your driving the car, if the restrictions were not included in the first part of this questionnaire:

_____

_____

_____

APPENDIX B

INTERVIEW SHEET

APPENDIX B

INTERVIEW SHEET

Subject # _____ Name _____

Age _____ Car-Ownership Yes ____ No _____

Sex _____

The subject was asked to respond to the following three categories of questions. The check list was utilized to stimulate response.

QUESTIONS

1. Name the exact locations to which you drive during the school week. How often? Location recorded as:

Area 1. (10 mile radius)
2. (11-25 mile radius)
3. (26-50 mile radius)
4. (51-200 mile radius)
5. (200 miles and over)

2. On weekends do these locations change? ____ Yes ____ No

Exactly where are the locations of weekend driving? _____

_____

Every weekend? Yes ____ No ____

How often? ____ Location: 1 2 3 4 5 (circle one)

Frequency: ____ (no. of times) Approximate miles: _____

Day: ____ Night: ____ (Time driven)

DRIVING

3. Vacation: Are there changes in the locations of your driving: Yes: ____ No: ____ Specifically where: _____

What places do you visit during the different vacation times? Winter ____ Spring ____ Summer ____ Fall ____

Location: Area 1 2 3 4 5 (circle one)

Frequency _____

Season: Winter ____ Spring ____ Summer ____ Fall ____

The interviewer prepared a map of the area with the five sections carefully delineated to use for reference during the interview.

ITEM CHECK SHEET

(Used in conjunction with questionnaire)

Checks were made in appropriate spots as subjects responded to the questions. Also these served as stimulators to subjects' responses. Minutes to and from destination noted.

Errands (Family and personal)		Frequency
Grocery store	_____	_____
Drug store	_____	_____
Gas station	_____	_____
Bank	_____	_____
Clothing store	_____	_____
Other	_____	_____
Church	_____	_____
School	_____	_____
Daily	_____	_____
Activities at school	_____	_____
Away games and activities	_____	_____
Other activities	_____	_____
Library (not school)	_____	_____

Recreation	Locally?	Where?	Out of Town	Where
Dances	_____	_____	_____	_____
Movies	_____	_____	_____	_____
Bowling	_____	_____	_____	_____
Drag racing supervised	_____	_____	_____	_____
Drive-ins	_____	_____	_____	_____
Parties	_____	_____	_____	_____
Others	_____	_____	_____	_____

Vacation Driving:

Winter:

Where? _____ Nearest big city _____

How often? _____

Spring:

Where? _____ Nearest big city _____

How often? _____

Summer:

Where? _____ Nearest big city _____

How often? _____

Fall:

Where? _____ Nearest big city _____

How often? _____

APPENDIX C

REQUEST FOR MICHIGAN DRIVER RECORD INFORMATION

REQUEST FOR MICHIGAN DRIVER RECORD INFORMATION

DC-70

DEPARTMENT OF STATE, LANSING, MICHIGAN 48918

IF ADDRESS ONLY WANTED CHECK CIRCLE ○

THIS SPACE FOR NAME AND ADDRESS OF COMPANY OR PERSON SUBMITTING REQUEST

STATE DEPT. ACCOUNT NO.

LICENSE NO. (IMPORTANT)					

NAME (FIRST, MIDDLE, LAST)

ADDRESS

BIRTH DATE	OPER LIC EXPIRES ON 19 ____ BIRTHDAY	CHAUF LIC EXPIRATION DATE

THIS SPACE FOR USE OF COMPANY SUBMITTING REQUEST

FINANCIAL RESPONSIBILITY RECORD

CASE NO.	CONVICTION OR ACCIDENT DATE	REASON FOR F. R. ACTION	LOCATION	DATE ACTION LIFTED

DRIVER RECORD INFORMATION

PROBATE COURT FINDING OR CONVICTION DATE	ARREST DATE	ACCIDENT DATE	LOCATION	OFFENSE, ACCIDENT, OR DEPT. ACTION

LOCATIONS

1. DETROIT
2. HIGHLAND PARK
3. LINCOLN PARK
4. LIVONIA
5. DEARBORN
6. GRAND RAPIDS
7. KALAMAZOO
8. LANSING
9. FLINT
10. SAGINAW

(ALL OTHERS WRITTEN)

OFFENSES

A. SPEEDING
B. RAN RED LIGHT
C. RAN STOP SIGN
D. IMPROPER LEFT TURN
E. IMPROPER RIGHT TURN
F. IMPROPER PASSING
G. RECKLESS DRIVING
H. INTERFERING WITH TRAFFIC
I. FAILURE TO YIELD RIGHT OF WAY
J. BASIC SPEED

(ALL OTHERS WRITTEN)

Information provided herein is intended to show only the basic facts pertaining to the individual's historical driving record. It does not show details pertaining to each entry such as:

1. Court fines and sentences
2. Date documents received by Department of State
3. Minor traffic offenses over seven years old
4. Attempts to pick up drivers licenses from those suspended or revoked.
5. Attempts to notify subject of pending re-examination
6. Length of time required to schedule and hold a re-examination due to statutory requirements that must be adhered to

Use of this record to determine the effectiveness of the law enforcement, judicial or driver improvement programs should not be attempted as it does not contain sufficient detail from which accurate conclusions can be reached.

Those attempting this type of study should write directly to Driver Services Division, Central Records Section stating the purpose of the study. Sufficient detail will then be included with the record.

APPENDIX D

SUMMARY OF DATA

APPENDIX D

SUMMARY OF DATA

SUBJECT	SEX	AGE	CAR OWNERSHIP	DRIVING HOURS PER WEEK	NIGHT DRIVING HOURS PER WEEK	MILEAGE PER WEEK	ACCIDENT RATES	VIOLATION RATES	PARENTAL CONTROL
1	1	17	2	6	3	100	1	2	1
2	1	17	2	5	2	65	3	4	1
3	1	17	2	3	0	19	0	0	2
4	1	17	2	8	4	60	0	0	2
5	1	17	2	5	2	20	0	0	2
6	1	17	2	25	14	200	0	0	1
7	1	17	2	25	18	200	0	0	2
8	1	17	2	15	8	400	0	0	1
9	1	17	2	20	14	300	0	0	1
10	1	17	2	7	1	200	0	0	2
11	1	17	2	25	12	600	0	0	1
12	1	17	2	30	15	100	0	0	2
13	1	17	2	6	1	50	0	0	1
14	1	17	2	6	3	120	0	0	1
15	1	17	2	5	1	100	0	0	2
16	1	17	2	20	14	100	0	0	1
17	1	17	2	6	1	110	0	0	2
18	1	17	2	20	14	200	0	0	1

APPENDIX D.--Continued

SUBJECT	SEX	AGE	CAR OWNERSHIP	DRIVING HOURS PER WEEK	NIGHT DRIVING HOURS PER WEEK	MILEAGE PER WEEK	ACCIDENT RATES	VIOLATION RATES	PARENTAL CONTROL
19	1	17	2	1	0	4	0	0	1
20	1	17	2	1	0	30	0	0	3
21	1	17	2	3	1	140	0	0	2
22	1	17	2	15	8	350	0	0	2
23	1	17	2	4	2	25	0	0	2
24	1	17	2	7	3	125	0	0	2
25	1	17	2	1	0	5	0	0	2
26	1	17	2	7	3	75	0	0	2
27	1	17	2	6	4	85	0	0	2
28	1	17	2	25	14	250	0	0	2
29	1	17	2	3	1	25	0	0	2
30	1	17	2	25	14	500	0	0	2
31	1	17	2	8	4	60	0	0	2
32	1	17	2	10	7	170	0	0	2
33	1	17	2	30	18	210	0	0	1
34	1	17	2	10	5	150	1	1	3
35	1	17	2	8	1	100	1	1	1
36	1	17	2	20	10	100	0	4	1
37	1	17	2	14	7	300	1	2	2

APPENDIX D.--Continued

SUBJECT	SEX	AGE	CAR OWNERSHIP	DRIVING HOURS PER WEEK	NIGHT DRIVING HOURS PER WEEK	MILEAGE PER WEEK	ACCIDENT RATES	VIOLATION RATES	PARENTAL CONTROL
38	1	17	2	10	8	40	0	1	2
39	1	17	2	20	14	700	2	3	1
40	1	17	2	10	7	100	1	1	2
41	1	17	2	10	7	80	1	1	2
42	1	17	2	25	3	900	3	2	1
43	1	17	2	23	12	800	0	2	1
44	1	17	2	10	7	250	1	0	3
45	1	17	2	10	1	400	0	2	2
46	1	17	2	4	2	100	1	0	2
47	1	17	2	8	6	100	1	1	3
48	1	17	2	8	12	200	0	1	3
49	1	17	2	7	5	250	1	1	1
50	1	17	2	20	10	500	1	1	2
51	1	17	1	2	1	45	0	0	2
52	1	17	1	2	1	30	0	0	2
53	1	17	1	8	4	24	0	0	3
54	1	17	1	3	1	100	0	0	3
55	1	17	1	4	1	70	0	0	1
56	1	17	1	5	1	50	1	0	2

APPENDIX D.--Continued

SUBJECT	SEX	AGE	CAR OWNERSHIP	DRIVING HOURS PER WEEK	NIGHT DRIVING HOURS PER WEEK	MILEAGE PER WEEK	ACCIDENT RATES	VIOLATION RATES	PARENTAL CONTROL
57	1	17	1	8	1	25	0	0	2
58	1	17	1	5	1	60	0	0	3
59	1	17	1	5	1	40	0	0	2
60	1	17	1	20	14	200	0	0	2
61	1	17	1	8	4	45	0	0	2
62	1	17	1	8	7	100	0	0	1
63	1	17	1	10	5	75	0	0	2
64	1	17	1	3	1	75	0	0	2
65	1	17	1	10	5	100	0	0	3
66	1	17	1	8	1	30	0	0	3
67	1	17	1	10	8	250	0	1	1
68	1	17	1	6	4	200	0	0	2
69	1	17	1	1	1	20	0	0	2
70	1	17	1	8	1	150	0	0	2
71	1	17	1	15	7	300	0	0	2
72	1	17	1	15	7	100	0	0	2
73	1	17	1	15	7	200	0	0	2
74	1	17	1	16	8	100	0	0	2
75	1	17	1	4	1	100	0	0	2

APPENDIX D.--Continued

SUBJECT	SEX	AGE	CAR OWNERSHIP	DRIVING HOURS PER WEEK	NIGHT DRIVING HOURS PER WEEK	MILEAGE PER WEEK	ACCIDENT RATES	VIOLATION RATES	PARENTAL CONTROL
76	1	17	1	16	7	200	0	1	2
77	1	17	1	10	5	90	0	0	2
78	1	17	1	3	1	25	0	1	3
79	1	17	1	20	14	500	1	0	1
80	1	17	1	3	1	30	0	1	2
81	1	17	1	2	1	20	1	0	2
82	1	17	1	20	10	200	0	2	3
83	1	17	1	10	5	100	0	1	2
84	1	17	1	6	3	30	0	0	2
85	1	17	1	3	1	25	0	0	2
86	1	17	1	6	1	100	0	0	2
87	1	17	1	8	1	375	0	0	2
88	1	17	1	2	1	63	0	0	2
89	1	17	1	8	3	130	0	0	2
90	1	17	1	2	1	40	0	0	2
91	1	17	1	2	1	40	0	0	1
92	1	17	1	15	7	75	0	0	2
93	1	17	1	2	1	40	0	0	3
94	1	17	1	12	8	150	0	0	2

APPENDIX D.--Continued

SUBJECT	SEX	AGE	CAR OWNERSHIP	DRIVING HOURS PER WEEK	NIGHT DRIVING HOURS PER WEEK	MILEAGE PER WEEK	ACCIDENT RATES	VIOLATION RATES	PARENTAL CONTROL
95	1	17	1	2	2	17	0	1	3
96	1	17	1	4	1	15	0	1	2
97	1	17	1	16	9	125	1	1	2
98	1	17	1	20	14	50	0	0	2
99	1	17	1	15	7	250	0	1	2
100	1	17	1	17	8	750	0	0	3
101	1	18	2	10	7	400	0	0	2
102	1	18	2	8	4	500	0	0	3
103	1	18	2	8	4	100	0	0	2
104	1	18	2	3	1	15	0	0	2
105	1	18	2	0	0	0	0	0	3
106	1	18	2	10	7	150	0	0	2
107	1	18	2	36	21	100	0	0	2
108	1	18	2	6	3	120	0	0	2
109	1	18	2	16	7	200	0	0	1
110	1	18	2	10	6	250	0	0	1
111	1	18	2	20	12	400	0	0	1
112	1	18	2	10	7	200	0	0	3
113	1	18	2	10	7	400	0	0	2

APPENDIX D.--Continued

SUBJECT	SEX	AGE	CAR OWNERSHIP	DRIVING HOURS PER WEEK	NIGHT DRIVING HOURS PER WEEK	MILEAGE PER WEEK	ACCIDENT RATES	VIOLATION RATES	PARENTAL CONTROL
114	1	18	2	20	14	60	0	0	2
115	1	18	2	13	7	425	0	0	2
116	1	18	2	10	7	400	0	0	2
117	1	18	2	4	1	300	0	0	1
118	1	18	2	10	7	250	0	0	2
119	1	18	2	25	21	500	0	0	3
120	1	18	2	15	7	50	0	0	2
121	1	18	2	14	7	250	0	0	2
122	1	18	2	11	2	400	0	0	3
123	1	18	2	20	14	200	0	0	2
124	1	18	2	15	7	300	0	0	1
125	1	18	2	10	1	100	0	0	2
126	1	18	2	11	7	400	0	0	3
127	1	18	2	15	7	300	0	0	1
128	1	18	2	20	14	200	0	0	2
129	1	18	2	30	21	300	0	0	2
130	1	18	2	48	28	900	0	0	2
131	1	18	2	15	7	100	1	2	1
132	1	18	2	3	1	100	0	3	2

APPENDIX D.--Continued

SUBJECT	SEX	AGE	CAR OWNERSHIP	DRIVING HOURS PER WEEK	NIGHT DRIVING HOURS PER WEEK	MILEAGE PER WEEK	ACCIDENT RATES	VIOLATION RATES	PARENTAL CONTROL
133	1	18	2	7	1	45	1	2	1
134	1	18	2	7	1	100	1	4	1
135	1	18	2	37	21	200	1	2	2
136	1	18	2	7	1	100	1	2	1
137	1	18	2	14	7	250	1	2	2
138	1	18	2	20	10	400	2	5	2
129	1	18	2	30	21	300	0	2	2
140	1	18	2	48	28	700	2	4	2
141	1	18	2	10	7	400	1	2	2
142	1	18	2	10	10	250	0	3	2
143	1	18	2	40	28	350	2	4	1
144	1	18	2	15	7	300	1	2	2
145	1	18	2	30	21	350	1	3	1
146	1	18	2	38	21	200	0	4	2
147	1	18	2	70	21	350	1	2	1
148	1	18	2	40	21	400	2	4	1
149	1	18	2	15	7	300	1	2	2
150	1	18	2	5	2	100	0	0	2
151	1	18	1	15	7	400	0	1	3

APPENDIX D.--Continued

SUBJECT	SEX	AGE	CAR OWNERSHIP	DRIVING HOURS PER WEEK	NIGHT DRIVING HOURS PER WEEK	MILEAGE PER WEEK	ACCIDENT RATES	VIOLATION RATES	PARENTAL CONTROL
152	1	18	1	15	7	50	0	1	1
153	1	18	1	6	3	80	0	2	2
154	1	18	1	6	3	100	0	0	2
155	1	18	1	10	7	300	0	2	2
156	1	18	1	10	7	270	0	1	2
157	1	18	1	15	7	50	0	2	1
158	1	18	1	15	7	300	0	0	3
159	1	18	1	12	7	150	0	0	2
160	1	18	1	17	5	85	0	0	2
161	1	18	1	16	10	150	0	1	2
162	1	18	1	3	1	25	0	0	2
163	1	18	1	10	7	500	0	0	3
164	1	18	1	3	1	50	0	0	1
165	1	18	1	45	21	500	0	0	2
166	1	18	1	12	7	250	0	0	1
167	1	18	1	4	1	60	0	0	2
168	1	18	1	15	7	200	0	1	2
169	1	18	1	10	7	500	0	0	3
170	1	18	1	4	1	100	0	0	3

APPENDIX D.--Continued

SUBJECT	SEX	AGE	CAR OWNERSHIP	DRIVING HOURS PER WEEK	NIGHT DRIVING HOURS PER WEEK	MILEAGE PER WEEK	ACCIDENT RATES	VIOLATION RATES	PARENTAL CONTROL
171	1	18	1	4	2	45	0	0	2
172	1	18	1	5	1	50	0	0	2
173	1	18	1	3	2	30	0	0	1
174	1	18	1	25	14	350	1	0	1
175	1	18	1	4	1	45	0	0	2
176	1	18	1	4	1	100	0	0	2
177	1	18	1	30	2	30	0	0	1
178	1	18	1	14	7	200	0	1	2
179	1	18	1	15	7	150	0	1	2
180	1	18	1	17	10	600	0	0	2
181	1	18	1	4	2	26	0	0	3
182	1	18	1	15	7	200	0	0	2
183	1	18	1	15	7	400	0	0	3
184	1	18	1	6	3	100	0	0	2
185	1	18	1	7	4	300	0	0	2
186	1	18	1	6	3	100	0	0	2
187	1	18	1	10	7	200	0	1	2
188	1	18	1	15	7	250	0	1	2
189	1	18	1	16	14	100	0	1	2

APPENDIX D.--Continued

SUBJECT	SEX	AGE	CAR OWNERSHIP	DRIVING HOURS PER WEEK	NIGHT DRIVING HOURS PER WEEK	MILEAGE PER WEEK	ACCIDENT RATES	VIOLATION RATES	PARENTAL CONTROL
190	1	18	1	4	2	26	0	0	3
191	1	18	1	32	21	400	0	0	1
192	1	18	1	4	2	50	0	0	2
193	1	18	1	3	1	20	0	0	2
194	1	18	1	19	10	75	0	0	2
195	1	18	1	10	7	125	0	0	2
196	1	18	1	15	7	170	0	0	2
197	1	18	1	6	3	80	1	0	2
198	1	18	1	10	7	300	0	1	3
199	1	18	1	10	7	270	0	1	2
200	1	18	1	21	14	175	0	0	2
201	2	17	2	5	3	55	0	0	2
202	2	17	2	12	8	30	0	0	2
203	2	17	2	14	7	600	0	0	2
204	2	17	2	1	0	20	0	0	2
205	2	17	2	4	2	60	0	1	2
206	2	17	2	8	1	40	0	0	2
207	2	17	2	13	7	250	0	0	2
208	2	17	2	4	1	25	0	0	2

APPENDIX D.--Continued

SUBJECT	SEX	AGE	CAR OWNERSHIP	DRIVING HOURS PER WEEK	NIGHT DRIVING HOURS PER WEEK	MILEAGE PER WEEK	ACCIDENT RATES	VIOLATION RATES	PARENTAL CONTROL
209	2	17	2	5	1	50	0	0	2
210	2	17	2	8	6	75	0	0	2
211	2	17	2	10	7	100	0	0	2
212	2	17	2	20	14	300	0	0	2
213	2	17	2	5	2	50	0	0	3
214	2	17	2	4	2	25	0	0	2
215	2	17	2	10	7	100	0	0	2
216	2	17	2	2	1	30	0	0	2
217	2	17	2	10	5	70	0	0	2
218	2	17	2	10	7	25	0	0	3
219	2	17	2	5	1	73	0	0	2
220	2	17	2	10	5	100	0	0	2
221	2	17	2	7	4	55	0	1	2
222	2	17	2	10	7	100	0	0	2
223	2	17	2	40	20	150	0	0	3
224	2	17	2	2	1	30	0	0	2
225	2	17	2	6	3	70	0	0	3
226	2	17	2	1	0	5	0	0	2
227	2	17	2	00	0	0	0	0	3

APPENDIX D.--Continued

SUBJECT	SEX	AGE	CAR OWNERSHIP	DRIVING HOURS PER WEEK	NIGHT DRIVING HOURS PER WEEK	MILEAGE PER WEEK	ACCIDENT RATES	VIOLATION RATES	PARENTAL CONTROL
228	2	17	2	10	5	100	0	0	2
229	2	17	2	3	1	30	0	1	3
230	2	17	2	15	7	125	0	1	1
231	2	17	2	4	1	30	0	0	1
232	2	17	2	15	7	150	0	0	2
233	2	17	2	8	5	90	0	0	2
234	2	17	2	2	1	7	0	0	3
235	2	17	2	10	5	200	0	0	2
236	2	17	2	10	4	20	0	0	1
237	2	17	2	10	6	150	0	0	1
238	2	17	2	5	2	30	0	0	3
239	2	17	2	15	7	300	0	1	1
240	2	17	2	20	18	400	1	0	2
241	2	17	2	7	2	35	0	0	2
242	2	17	2	5	2	50	0	0	2
243	2	17	2	2	1	10	0	0	3
244	2	17	2	2	1	8	0	0	3
245	2	17	2	15	7	200	0	0	2
246	2	17	2	10	3	150	0	0	1

APPENDIX D.--Continued

SUBJECT	SEX	AGE	CAR OWNERSHIP	DRIVING HOURS PER WEEK	NIGHT DRIVING HOURS PER WEEK	MILEAGE PER WEEK	ACCIDENT RATES	VIOLATION RATES	PARENTAL CONTROL
247	2	17	2	15	7	500	0	0	1
248	2	17	2	10	6	20	0	0	2
249	2	17	2	10	7	200	0	0	2
250	2	17	2	4	1	100	0	0	2
251	2	17	2	10	6	150	0	0	3
252	2	17	2	10	9	500	0	0	2
253	2	17	2	15	7	200	1	1	2
254	2	17	2	3	1	20	0	0	2
255	2	17	2	18	10	300	0	0	2
256	2	17	2	10	8	15	0	0	2
257	2	17	2	4	3	50	0	0	2
258	2	17	2	15	9	52	0	0	2
259	2	17	2	3	1	10	0	0	3
260	2	17	2	5	2	50	0	0	2
261	2	17	2	8	6	150	0	0	2
262	2	17	2	4	1	30	0	0	1
263	2	17	2	3	1	8	0	0	2
264	2	17	2	5	3	10	0	0	1
265	2	17	2	5	3	10	0	0	2

APPENDIX D.--Continued

SUBJECT	SEX	AGE	CAR OWNERSHIP	DRIVING HOURS PER WEEK	NIGHT DRIVING HOURS PER WEEK	MILEAGE PER WEEK	ACCIDENT RATES	VIOLATION RATES	PARENTAL CONTROL
266	2	17	2	5	2	50	0	0	1
267	2	17	2	15	10	75	0	1	1
268	2	17	2	10	7	150	0	0	1
269	2	17	2	5	3	100	0	0	2
270	2	17	2	10	6	125	0	0	2
271	2	17	2	4	2	100	0	0	2
272	2	17	2	8	6	150	0	0	2
273	2	17	2	3	1	30	0	0	2
274	2	17	2	5	2	70	0	0	3
275	2	17	2	10	5	50	0	0	2
276	2	17	2	10	6	150	0	1	2
277	2	17	2	3	1	5	0	0	3
278	2	17	2	7	3	200	0	0	2
279	2	17	2	2	1	12	0	1	3
280	2	17	2	16	12	350	0	0	1
281	2	17	2	6	4	150	0	0	2
282	2	17	2	20	14	50	0	0	3
283	2	17	2	15	7	200	0	0	2
284	2	17	2	10	6	200	0	0	2

APPENDIX D.--Continued

SUBJECT	SEX	AGE	CAR OWNERSHIP	DRIVING HOURS PER WEEK	NIGHT DRIVING HOURS PER WEEK	MILEAGE PER WEEK	ACCIDENT RATES	VIOLATION RATES	PARENTAL CONTROL
285	2	17	2	12	8	400	0	1	2
286	2	17	2	2	1	25	0	0	3
287	2	17	2	10	7	300	0	0	2
288	2	17	2	2	1	50	0	0	3
289	2	17	2	14	9	30	0	0	2
290	2	17	2	11	7	80	0	0	1
291	2	17	2	10	8	200	0	0	2
292	2	17	2	4	2	40	0	0	2
293	2	17	2	5	2	50	1	1	2
294	2	17	2	10	7	55	0	0	3
295	2	17	2	25	14	55	0	0	2
296	2	17	2	7	3	200	0	1	3
297	2	17	2	2	1	15	0	0	2
298	2	17	2	4	2	6	0	0	3
299	2	17	2	2	1	60	0	0	2
300	2	17	2	5	2	75	0	0	2
301	2	17	2	16	8	120	0	0	1
302	2	17	2	4	2	25	0	0	2
303	2	17	2	2	1	20	1	1	2

APPENDIX D.--Continued

SUBJECT	SEX	AGE	CAR OWNERSHIP	DRIVING HOURS PER WEEK	NIGHT DRIVING HOURS PER WEEK	MILEAGE PER WEEK	ACCIDENT RATES	VIOLATION RATES	PARENTAL CONTROL
304	2	17	2	15	6	300	0	0	2
305	2	17	2	10	6	200	0	0	3
306	2	17	2	2	1	15	0	0	2
307	2	17	2	10	7	100	0	0	2
308	2	17	2	5	3	50	0	1	1
309	2	17	2	8	5	150	0	0	2
310	2	17	2	4	2	100	0	0	2
311	2	17	1	27	14	425	1	1	1
312	2	17	1	7	1	15	0	0	1
313	2	17	1	50	10	300	0	0	2
314	2	17	1	14	7	175	0	1	2
315	2	17	1	13	6	150	1	2	3
316	2	17	1	21	10	155	0	0	2
317	2	17	1	18	14	60	0	0	1
318	2	17	1	30	14	250	0	0	2
319	2	17	1	3	1	50	0	0	1
320	2	17	1	15	7	28	0	0	2
321	2	17	1	15	5	100	0	0	2
322	2	17	1	10	5	200	1	0	1

APPENDIX D.--Continued

SUBJECT	SEX	AGE	CAR OWNERSHIP	DRIVING HOURS PER WEEK	NIGHT DRIVING HOURS PER WEEK	MILEAGE PER WEEK	ACCIDENT RATES	VIOLATION RATES	PARENTAL CONTROL
323	2	17	1	25	18	400	0	0	1
324	2	17	1	3	1	25	0	0	2
325	2	17	1	3	1	50	0	0	3
326	2	17	1	3	1	30	0	0	2
327	2	17	1	20	5	300	0	0	2
328	2	17	1	10	5	50	0	0	3
329	2	17	1	8	5	120	0	0	1
330	2	17	1	14	5	50	0	0	1
331	2	17	1	3	1	10	1	1	1
332	2	17	1	5	1	60	0	0	3
333	2	17	1	12	6	60	0	0	2
334	2	17	1	2	1	40	1	0	1
335	2	17	1	10	7	120	1	0	1
336	2	17	1	2	0	10	0	0	1
337	2	17	1	15	9	75	0	0	1
338	2	17	1	18	8	100	0	1	1
339	2	17	1	3	1	30	1	0	2
340	2	17	1	10	2	100	0	1	1
341	2	17	1	6	1	100	1	0	1

APPENDIX D.--Continued

SUBJECT	SEX	AGE	CAR OWNERSHIP	DRIVING HOURS PER WEEK	NIGHT DRIVING HOURS PER WEEK	MILEAGE PER WEEK	ACCIDENT RATES	VIOLATION RATES	PARENTAL CONTROL
342	2	17	1	3	0	10	1	1	1
343	2	17	1	1	0	10	1	1	1
344	2	17	1	13	7	75	1	0	1
345	2	17	1	8	6	113	0	1	1
346	2	17	1	4	2	10	1	0	2
347	2	17	1	3	1	50	0	0	2
348	2	17	1	7	1	100	1	0	2
349	2	17	1	1	0	20	0	0	1
350	2	17	1	8	1	40	0	0	3
351	2	17	1	10	7	75	1	1	1
352	2	17	1	20	14	60	1	0	1
353	2	17	1	4	2	12	1	1	1
354	2	17	1	10	7	150	0	0	2
355	2	17	1	15	8	300	0	0	3
356	2	17	1	3	1	25	0	1	3
357	2	17	1	4	1	50	1	1	2
358	2	17	1	10	7	100	0	0	3
359	2	17	1	24	16	400	0	0	1
360	2	17	1	2	1	10	0	1	1

APPENDIX D.--Continued

SUBJECT	SEX	AGE	CAR OWNERSHIP	DRIVING HOURS PER WEEK	NIGHT DRIVING HOURS PER WEEK	MILEAGE PER WEEK	ACCIDENT RATES	VIOLATION RATES	PARENTAL CONTROL
361	2	18	2	25	14	300	0	0	2
362	2	18	2	20	14	250	0	0	3
363	2	18	2	21	14	75	0	0	2
364	2	18	2	3	1	100	0	0	2
365	2	18	2	25	14	150	0	0	2
366	2	18	2	14	7	250	1	1	3
367	2	18	2	20	17	360	1	1	3
368	2	18	2	15	7	225	1	1	1
369	2	18	2	20	7	400	1	1	2
370	2	18	2	28	14	600	1	1	1
371	2	18	2	21	14	400	1	1	1
372	2	18	2	40	21	500	1	1	3
373	2	18	2	11	7	250	1	1	2
374	2	18	2	30	14	200	1	1	1
375	2	18	2	20	12	500	0	1	3
376	2	18	2	10	7	250	0	1	3
377	2	18	2	15	7	400	0	1	3
378	2	18	2	7	4	200	0	1	3
379	2	18	2	30	20	400	0	0	3

APPENDIX D.--Continued

SUBJECT	SEX	AGE	CAR OWNERSHIP	DRIVING HOURS PER WEEK	NIGHT DRIVING HOURS PER WEEK	MILEAGE PER WEEK	ACCIDENT RATES	VIOLATION RATES	PARENTAL CONTROL
380	2	18	2	24	17	450	0	0	3
381	2	18	2	15	8	500	0	0	3
382	2	18	2	10	7	150	0	0	3
383	2	18	2	30	10	200	0	0	2
384	2	18	2	16	9	50	0	0	3
385	2	18	2	25	16	300	0	0	3
386	2	18	2	8	4	250	0	0	3
387	2	18	1	10	7	200	0	0	2
388	2	18	1	10	7	200	0	0	2
389	2	18	1	10	7	150	0	0	2
390	2	18	1	2	1	18	0	0	3
391	2	18	1	4	2	145	0	0	2
392	2	18	1	21	14	150	0	0	2
393	2	18	1	1	0	10	0	0	3
394	2	18	1	4	2	130	0	0	1
395	2	18	1	48	24	70	0	0	2
396	2	18	1	15	7	200	1	1	2
397	2	18	1	24	16	200	1	1	2
398	2	18	1	12	8	222	0	0	2

APPENDIX D.--Continued

SUBJECT	SEX	AGE	CAR OWNERSHIP	DRIVING HOURS PER WEEK	NIGHT DRIVING HOURS PER WEEK	MILEAGE PER WEEK	ACCIDENT RATES	VIOLATION RATES	PARENTAL CONTROL
399	2	18	1	5	3	40	0	0	2
400	2	18	1	0	0	0	0	0	3
401	2	18	1	15	9	150	0	0	2
402	2	18	1	10	8	100	0	0	1
403	2	18	1	33	21	440	0	0	2
404	2	18	1	30	14	180	0	0	3
405	2	18	1	6	1	100	0	0	2
406	2	18	1	60	35	779	0	0	3
407	2	18	1	12	7	400	0	0	2
408	2	18	1	4	2	100	0	0	3
409	2	18	1	0	0	0	0	0	3
410	2	18	1	3	1	30	0	0	2
411	2	18	1	20	14	45	0	0	2
412	2	18	1	24	14	600	0	0	3
413	2	18	1	7	7	70	0	0	3
414	2	18	1	30	21	250	0	0	3
415	2	18	1	4	1	40	0	0	2
416	2	18	1	6	2	150	0	0	2
417	2	18	1	7	3	100	0	0	2

APPENDIX D.--Continued

SUBJECT	SEX	AGE	CAR OWNERSHIP	DRIVING HOURS PER WEEK	NIGHT DRIVING HOURS PER WEEK	MILEAGE PER WEEK	ACCIDENT RATES	VIOLATION RATES	PARENTAL CONTROL
418	2	18	1	40	20	600	0	1	3
419	2	18	1	3	1	20	0	1	2
420	2	18	1	25	14	440	0	1	3
421	2	18	1	21	14	500	0	1	2
422	2	18	1	1	0	10	1	1	3
423	2	18	1	5	3	30	1	1	2
424	2	18	1	1	0	10	0	0	3
425	2	18	1	22	12	300	0	0	1
426	2	18	1	14	8	225	0	0	3
427	2	18	1	8	6	100	0	0	2
428	2	18	1	5	2	150	0	0	2
429	2	18	1	15	8	100	0	0	2
430	2	18	1	15	7	300	0	0	2
431	2	18	1	5	3	120	0	0	3
432	2	18	1	2	1	4	0	0	2
433	2	18	1	1	0	2	0	0	3
434	2	18	1	5	3	60	0	0	3
435	2	18	1	10	7	100	0	0	2
436	2	18	1	20	14	200	1	1	2