

# Community Study of the Characteristics of Drivers and Driver Behavior Related to Accident Experience

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This is a study of human characteristics and driver habits considered to be associated with motor vehicle accidents. The basic sample of Schenectady, N. Y. was established by visiting 1,567 households in that city during 1955. Of these, 810 were driver or interview households and the remaining 757 were no-interview households.

This study was conducted by the New York State Department of Public Works in cooperation with the Bureau of Public Roads. The New York State Department of Health collaborated in the study in the planning and interpretation of data phases.

For the collection of data, 526 male and 284 female drivers were interviewed using a schedule of 60 questions relating to personal, social, health and driving characteristics, including miles driven for a 2½-year period from January 1953 through June 1955. Accident records for the respondents covering this 2½-year period were searched from the files of the Motor Vehicle Bureau and evaluated by a panel of judges to determine accident responsibility.

Data for each characteristic collected in the interview were tabulated by three groups of exposure—low, medium, and high—and each related to the drivers' accident status—no-accident, accident responsible, and accident not responsible—for the range of answers obtained.

The general hypothesis of the whole study is that drivers responsible for motor vehicle accidents have different personal, social, and driving characteristics than drivers who have not had accidents. Each characteristic of the respondent was put into the form of a specific null hypothesis and tested statistically.

To determine those attributes that may be causally associated with driver behavior, a factor test was applied to those variables for both male and female drivers that (a) were statistically significant on a 95 percent level, (b) were selected on a statistical judgment basis, and (c) were selected because of current interest in the variable.

To test the hypothesis that there is no difference between accident and no-accident drivers in the way they drive, 428 male and 122 female drivers were followed while driving in Schenectady and their driver behavior was noted and rated on a scale to include speed, headway, lane markings, passing, traffic signals, stop signs, turning movements, yielding, and attentiveness. A scoring system was adopted to group the drivers according to their rated driver behavior into categories of unsafe, predominately unsafe, neutral, predominately safe, and safe drivers. Accident records of the observed drivers for a 2½-year period, January 1953 through June 30, 1955, were searched and the data were tabulated by sex to show the relation between the five categories of drivers by the no-accident and accident drivers. The types of accidents were likewise grouped for examination. Composition of the sample, characteristics of drivers and cars driven with accident experience are also examined.

● **THE RISK OF** an automobile accident is accepted by most people as a part of their lives. Actually little serious thought is given to the hazards of automobile travel, perhaps because accidents have become a part of the present system of values.

In spite of the public's generally casual attitude toward this potential danger, the cost to society is such as to cause real concern among both governmental and private groups. One of the newest needs recognized is a scientific study of the drivers themselves. It was on this very note, in fact, that Dr. Detlev W. Bronk, President of the National Academy of Sciences, opened the 34th annual meeting of the Highway Research Board. Although the principles and methodology for this type of research are known by students of human behavior, the project reported here is virtually the first instance in which they have been utilized to examine the phenomena of driving and accidents.

This study was conducted in Schenectady, N. Y., by the New York State Department of Public Works in cooperation with the United States Bureau of Public Roads. The New York State Department of Health collaborated in planning the project and in the preliminary interpretation of the data.

The ground work for this research was based on a combination of data from three pilot studies and the knowledge of traffic engineers, social scientists, and epidemiologists. As a research project, it is unique in at least four respects. First, it is different because of its interdepartmental and interdisciplinary approach. Second, it is one of the first studies of accidents to go beyond a clinical examination of the drivers involved. It is based on a random sampling of all drivers in a community to determine whether drivers involved in accidents have different characteristics from those who have not been in accidents. Third, methods were developed and used for assessing the responsibility for accidents and for obtaining the number of miles driven. This was defined as "exposure." Fourth, drivers were rated on their driving in terms of safe-unsafe behavior while they drove without knowing that they were being followed.

The findings reported are those considered to be most useful. Many more studies should be made of automobile drivers, their accident records, and other related factors. Data from such sources will build the store of knowledge necessary for a planning program of automobile accident prevention.

## PART I. FIRST PHASE Determination of Data

### General

Research in driver behavior and highway safety in the Schenectady project was handled in two phases. The principal phase was interviewing drivers in their homes. The second phase was observing motorists as they drove on the streets.

The primary purpose of each phase was to compare those drivers who had been involved in accidents with those who had not had accidents.

Fundamental to this endeavor were three earlier pilot studies on accidents, certain relevant literature, and the abilities of the members of the Interdepartmental Committee representing different disciplines and research experience.

### Background

Prior to beginning the work in Schenectady, studies had been made in West Sand Lake (1), Oneonta (2), and Saratoga Springs (3), each in New York State, which demonstrated the feasibility of conducting research on a community basis using the interview and observation methods.

In the literature, there was no record of a study of motor vehicle accidents based on the community research method. According to Ross A. McFarland (4), who has compiled an extensive review of the literature on accidents, the range of work has been "from opinion essays to critical theoretical discussions, from a simple counting of accidents to complex statistical analyses, and from everyday observation to controlled experiment."

The Committee set up the following criteria for selecting the community to be studied:

1. Where accidents are recorded.
2. Where accidents are investigated.
3. Where the accident rate is normal or average.

4. Where the community is reasonably isolated.
5. Where there is a usual amount of through traffic.
6. Where there is a diversity of industries.
7. Where there are few suburbs.
8. Where there is a population over 25,000.
9. Where there is a well-balanced traffic pattern.
10. A location easily accessible to Albany.

It was found that Schenectady fulfilled most of these requirements. In addition, the study was welcomed by the city officials.

## INTERVIEWS WITH A SAMPLE OF DRIVERS

### The Research Design

The Interdepartmental Committee met and determined the scope of the work, the definitions of terms and the procedures for finishing the work within a year. A statement incorporating their point of view, basic assumptions, dimensions of the project, and hypotheses to be tested were set forth in a research statement.

In their planning, the Committee made use of results from the Oneonta, Saratoga Springs and West Sand Lake pilot studies, as well as interviews with some West Sand Lake respondents. These data helped in defining "accident" as "a motor vehicle mishap occurring between January 1, 1953 and July 1, 1955 on file with the New York State Bureau of Motor Vehicles."

Another operational definition was "a driver is anyone 16 years of age or over who has operated a motor vehicle at any time from January 1, 1953 to the date of the interview."

### Construction and Pretest of the Interview Schedule

Once the areas of investigation, hypotheses, definitions, and instruments were decided upon, questions were devised to secure the type of information desired. The questions (Appendix B) were formulated to test a specific hypothesis, to secure control data, and in a few instances, to provide a setting against which facts could be remembered. If no driver was present or if a driver was not to be interviewed in the household visited, the interview was terminated after asking the questions on the first two pages.

When drivers were interviewed, they were asked about the amount of time they spent motoring within the last three years and the mileages traveled in order to get their average monthly mileage. These questions were the first of seven separate sets of questions designed to learn how far people drove within a given period. The number of miles for such a time period was defined as the "exposure" of the driver.

The difficult questions of (a) present car speedometer readings, (b) past car speedometer readings, (c) 1955 mileage, (d) sample day driving, (e) 1954 estimation of mileage, (f) 1954 calculation of trips, and (g) 1953 estimation of mileage, were asked during the first half hour. The driver was then the freshest and the most interested in the difficult work of recalling the facts. Once the mileage data were secured, the hard part of the interview was finished.

Once the schedule of questions was drafted and revised, a test of the wording and their sequence was made in actual interviews in order to retain material that worked best and discard all that did not contribute to the results. It was thought best not to confuse the work areas in Schenectady by any preliminary interviewing. Permission was therefore secured from the Mayor and Police Chief in the adjoining village of Scotia for conducting certain interviews there. Blocks and households were selected just as they would later be selected in Schenectady. In addition, to provide an opportunity to examine the schedule, this pretesting procedure enabled some interviewers to receive initial training. Results were tabulated and scrutinized before decisions were made as to what was feasible to include and what should be added for clarity and for securing information by which hypotheses could be tested. The questions included in the interview schedule, according to general areas, are shown in Table 1.

TABLE 1

THE QUESTIONS BY GENERAL AREAS INCLUDED IN THE INTERVIEW SCHEDULE  
(Schenectady Interview)

1. General Characteristics of Drivers
  - a. Sex
  - b. Age
  - c. Education
  - d. Marital status
  - e. Labor force
  - f. Weight
2. Exposure
  - a. Annual mileage for:
    - 1 - 1953-using a combination of speedometer readings and estimated mileages.
    - 2 - 1954-using a combination of speedometer readings, estimated and calculated mileages.
    - 3 - 1955-6 months-using a combination of calculated and mileages recorded by diary.
3. Driving Experience
  - a. Years of driving experience
  - b. Motor vehicle accidents January 1, 1953 to June 30, 1955 by type and accident responsibility
4. Speed
  - a. Speed on the open road
  - b. Opinion of whether a slow or fast driver
  - c. Fastest ever driven on the open highway
5. Skill
  - a. Opinion of own driving skill
  - b. Driving instructor
  - c. Number of times driver exam taken
6. Safety-mindedness
  - a. What is done to wake up when sleepy at the wheel
  - b. Whether or not they drive after drinking on occasion
7. Attitude on Traffic Regulations
  - a. Enforcement of traffic laws
  - b. Belief about stop signs being generally observed
  - c. Opinion on necessity of drivers coming to a full stop at a corner stop sign
8. Medical Aspects
  - a. Use of alcohol
  - b. Use of tobacco
    - 1 - smoke now
    - 2 - how much
    - 3 - smoke while driving
  - c. State of health  
(hayfever, asthma, diabetes, high blood pressure, stomach ulcer, arthritis, rheumatism or neuritis, limited use of either arm or leg, fainting spells or epilepsy, nervous or emotional illness, chronic condition or long drawn-out illness, and trouble hearing).
9. Social Stress
  - a. Share of worries the last three years

Table 1 (continued)

- b. Use of driving to relieve tension
  - c. Affect on driving when angry
  - d. Affect on driving when sad or depressed
  - e. Relative nervousness
  - f. Trouble getting to sleep
  - g. Enjoy driving
  - h. How they feel when they drive
10. Social Characteristics
- a. Type of dwelling
  - b. Type of neighborhood
  - c. Economic level
  - d. Number of people in household
  - e. Occupation
11. General Opinions
- a. Whether or not they think other drivers are courteous
  - b. Opinion of night driving
  - c. Opinion about the size of route signs
  - d. Opinion of other peoples driving according to the way they feel
12. Other Characteristics
- a. Wearing of glasses
  - b. Use of sunglasses while driving
  - c. Year of car driven most
  - d. Make of car driven most
  - e. Car breakdowns
  - f. Relative ease of finding their way on a strange road
  - g. Whether or not satisfied with appearance of car they drive
  - h. Satisfaction with mechanical performance and the way their car drives

Some 200 questions were used covering these areas.

## APPLICATION OF DATA

### Random Sample Selection in Schenectady

Before this study was undertaken, there was no information as to who, within any population area, drove or did not drive a car. In seeking to provide these data, a sample area of Schenectady was selected to which could be applied area probability techniques. This meant that city blocks were selected at random and people on those blocks were selected for contact by an unbiased procedure.

Chief reliance was placed on census block statistics. The outline of the selected block was drawn on 8 $\frac{1}{2}$ -by 11-in. paper and put in a folder along with interview schedules and diary forms to make a working sheet for the interviewer. The interviewer's first step in the field was to ascertain the correctness of the boundaries before he drew in the number of households. Of the 873 blocks listed by the census, 14 densely-settled and 183 lightly-settled blocks formed the final sample. Distribution of these is shown in Figure 1.

In this work, a household was defined as a group of people sharing the same kitchen and other facilities.

At the start of the survey, one or two drivers were arbitrarily assigned to each fourth household (each sixth household for the dense blocks). An assignment of one meant that the oldest driver in the household was to be interviewed. Assignment of two meant an interview with the second oldest driver. In households having only one driver, but where a random start of two had been assigned, no driver was interviewed. In households with several drivers and a random start of one assigned, the first and



Figure 1. Schenectady, New York, by Wards and Blocks, 1950.

third oldest drivers were to be interviewed. With a random start of two, the second, fourth, and sixth oldest drivers were to be interviewed. The purpose of this procedure was to restrict the number of multiple-interviews in a given household in order to secure a wider spread of households, improve the pattern of sampling, and eliminate biases that might arise from people hearing a family member answering the same questions he had been asked or would be asked.

People were revisited until contact was made. The prediction was borne out very early that the only feasible times for interviewing were evenings and weekends.

### The Interviewing

Interviewers were trained by the Project Director, initially through a "guide" written for them, and then by supervised practical work.

Interviewing of Schenectady drivers began on August 8, 1955, and continued until January 30, 1956. Some 810 drivers were completely interviewed; 757 others were contacted at least once for basic household data.

### Diary-Keeping and Follow-Up

At the close of the interview, the driver was asked if he would be willing to keep a daily record of all miles driven. Respondents were told that an account of their driving

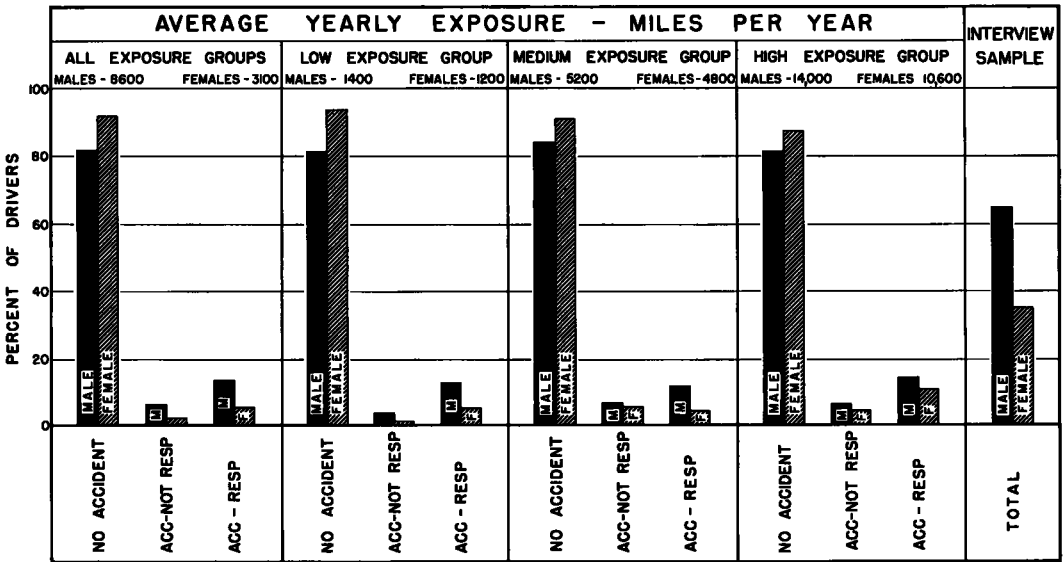


Figure 2. Sex of drivers compared with exposure (miles driven) and accident status for the period from January 1, 1953 through June 30, 1955.

would be collected at the end of each week for the four succeeding weeks. Most people readily agreed to do this and took the diary form, to which was attached a note from the Project Director thanking them for the interview, explaining something about the diary, and indicating where contact could be made with the project staff at City Hall. As the person finished four weeks, he was sent another thank-you letter from the Project Director for keeping the record.

A test was made to determine which of three follow-up methods brought the best cooperation and at the same time was most efficient to carry on. This was accomplished through three random subsamples of the blocks selected for interviews. In one subsample, everyone interviewed on the blocks chosen was sent a double, self-addressed postcard each week on which to copy the daily mileage from their diary before dropping it in the mail. Respondents in the second subsample were phoned each week and their mileages noted on their office copy directly. In the third subsample, drivers were visited each week in order that mileage could be copied on the office record directly at the doorstep. On October 26, 1955, an analysis was made of the three follow-up procedures in order to decide which should be carried on during the remainder of the study.

As a result of these analyses, the weekly follow-up for the remainder of the project was made by telephone, except for home visits to the approximately 10 percent who did not have phones.

#### Accident Record Search and Evaluation

Motor vehicle accidents, for the purpose of this study, were limited to those reported to and filed by the Bureau of Motor Vehicles. By statute, this includes all accidents involving personal injury or property damage of \$50 or more.

Upon completion of their search the Bureau returned the index cards for each respondent, together with photostats of all corresponding accident reports. The photostats were then released for evaluation of accident responsibility.

A panel of 15 persons acted as judges for evaluating accident responsibility. Among these were five engineers, five statisticians, and five others, including physicians, a public health nurse, a cultural anthropologist and an insurance evaluator. The 15 were divided into five teams of three members each by selecting at random one engineer, one statistician, and one of the others.

To remove bias in judging, photostatic copies of the accident records were identified

by number only. Name, age, sex, and color were obliterated. The records were divided into groups and each group sent to a team. If all three on a team assigned responsibility to the same driver on a record, judging was complete, since this is a majority decision of five. If the agreement was not complete on a record, it was sent to two more evaluators. Responsibility for each accident was thus determined by majority decision of five.

Accident responsibility was defined as any percentage attributable to a driver. Drivers in the "accident-not-responsible" category thus were judged as having zero responsibility for the accidents.

#### Coding, Punching, and Tabulating Interview Data

Coding was done as a separate operation. Data from the schedules were punched into five Holerith cards and information about accidents was punched on the sixth card. These cards formed the basis for tabulation by use of IBM equipment.

TABLE 2  
CONTACT WITH HOUSEHOLDS

Nature of Contact	No-Interview Contacts		Interview Contacts		Total Contacts	
	Number	Percent	Number	Percent	Number	Percent
Driver interviewed	-	-	810	99.9	810	51.7
Wrong random start	8	1.1	-	-	8	0.5
No driver in household	341	45.0	-	-	341	21.8
Refusal: should be driver	18	2.4	-	-	18	1.1
Refusal: wrong random start or no driver	5	0.6	-	-	5	0.3
Refusal: household composition unknown	12	1.6	-	-	12	0.8
No contact could be made	87	11.5	-	-	87	5.6
No random start (start was 2 and only 1 driver)	276	36.5	-	-	276	17.6
Refusal: no random start driver in household	5	0.6	-	-	5	0.3
Interviewer failed to get interview	5	0.6	-	-	5	0.3
<b>Totals</b>	<b>757</b>	<b>99.9</b>	<b>810</b>	<b>99.9</b>	<b>1,567</b>	<b>100.0</b>

#### ANALYSIS OF DATA

##### Control Data

Control data are those which help form the background for evaluation of other findings in a study. Some of these can be indicated here.

A total of 1,567 contacts was made in Schenectady. These contacts made up the basic sample of the city. Of these, 810 were driver contacts. The remaining 757 were no-interview contacts. The latter group contained households in which no one had driven since January 1953, in which there was one driver but a random start of two, in which no complete contact could be made after one to six visits because of termination of the field work, and a very few in which the person refused to give more than a fragment of the information needed. Table 2 shows the nature of contacts with Schenectady households. Other analyses of the control data are shown in Appendix C.

##### Accident Evaluation

Of the 810 interviewed drivers, 119 were found to have been involved in motor ve-



hicle accidents. Among the 119, 11 had had two and 2 had had three, making a total of 134 accident records on file with the Bureau of Motor Vehicles from January 1, 1953 through June 30, 1955. For comparative purposes, the average yearly accident rate for the sample was 0.066, as compared to the statewide average yearly rate of 0.057 for the same period.

Responsibility for each of the 134 accidents was judged separately. In the tabulations, 691 drivers were classified as no-accident; 82, involved in 88 accidents, as accident responsible; and 37, involved in 46 accidents, as accident not-responsible. The number of accidents, is shown in Table 3 and judged accident responsibility.

TABLE 3

## NUMBER OF ACCIDENTS BY TYPE AND JUDGED DRIVER RESPONSIBILITY

Driver Responsibility	Head On	Rear End	Angular	One Car	Pedestrian	Others	Total
Responsible	6	36	21	12	5	8	88
Not Responsible	2	18	5	16	2	3	46
Total	8	54	26	28	7	11	134
		106 drivers with one accident					
		11 drivers with two accident					
		2 drivers with three accidents					
		119 drivers = 134 accidents					

Data Arrangement by Exposure

A serial tabulation of miles driven during a 2½-yr period by 810 drivers showed the range to be from 0 to 161,000. For arrangement by exposure, the 810 drivers were simply divided into three groups of 270 each. For the first 270 respondents, the mileage driven ranged from 0 to 7,600. The second group of 270 drove from 7,601 to 18,100 mi and was called the medium exposure group. The third group drove from 18,101 to 161,000 mi and was called the high exposure group.

TABLE 4

## DRIVERS COMPARED BY EXPOSURE (MILES DRIVEN) AND ACCIDENT STATUS

Exposure Category	No Accident		Accident Responsible		Accident Not Responsible		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Low								
0 - 7,600	243	90	21	8	6	2	270	100
Medium								
7,601-18,100	231	86	24	9	15	6	270	100
High								
18,101-161,000	217	80	37	14	16	6	270	100
Total	691	85	82	10	37	5	810	100

With respect to the accident status, it can be noted that 21 accident responsible drivers were in the low mileage category, 24 were in the medium, and 37 in the high group. Table 4 shows these comparisons in greater detail.

Machine tabulations and percentages were then run for each tabulation of the 60 variables under study. A sample of these first-run tabulations is shown in Table 5.



period. Without taking exposure into account, statistical test showed that this difference is significant; on this basis the null hypothesis of no difference in accident status according to sex might be rejected at this point and further supports separate analysis of the characteristics of male and female drivers.

This hypothesis testing by inspection was subject to further study by tests for statistical significance before deciding whether or not to reject the general null hypothesis that drivers who are involved in accidents do not differ from those who are accident free.

Statistical Tests for Confidence Levels. Using the total figures (for all exposure groups) and based on the closeness of the actual frequency of the responses to that of the theoretical, inspection of the tabulated data revealed that the data for 28 of the 60 variables would yield no appreciable confidence levels. The general null hypothesis that drivers who are responsible for accidents do not differ from those who are not responsible for accidents or those who are accident free could not be rejected with respect to these 28 variables (Table 6).

TABLE 6  
VARIABLES WHICH FROM INSPECTION OF DATA YIELDED  
NO APPRECIABLE CONFIDENCE LEVELS

Table No.

of Variable	Variable
4	Length of driving experience
5	Make of car driven most at present
6	Year of vehicle driven most at present
7	Instructor when learning to drive
13	How they feel when they drive
16	Satisfaction with mechanical performance and the way the car drives
17	Satisfaction with the appearance of the car they drive
18	Opinion of people's driving according to the way they feel
20	Affect on driving when they are angry
21	Affect on driving when they are sad or depressed
29	Weight of respondent
30	Whether or not they have hay fever
31	Whether or not they have asthma
32	Whether or not they have diabetes
33	Whether or not they have high blood pressure
34	Whether or not they have a stomach ulcer
35	Whether or not they have arthritis, rheumatism or neuritis
36	Whether or not they have limited use of either arm or leg
37	Whether or not they have fainting spells or epilepsy
38	Whether or not they ever had nervous or emotional illness
39	Whether or not they ever had chronic condition or long drawnout illness
40	Whether or not they have trouble hearing
41	Whether or not they have trouble getting to sleep
46	Opinion of own driving skill
48	Opinion about most people noticing warning signs on the road
49	Opinion on stop signs being generally observed
59	Total score of house and neighborhood of drivers
60	Occupation

As previously noted, a comparison of the accident status of the males and females showed a higher percentage of the males in the accident responsible and accident not-responsible categories than the females in all exposure groups. This relation was statistically significant at a 99 percent confidence level. As a result, the remaining 31 variables were examined by sex; otherwise, the sex factor may have masked or distorted the presence and influence of the other variables. Thus, for each of these

TABLE 7

CONFIDENCE LEVELS OF VARIABLES (DATA) TESTED FOR  
"ALL EXPOSURE GROUPS" BY CHI-SQUARE METHOD

Table No. of Variable	Variable	Confidence level	
		Males	Females
1	Size of household	0.63	0.62
2	Age of respondent	0.13	0.51
8	Number of times exam taken for first license	0.44	0.58
9	Highest grade or year completed in school	0.82	0.82
10	Present marital status	0.97	0.90
11	Present labor force status	0.53	0.89
14	Whether or not they enjoy driving	0.49	0.49
15	Their opinion of night driving	0.20	0.38
19	If driving relaxes one when disturbed about something with other people	0.19	0.46
22A	Their opinion of how nervous they are	0.04	0.45
22B	What is done to wake up when sleepy at the wheel	0.04	0.70
23	Their share of worries the last three years	0.01	0.10
24	Whether they smoke now and whether they have smoked in the last three years	0.40	0.79
25	How much they smoke now	0.07	0.42
26	Whether or not they smoke while driving	0.16	0.74
27	Whether or not they drink	0.35	0.70
28	Whether or not they drive after drinking on occasion	0.44	0.25
42	Whether or not they wear glasses	0.13	0.22
43	Whether or not they have been wearing sunglasses on sunny days.	0.53	0.65
44	Usual speed on the open road with no speed control signs	0.03	0.85
45	Whether or not they think other drivers are courteous	0.12	0.08
47	Opinion of whether a slow or fast driver	0.03	0.22
50	Their opinion about the necessity of drivers coming to a full stop at a corner stop sign	0.13	0.68
51	Their relative ease of finding their way on a strange road	0.99	0.42
52	Their opinions about the size of route signs	0.72	0.56
53	Fastest ever driven on the open highway	0.16	0.27
54	Number of times stopped along the road because of car breakdown since January, 1953	0.62	0.49
55	Opinion of whether or not traffic laws are enforced strictly enough	0.46	0.81
56	Total family income for 1954	0.69	0.59
57	Type of dwelling of driver	0.94	0.05
58	Type of neighborhood area driver's house is in	0.40	0.45

variables, the responses under the totals column (all exposure group) for each of the three categories of drivers (no-accident, accident and responsible, and accident not-responsible) by sex, were tested simultaneously by the chi-square method. A 95 per cent confidence level was considered as statistically significant.

TABLE 8  
VARIABLES SELECTED FOR FACTOR ANALYSIS FOR  
MALE AND FEMALE DRIVERS, FIRST RUN<sup>a</sup>

Table No. of Variable	Variable	Method of Selection	Selected for	
			Male	Female
1	Size of household	2	X	
9	Highest grade or year completed in school	2	X	X
10	Present marital status	1	X	
11	Present labor force status	2		X
23	Their share of worries in last 3 years	2	X	
24	Whether they smoke now and in past 3 years	3	X	X
25	How much they smoke now	3		X
27	Whether or not they drink	2	X	
25	Whether or not they drive after drinking	2	X	
42	Whether or not they wear glasses	2	X	
43	Whether or not they wear sunglasses on sunny days	2	X	X
44	Usual speed on the open road w/no speed control signs	2	X	
47	Opinion of whether a slow or fast driver	2		X
51	Their relative ease in finding their way on a strange road	1	X	X
55	Opinion of whether or not traffic laws are enforced strictly enough	2		X
59	Driving instructor when learning to drive	2	X	
Total			12	8

<sup>a</sup> All variables analyzed for totals; all exposure groups only

Table 7 indicates that for the male drivers the responses for only two of the variables met the qualification for statistical significance. None of the data for the female drivers reached the 95 percent confidence level for statistical significance.

**Factor Analysis, First Run.** In order to further interpret the data, it was appropriate to introduce a "factor analysis," which is used to determine the underlying influences on apparent differences in the various distributions of the data.

Variables by sex, as shown in Table 8, were selected for analysis in the first run, using one of the following three criteria:

1. A chi-square test of significance gave a confidence level of 95 percent or better.
2. Judgment wherein the various attributes were studied and, in general, selecting those with the largest diversion from expectation.
3. The current interest of the item.

It is to be noted that the data in the total or "all exposure" groups were used for this investigation. These results are not discussed here as they were exploratory in nature.

**Factor Analysis, Second Run.** The foregoing factor analysis was applied to all the drivers in the sample by sex. In order to consider the influence of exposure on the apparent differences in the various distributions of the data, 19 variables for the male and 17 variables for the female drivers (Table 9) were selected for a second-run factor analysis. The same method of selecting the variables for study was used as in the first-run analysis.

However, for analysis both the male and female drivers were divided into three

TABLE 9  
 VARIABLES SELECTED FOR FACTOR ANALYSIS FOR  
 MALE AND FEMALE DRIVERS, SECOND RUN<sup>1</sup>

Table No. of Variable	Variable	Method of Selection	Selected for	
			Males	Females
1	Size of household	2	X	X <sup>2</sup>
2	Age of respondent	3	X <sup>2</sup>	X <sup>2</sup>
4	Length of driving experience	3	X <sup>2</sup>	X <sup>2</sup>
6	Year of vehicle driven most at present	3	X <sup>2</sup>	X <sup>2</sup>
7	Driving instructor when learning to drive	2	X	X <sup>2</sup>
9	Highest grade or year completed in school	2	X	X
10	Present marital status	1	X	X <sup>2</sup>
11	Present labor force status	2		X
15	Their opinion of night driving	3	X <sup>2</sup>	X <sup>2</sup>
23	Their share of worries last 3 years	2	X	
24	Whether they smoke now and in past 3 years	3	X	X
25	How much they smoke now	3	X <sup>2</sup>	X
26	Whether or not they smoke while driving	3	X <sup>2</sup>	
27	Whether or not they drink	2	X	
28	Whether or not they drive after drinking	2	X	
42	Whether or not they wear glasses	2	X	
43	Whether or not they wear sunglasses on sunny days	2	X	X
44	Usual speed on the open road w/no speed control signs	2	X	X <sup>2</sup>
46	Opinion of driving skill	3	X	X
47	Opinion of whether a slow or fast driver	1		X
51	Their relative ease in finding their way on a strange road	1	X	X
55	Opinion of whether or not traffic laws are enforced strictly enough	2		X
<b>Totals</b>			19	17

<sup>1</sup> In addition to first run

<sup>2</sup> All variables analyzed by four exposure groups, low, medium, high and totals

nearly equal groups with totals, groups, and the corresponding accident involvement data, for the range of answers given for each variable, and were tabulated accordingly. In the first instance the multiple-accident drivers were excluded from the analysis, for which all drivers and all accidents were used as a base.

For the first 175 male drivers (low exposure group) the mileage driven for the 2½-year period ranged from 0 to 12,600. The medium exposure group (176) drove from 12,601 to 22,900 miles and the high exposure group (175) drove from 22,901 to 161,000 miles. Likewise, for the female drivers the first group (95), the second group (96), and third group (95), drove from 0 to 2,700, 2,701 to 8,500, and 8,501 to 40,800 miles, respectively, during the 2½-year period.

Separate factor analyses were performed for each of these exposure groups and the total group for both male and female drivers. For the male drivers, 19 sets of inter-correlation were performed, intercorrelating each variable with the other 18, thus pro-

TABLE 10

CHARACTERISTICS OF VARIABLES FOR MALE DRIVERS WHICH WERE UNDERLYING FACTORS IN THEIR ASSOCIATION WITH ACCIDENTS,  
BY EXPOSURE GROUPS - SCENECTADY INTERVIEW

Variable for the male drivers	Exposure			Group
	Low (2,800) <sup>a</sup>	Medium (6,400) <sup>a</sup>	High (16,200) <sup>a</sup>	Totals (8,800) <sup>a</sup>
	Unfavorable	Characteristic	for those	
Size of household	-----	-----	-----	-----
Age of respondent	in middle age group	in middle age group	in middle age group	in middle age group
Length of driving experience	with 10 to 19 years of experience	-----	-----	-----
Year of vehicle driven most at present	-----	who drove older models than '53 and later models than '54 other than self	-----	who drove older models than '53 and later models than '54
Driving instructor when learning to drive	-----	-----	-----	-----
Highest grade or year completed in school	who did not finish high school	-----	who did not finish high school	who did not finish high school
Present marital status	-----	who were single	who were single	who were single
Objection to night driving	other than who didn't object	other than who didn't object	other than who didn't object	other than who didn't object
Their share of worries last 3 years	-----	-----	-----	-----
Whether they smoke now and in past 3 years	-----	who smoked	who smoked	who smoked
How much they smoke now	-----	-----	-----	-----
Smoke while driving	-----	-----	-----	-----
Whether or not they drink	who drank <sup>1</sup>	-----	who drank <sup>1</sup>	who drank
Drive after drinking	who drove after drinking <sup>1</sup>	-----	who drove after drinking <sup>1</sup>	-----
Wear glasses or not	who did not wear glasses	-----	who did not wear glasses	-----
Whether or not they wear sunglasses on sunny days	-----	-----	-----	who usually wore sunglasses
Usual speed on the open road w/no speed control signs	who drove at speeds higher than 50 mph <sup>1</sup>	who drove at speeds higher than 50 mph	who drove at speeds higher than 50 mph <sup>1</sup>	-----
Opinion of driving skill	-----	who rated themselves as average	-----	who rated themselves as average
Their relative ease in finding their way on a strange road (EXPOSURE)	who had no difficulty	-----	-----	who had no difficulty
	N A	N A	N A	-----
	9 of 19 variables = factors	8 of 19 variables = factors	9 of 19 variables = factors	10 of 19 variables = factors
<sup>a</sup> Average miles driven per year for period January 1, 1953 through June 30, 1955	<sup>1</sup> Three variables together (safety-mindedness)			

TABLE 11

CHARACTERISTICS OF VARIABLES FOR FEMALE DRIVERS WHICH WERE UNDERLYING FACTORS IN THEIR ASSOCIATION WITH ACCIDENTS  
FOR ALL EXPOSURE GROUPS - SCENECTADY INTERVIEW

Variable for the female drivers	Exposure			Group
	Low (500) <sup>a</sup>	Medium (2,100) <sup>a</sup>	High (6,600) <sup>a</sup>	Totals (3,100) <sup>a</sup>
	Unfavorable	Characteristic	for those	
Size of household	with 1 or 2 in household	-----	with 1 or 2 in household	with 1 or 2 in household
Age of respondent	in younger & older age groups	in younger & older age groups	in younger & older age groups	in younger & older age groups
Length of driving experience	-----	-----	-----	-----
Year of vehicle driven most at present	-----	who drove older models than '53	-----	-----
Driving instructor when learning to drive	-----	-----	-----	who were not taught by a relative
Highest grade or year completed in school	who did not finish high school	-----	who did not finish high school	-----
Present marital status	who were presently married	-----	-----	-----
Present labor force status	-----	who were housewives	who were housewives	who were housewives
Objection to night driving	-----	-----	-----	other than who didn't object
Whether they smoke now and in past 3 years	-----	-----	who did not smoke	who did not smoke
How much they smoke now	-----	-----	-----	-----
Whether or not they wear sunglasses on sunny days	who usually wore sunglasses	-----	who usually wore sunglasses	who usually wore sunglasses
Usual speed on the open road w/no speed control signs	-----	-----	-----	-----
Opinion of driving skill	who rated themselves other than average <sup>1</sup>	-----	who rated themselves other than average	who rated themselves other than average
Opinion of whether a slow or fast driver	other than slow drivers <sup>1</sup>	other than slow drivers	other than slow drivers	-----
Their relative ease in finding their way on a strange road	-----	who had difficulty	who had difficulty	-----
Opinion of whether or not traffic laws are enforced strictly enough (EXPANSION)	-----	who said no	who said no	-----
	N A	N A	N A	in higher exposure group
	7 variables of 17 = factors	6 variables of 17 = factors	10 variables of 17 = factors	9 variables of 18 = factors
<sup>a</sup> Average miles driven per year for period January 1, 1953 through June 30, 1955	<sup>1</sup> Two variables together			

ducing 702 indices of association with accident status. Similarly, for the female drivers 561 indices of association with accident status were produced.

Table 10 shows the characteristics of the variables for male drivers which were underlying factors (unfavorable characteristics) in their association with accidents by exposure groups. Four variables did not give any evidence of being underlying factors associated with accident status. Being in the middle age group (30 to 49 years of age) and those who did object to night driving were unfavorable characteristics of male drivers in accident association for all exposure groups. In the examination of the totals group, exposure was not found as an underlying factor for male drivers in their association with accidents. Three of the factors appeared as unfavorable characteristics in but one exposure group, five appeared in two groups, five appeared in three groups, and two appeared in all four groups.

Table 11 shows the characteristics of the variables for female drivers which were underlying factors (unfavorable characteristics) in their association with accidents by exposure groups. Three variables did not give any evidence of being underlying factors associated with accident status. Being in the younger (under 30 years of age) and the older (over 49 years of age) groups of female drivers were unfavorable characteristics in accident association for all exposure groups. In the examination of the total group, exposure in the average yearly range of from 2,000 to 16,000 miles for female drivers was found as an underlying factor in their association with accidents. Two of the factors appeared as unfavorable characteristics in but one exposure group, four appeared in two groups, five appeared in three groups, and one appeared in all four groups.

Table 12 shows the consensus of characteristics of variables for male and female drivers which were underlying factors in their association with accidents, for all exposure groups. The basis for these factors was obtained from analyzing the data for male and female drivers in the four exposure groups and comparing results for consistency within the groups.

It appears that for the drivers studied, those with the following characteristics are more apt to be associated with accidents than those without:

#### MALE DRIVERS

1. Between 30 and 49 years of age
2. Who drive older models than '53 and later models than '54
3. Who did not finish high school
4. Who are single
5. Who do object to night driving
6. Who smoke
7. Who drink
8. Who drive after drinking
9. Who usually wear sunglasses while driving
10. Who drive at speeds greater than 50 mph
11. Who rate themselves as average drivers
12. Who have no trouble finding their way on strange roads

#### FEMALE DRIVERS

1. With one or two in household
2. Under 30 and over 49 years of age
3. Who did not finish high school
4. Who are housewives
5. Who do not smoke
6. Who usually do not wear sunglasses while driving
7. Who rate themselves as other than average drivers
8. Who have difficulty in finding their way on strange roads
9. Who believe that traffic laws are not enforced strictly enough
10. In higher exposure group (over 2,000 miles per year)

The balance of the variables selected for study did not give evidence of being underlying factors associated with accident status. However, it must be considered that, except for exposure for females, the variables when tested individually did not reach significance. Thus, these results could not be readily applied to any other group of drivers except the group studied, without additional investigation.

Analysis of Distribution of Answers. The distribution of the answers for each variable selected for factor analysis (Table 9) was examined to determine trends in the data. The detailed results of this study are shown in Appendix A.



**PART II. DRIVER OBSERVATION OF A SAMPLE OF DRIVERS**  
Determination of Data

The interdepartmental committee, in the initial planning for the study, decided to observe persons driving in Schenectady in order to test the hypothesis that there is no difference between accident and no-accident drivers in the way they drive. This part of the research was considered important, as it is postulated that practice in ordinary driving may be related to what occurs in an emergency situation or accident.

The nature of this phase of the study made it necessary to construct, test, and standardize scales on which the different aspects of a person's driving could be recorded objectively and reduced to a score for comparative purposes. Because little has been done to relate ordinary driving to other characteristics of persons, including their driving experience, accidents, personality, attitudes, and related information collected in the first part of this study, it was hoped that a method could be devised to either observe the persons interviewed or interview the drivers observed.

No practical method could be determined to observe persons driving subsequent to the interview and the time element of the project would not support the interview of persons after driver observation. Thus, it was decided that the scope of this phase of the study would be limited to relating observed driving characteristics to the subject's accident experience, as reported to the Motor Vehicle Bureau, for the period January 1, 1953, through June 30, 1955.

TABLE 12

CONSENSUS OF CHARACTERISTICS OF VARIABLES FOR MALE AND FEMALE DRIVERS WHICH WERE UNDERLYING FACTORS  
IN THEIR ASSOCIATION WITH ACCIDENTS FOR ALL EXPOSURE GROUPS - SCHENECTADY INTERVIEW

Variable for the drivers	Drivers	
	Male (8,600)*	Female (3,100)*
Size of household	-----	with 1 or 2 in household
Age of respondent	in middle age group	in younger & older age groups
Length of driving experience	-----	-----
Year of vehicle driven most at present	who drove older models than '53 and later models than '54	who drove older models than '53
Driving instructor when learning to drive	-----	who were not taught by a relative
Highest grade or year completed in school	who did not finish high school	who did not finish high school
Present marital status	who were single	-----
Present labor force status	N A	who were-housewives
Objection to night driving	other than who didn't object	-----
Their share of worries last 3 years	-----	N A
Whether they smoke now and in past 3 years	who smoked	who did not smoke
How much they smoke now	-----	-----
Smoke while driving	-----	N A
Whether or not they drink	who drank <sup>1</sup>	N A
Drive after drinking	who drove after drinking <sup>1</sup>	N A
Wear glasses or not	-----	N A
Whether or not they wear sunglasses on sunny days	who usually wore sunglasses	who usually did not wear sunglasses
Usual speed on the open road w/no speed control signs	who drove at speeds higher than 50 mph <sup>1</sup>	-----
Opinion of driving skill	who rated themselves as average	who rated themselves other than average
Opinion of whether a slow or fast driver	N A	-----
Their relative ease in finding their way on a strange road	who had no difficulty	-----
Opinion of whether or not traffic laws are enforced strictly enough (EXPOSURE)	N A	-----
	-----	in higher exposure group
	12 of 20 variables = factors	10 of 18 variables = factors
*Average miles driven per year for period January 1, 1953 through June 30, 1955	<sup>1</sup> Three variables together (safety-mindedness)	

## Scales

A scale for recording the actions of drivers being observed was developed only after evaluation of the results of pretesting several types of forms. Figure 3 is a reproduction of a completed form with scales adopted for use.

Scales with two or three sections were designed to note safe and/or unsafe actions concerning speed characteristics, headway allowed, observations of lane markings, judgment used in passing, compliance with traffic signals, respect for stop signs, method of turning, willingness to yield right-of-way to others, attentiveness to driving, and the over-all impression of the driver's ability. Also, selection of easily identified driver characteristics was listed, together with an outline description of both driver and car, including the car's registration plate number. Space was provided on the form for coding the recorded information.

## Scoring System

A point scoring system using the ratio of safe to unsafe observations was adopted and applied to each scale individually, as follows:

Number of Points	Observations		Number of Observations
	Safe	Unsafe	
0	None	None	It was originally planned to obtain a sample of seven different driver observations originating at each of 50 randomly selected intersections within the corporate limits of Schenectady. Provisions were made to extend this into February 1956, using eight different driver observations for a second sample of 32 intersections. Figure 4 shows the intersections used in each selection. The number of drivers observed at each intersection was planned to be in proportion to the average traffic volume, during the hour of the day observed. No observations were to be made on Saturdays or Sundays and between the hours of 11:00 P. M. to 7:00 A. M.
1	None	3 or more	
2	None	1 or 2	
3	1	More than 1	
4	1	1	
5	More than 1	1	
6	1 or 2	None	
7	3 or more	None	

observed at each intersection was planned to be in proportion to the average traffic volume, during the hour of the day observed. No observations were to be made on Saturdays or Sundays and between the hours of 11:00 P. M. to 7:00 A. M.

## Other Considerations

The techniques for the observations also included the following committee decisions:

1. Drivers to be followed and observed for a minimum of 1 mi and maximum of 2 mi.
2. One-half of the intersection samples each from inbound and outbound traffic.
3. Selection of cars passing intersections for observation in series of three (3rd, 6th, or 9th).
4. Indicate if driver was smoking or not.
5. Indicate if driver wore glasses.

## APPLICATION OF DATA

A team for the observation of drivers consisted of a driver and an observer. Before operations started, a chart for control purposes listing the number of observations to be taken during the various time periods at each of the numbered intersections was prepared. The observations were checked off as they were completed.

In tailing cars, particular attention was given to maintaining a respectable distance between cars to prevent the observed driver from becoming aware of being followed. When it became apparent that the driver was aware of being followed, the observation was cancelled.

## Procedure Particular to Items

Figure 3 shows the descriptions of the actions to be checked for each item of driver observation to be rated, thus simplifying the field work. Also, situations which the

driver was forced into by traffic conditions were not subject to rating.

Motor Vehicle Bureau Accident Search

At the end of each day, the vehicle registration plate numbers, together with the observation numbers, were transferred from the observation forms to individual Motor Vehicle Bureau "Information Request" forms (Figure 5).

Thus, the owner of the car was identified and accident records from January 1, 1953, through June 30, 1955, secured. When the field description of the driver did not match the owner, a personal contact was made with the owner and the driver's identity secured.

Each item of driver observation was scored using the system described. The results of the scoring, the common items recorded on the observation forms, information from the listings of the accident file cards, and type of accidents, were coded and placed on the individual observation forms.

This coded information was transferred to punch cards, which formed the basis for the analysis of the data.

TABLE 13

**DRIVERS OBSERVED IN SCHENECTADY COMPARED BY NUMBER OF PERSONS IN CAR INCLUDING DRIVERS**

Number of Persons In Car	Drivers, Number	Percent of Total	Average Occupancy, Number
1	301	55	
2	158	29	
3	49	9	
4	16	3	
5	6	1	
6	2	-	
Not observed	18	3	
<b>Total</b>	<b>550</b>	<b>100</b>	<b>1.6</b>

TABLE 14

**DRIVERS OBSERVED IN SCHENECTADY COMPARED BY DAY OF WEEK OBSERVATIONS WERE MADE**

Day of Week	Number	Percent
Monday	96	17
Tuesday	86	16
Wednesday	147	26
Thursday	130	24
Friday	91	17
<b>Total</b>	<b>550</b>	<b>100</b>

Number of Persons in Car. Table 13 compares the drivers observed by number of persons in the car including driver. Fifty-five percent of the drivers were driving alone when observed, whereas, 29 percent had only one passenger. The average occupancy (1.6 per car) appears to be representative of a typical metropolitan area.

Day of Week. A comparison of observations by day of week (Table 14) indicates that a higher proportion of observations were made on Wednesday and Thursday than on the other days of the week. Thus, for these two days about 5 percent more drivers were

ANALYSIS OF DATA

Procedure

Tabulations were run from the cards for each common characteristic of the drivers and cars by no-accident and accident drivers. The data relating to the number and type of accidents were collated with the various groups of accident drivers for comparison.

The same procedure was used in tabulating information for the items of driver behavior observed, except that the drivers were classified into five main groups according to the number of points used in scoring. For each item observed, those drivers with a score of 1 or 2 were grouped as unsafe; those with a score of 3, predominately unsafe; those with a score of 4, neutral; those with a score of 5, predominately safe; and those with a score of 6 or 7, safe.

Composition of the Sample

A total of 591 drivers was observed. Of these, 41 were not used as it was not possible to determine who drove. The remaining 550 (428 males and 122 females) formed the sample studied.

For these drivers, the Bureau of Motor Vehicles provided records of 96 males having a total of 119 accidents and 18 females with a total of 19 accidents for the period of investigation.

TABLE 15  
DRIVERS COMPARED BY SEX AND ACCIDENT EXPERIENCE

	D R I V E R S												A C C I D E N T S											
	NO-ACCIDENT			ACCIDENT			W I T H						T Y P E											
	1 Accident		2 Accidents		3 Accidents		Total		Head-On		Rear-End		Angular		Single Car		Pedestrian		Other					
All	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent		
Male	428	332	77	96	23	76	18	17	4	3	1	319	0	0	35	29	52	43	25	21	7	6	1	1
Female	122	104	85	18	15	17	14	1	1	0	0	19	1	5	3	16	12	58	3	16	1	5	0	0
All	550	436	79	114	21	93	17	18	3	3	1	338	1	1	38	27	62	45	28	20	8	6	1	1

observed than would have been expected if they were randomly distributed. This difference could be expected, because it was not required that the observers make an equal number of observations during each day of the week.

Characteristics of Drivers and Accident Experience

Sex. Table 15 shows the sample composition by sex and accident experience from January 1, 1953, through June 30, 1955. Males represented 78 percent of the observed drivers, with 23 percent (or 1 in 4) involved in accidents, and females 22 percent, with 15 percent (or 1 in 7) involved. More of the males (5 percent) than the females (1 percent) were involved in more than one accident.



Figure 4. Schenectady, New York, by Wards and Blocks, 1950.

MV 15 (3-55) 600M (5A-225)  
 State of New York—Department of Taxation and Finance  
 Bureau of Motor Vehicles 911

**INFORMATION REQUEST**

Enter all information you have — Check information requested

Name Mrs Julia Sableski

Address 1720 Foster Avenue, Schenectady

Date of Birth 5/28/10

Motor Vehicle Registration No SD 9022 Year \_\_\_\_\_

Chauffeur's License No. \_\_\_\_\_  Operator's License No. \_\_\_\_\_

55 Chev - nos - Blue / Platinum  
 Leave this space for answer

follow up.

S142

Julia Sableski  
1720 Foster Ave May 28, 1900  
Schenectady

56 of  
55 of  
54 of  
53 of  
52 of  
name of  
Alexander 3/7/6

**911**

Figure 5. Sample forms used for motor vehicle bureau searches.

More than 90 percent of all accidents (Table 15) were of rearend, angular or single-car types, with one-half of these being angular. Although the females appeared to have a higher proportion of angular and smaller proportion of rearend and single-car accidents than did the males, the numbers are small and could be due entirely to chance.

**Statistical Significance of Data.** Examination of the distribution of the no-accident and accident groups of male and female drivers by (a) age, smoking while driving, and wearing of glasses; and (b) accident experience for cars by age and weight, indicated that there were no significant differences between these groupings.

Likewise, the results of chi-square significance tests indicated that the five-point scale did not discriminate, in any of the nine items of driver behavior observed, with significance between no-accident and accident drivers. No better results were obtained when the data were re-analyzed to determine if the frequency of the safe and unsafe observations for each item of driver behavior observed would discriminate among the groups of drivers.

Unsafe Driver Behavior Habits by Item

The five-point scale used for classifying driver behavior was narrowed down to a

two-point scale for all drivers by placing all the unsafe, predominately unsafe, and neutral drivers into one group labeled "unsafe" and the balance into a "safe" group. The percentage of drivers guilty of unsafe actions, by rank for each item of driver behavior observed, is as follows:

<u>Item of Driver Behavior</u>	<u>Unsafe Drivers, Percent</u>
Stop sign	67
Yielding	36
Turning movement	35
Passing	19
Speed	17
Attentiveness	13
Lane markings	8
Headway	6

### CONCLUSIONS—Phase II

From studies of driver behavior in Schenectady and related accident experience of the drivers as reported to the Bureau of Motor Vehicles, for the period January 1, 1953, through June 30, 1955, it may be concluded that:

1. Approximately one out of every four male drivers observed was involved in an accident, whereas only one out of every seven female drivers observed was involved in an accident during the same period. Without taking exposure into account, statistical test showed that this difference is highly indicative (confidence level 0.80) that female drivers are less likely to be involved in accidents than male.

2. There was no significant difference between:

- (a) The frequency of accidents by type.
- (b) Accident experience and either the age of the driver, or whether or not the driver was smoking or wearing glasses while driving.
- (c) Accident experience and either the weight classification or age of cars driven.
- (d) Accident and no-accident drivers in the way they drove.

3. The order of driver behavior habits by percentage of unsafe drivers was:

- (a) At stop sign.
- (b) Yielding practice.
- (c) Turning movements.
- (d) Passing maneuvers.
- (e) Speed.
- (f) Attentiveness.
- (g) At traffic signal.
- (h) Lane marking observance.
- (i) Headway.

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## *Appendix A—Comparison and Analysis of Data*

### COMPARISON OF SELECTED DATA

#### Estimated vs Observed Speed

The respondents' answers to the question of usual speed on the open road with no speed control zones were tested by comparing their estimates of speed with actual observations. Figure 6 shows the comparison of actual speeds of passenger cars on a divided 4-lane high-speed interstate highway, a divided 4-lane intercity highway, and a 2-lane primary highway, respectively, near Schenectady with the estimates of the usual speed on the open road.

If the respondents were thinking about 2-lane highways when answering the question, their estimates appear to have been very accurate. However, if they were thinking about 4-lane divided highways, they were rather conservative, as the estimated speed accumulation curve is about 7 mph, or 15 percent lower than an average of the 4-lane divided highway speed curves throughout the percentile range.

#### Night Driving vs Wearing Sunglasses

The hypothesis that drivers who object to driving at night usually wear sunglasses on sunny days (weak eyesight), was tested by comparing the answers to the following questions:

1. Do you usually wear sunglasses when you drive on sunny days?
2. Do you object to night driving?

Table 16 shows that a greater proportion (60 percent) of the drivers who objected to night driving usually do not wear sunglasses, than those who usually wear sunglasses (40 percent). These data reached a 95 percent confidence level.

#### Age vs Objection to Night Driving

The age groups of drivers were compared with those who objected to night driving.

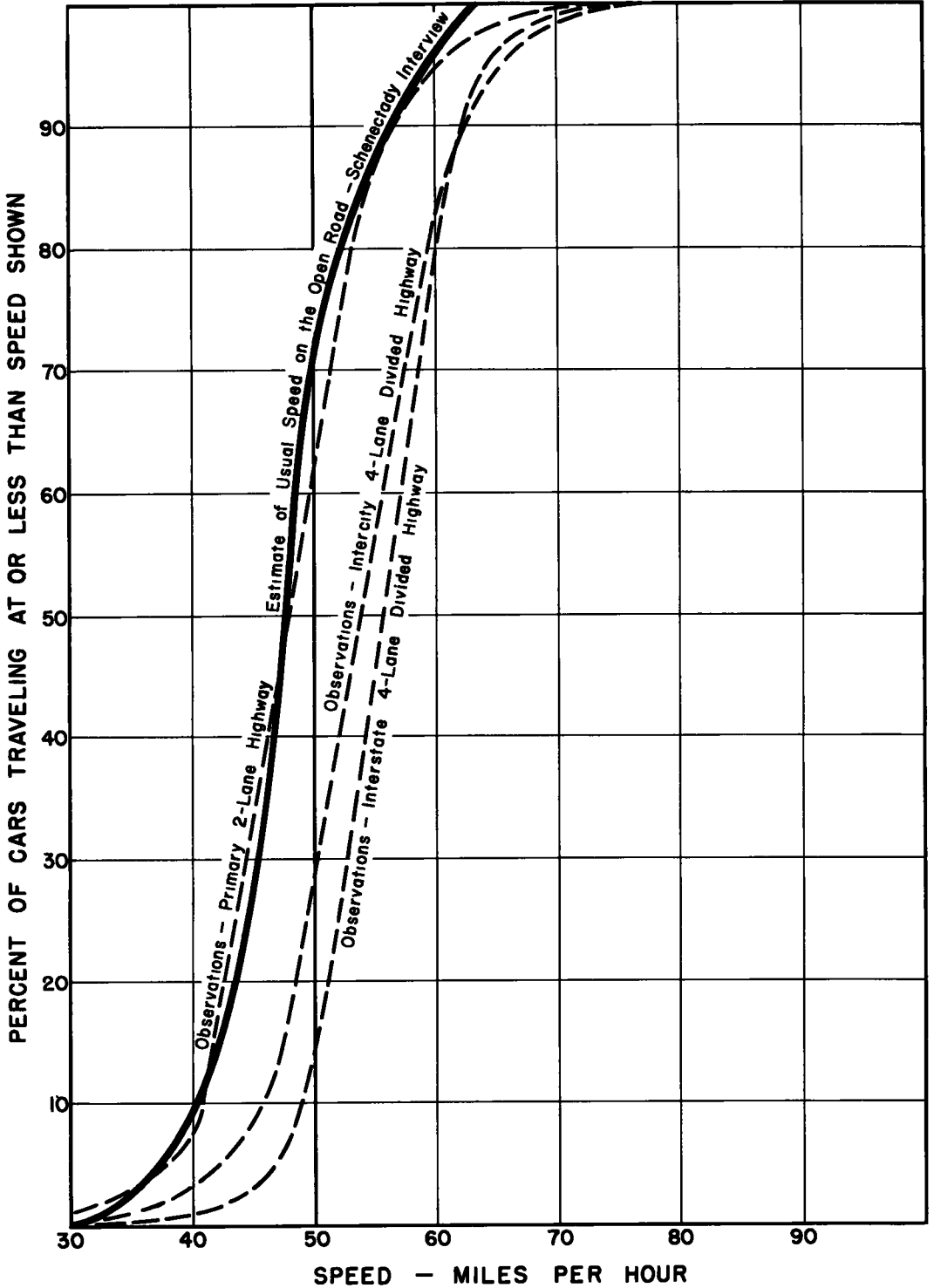


Figure 6. Comparison of speed accumulation curves for actual observations of cars with estimate of usual speed on the open road.



TABLE 16

NIGHT DRIVING VS WEARING OF SUNGLASSES WHILE DRIVING ON SUNNY DAYS

Night Driving	<u>Sunglasses</u>				Total	
	Usually Wear		Usually Don't Wear		No.	%
Object	No. 55	% 40	No. 83	% 60	138	100
Don't Object	271	44	342	56	613	100
Total	326	43	425	57	751 <sup>a</sup>	100

<sup>a</sup> Gave no specific answer.

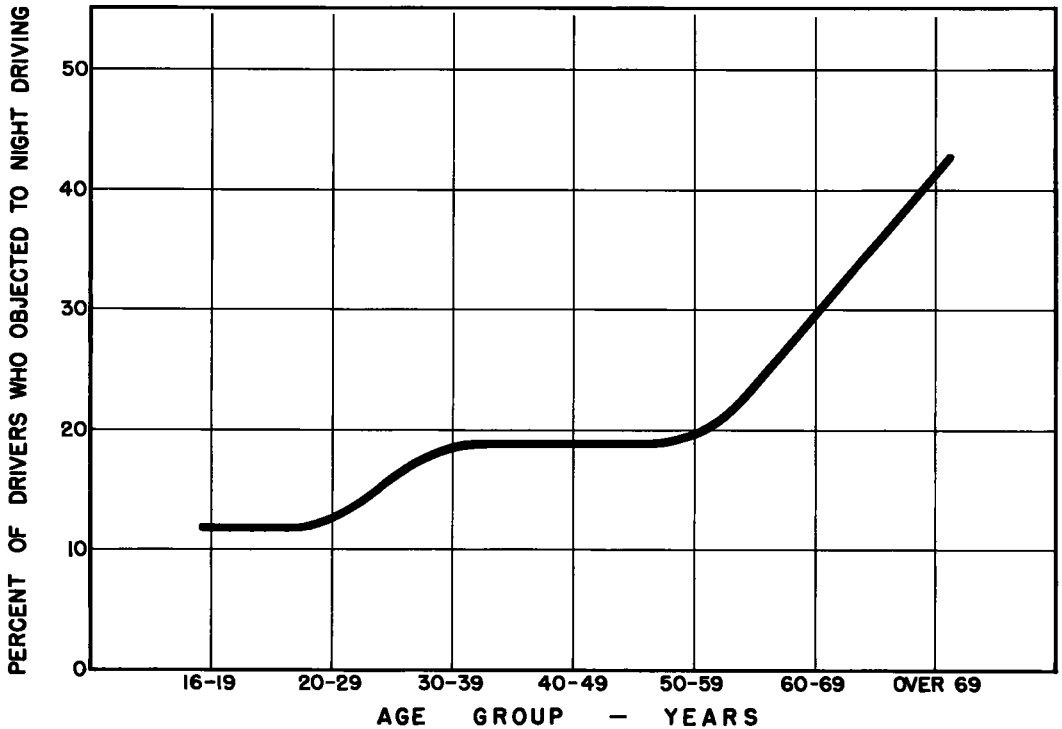


Figure 7. Percent of drivers who objected to night driving by age groups.

Table 17 shows the data broken down by age groups for those drivers who answered "yes" or "no" to the first question.

The youngest drivers (ages under 30) objected the least to night driving. The drivers from 30 to 60 years of age objected slightly more than the youngest drivers and the drivers 60 years of age and over objected the most to night driving. It is interesting to note that there is practically no difference in objection to night driving among the drivers from 30 to 60 years of age (Figure 7). These data reached a 95 percent confidence level.

Trouble Getting to Sleep vs Getting Sleepy at the Wheel

The trouble drivers had getting to sleep was compared to those drivers who did and did not get sleepy at the wheel while driving by relating the answers to the following questions:

TABLE 17  
OBJECTION TO NIGHT DRIVING BY AGE GROUPS

Age of Driver	Object to Night Driving				Total	%
	Yes	%	No	%		
16 - 20	2	12	15	88	17	100
20 - 29	21	12	149	88	170	100
30 - 39	36	19	151	81	187	100
40 - 49	36	18	160	82	196	100
50 - 59	19	19	83	81	102	100
60 - 69	21	30	49	70	70	100
Over 69	7	41	10	59	17	100
Total	142	19	617	81	759 <sup>a</sup>	100

<sup>a</sup> 51 gave no answer.

TABLE 18  
TROUBLE GETTING TO SLEEP VS GETTING SLEEPY AT THE WHEEL  
WHILE DRIVING

Have Trouble Getting to Sleep	Get Sleepy While Driving				Total	%
	Yes	%	No	%		
Yes	42	47	47	52	89	100
No	387	54	333	46	720	100
Total	429	53	380	47	809 <sup>a</sup>	100

<sup>a</sup> One with no answer.

1. Do you have trouble getting to sleep?
2. What do you do to wake up when you get sleepy at the wheel?

Those drivers who mentioned specific techniques to wake themselves up at the wheel were considered as those who get sleepy while driving. Table 18 shows the data for the answers to the two questions.

From these data there does not appear to be any distinct relation between a person's ease of getting to sleep at night and sleepiness while driving. This could be expected, as sleepiness while driving may be induced by causes other than physical and mental exhaustion and/or habit, such as the monotony experienced when driving fairly long distances on familiar highways requiring little physical or mental activity.

#### ANALYSIS OF DISTRIBUTION OF ANSWERS

The purpose of this analysis is to detect trends in the distribution of the answers for the various variables studied. Even if not of sufficient weight to be considered statistically significant, trends from the average characteristics may be of importance in studying drivers.

#### Procedure

The distribution of the answers for each variable selected for factor analysis (Table 9) was examined to determine the existence of trends in the data. The members of each sex were divided into low, medium, and high exposure groups so as to make each group equal in reliability.

Within each exposure group the respondents were categorized into three accident

TABLE 19

SCHENECTADY INTERVIEWED DRIVERS

Table A-4-1 Usual speed of male drivers on the open road with no speed control zones compared with exposure (miles driven) and accident status for the period from January 1, 1953 through June 30, 1955

Range of exposure - miles		0-13,085						13,107-22,879							
Average 2½ years exposure - miles		7,170						17,342							
Average yearly exposure - miles		2,868						6,937							
		Low						Medium							
CODE	No Accident		Accident Involved				Total	No Accident		Accident Involved				Total	
			Responsible		Not Responsible					Responsible		Not Responsible			
	Obs'd	Expt'd	Obs'd	Expt'd	Obs'd	Expt'd		Obs'd	Expt'd	Obs'd	Expt'd	Obs'd	Expt'd		
1	Under 24 4 mph	3	3	0	0	0	0	3	0	0	0	0	0	0	0
2	24 5 - 37 4 mph	4	4	1	1	0	0	5	1	1	0	0	0	0	1
3	37 5 - 42 4 mph	22	21	2	3	1	1	25	10	9	1	1	0	1	11
4	42 5 - 47 4 mph	27	24	2	4	0	1	29	16	16	3	2	1	2	20
5	47 5 - 52 4 mph	63	68	12	10	6	3	81	80	61	8	8	8	7	76
6	52 5 - 57 4 mph	20	18	1	3	1	1	22	19	19	2	3	3	2	24
7	57 5 - 62 4 mph	10	13	5	2	0	1	15	16	18	3	2	3	2	22
8	62 5 mph and over	1	1	0	0	0	0	1	8	7	1	1	0	1	9
9	Not stated	5	4	0	1	0	0	5	1	1	0	0	0	0	1
Totals		155	156	23	24	8	7	186	131	132	18	17	15	15	164

Range of exposure - miles		22,921-161,644						0-161,644							
Average 2½ years exposure - miles		40,312						21,431							
Average yearly exposure - miles		16,125						8,572							
		High						Totals							
CODE	No Accident		Accident Involved				Total	No Accident		Accident Involved				Total	
			Responsible		Not Responsible					Responsible		Not Responsible			
	Obs'd	Expt'd	Obs'd	Expt'd	Obs'd	Expt'd		Obs'd	Expt'd	Obs'd	Expt'd	Obs'd	Expt'd		
1	Under 24 4 mph	1	1	0	0	0	0	1	4	3	0	0	0	0	4
2	24 5 - 37 4 mph	0	0	0	0	0	0	0	5	5	1	1	0	0	6
3	37 5 - 42 4 mph	10	9	1	2	0	0	11	42	38	4	6	1	3	47
4	42 5 - 47 4 mph	15	14	2	3	0	1	17	58	54	7	8	1	4	66
5	47 5 - 52 4 mph	53	57	14	10	3	3	70	176	185	34	29	17	13	227
6	52 5 - 57 4 mph	26	24	3	4	1	1	30	65	62	6	10	5	4	76
7	57 5 - 62 4 mph	27	27	4	5	2	1	33	53	57	12	9	5	4	70
8	62 5 mph and over	10	10	1	2	1	0	12	19	18	2	3	1	1	22
9	Not stated	1	2	1	0	0	0	2	7	7	1	1	0	0	8
Totals		143	144	26	26	7	6	176	429	429	67	67	30	28	526

status groups for the period under study, as follows: (a) no accident, (b) accident responsible, and (c) accident not-responsible. Two sets of tables were compiled for each variable by sex.

The first set shows for each group the observed number of answers for each response and the mathematical expectation for each response, based on the assumption that the distributions for the three accident status groups are similar. Tables 19 and 20 illustrate this type of compilation. The "expected" number is required for the statistical test of significance ( $X^2$ ), and when used as a comparison with the actual frequency indicates relative divergence in the distribution.

The second set shows for each group the observed number of answers and the percent of total responses, for each response. Tables 21 and 22 illustrate this type of compilation.

Examination of the data shows that there are only 67 and 30 male and 15 and 17 female drivers, respectively, in the accident responsible and accident not-responsible groups. Moreover, they are distributed among three exposure groups. Analysis based on so few observations would be unreliable. Consequently, the following analysis is for male and female drivers simply by exposure, using the distribution of the total responses in each exposure group (Tables 21 and 22).

For the male drivers, the average yearly exposure for the low, medium, and high groups was approximately 2,900, 6,900 and 16,000 mi, respectively; for the female drivers they were approximately 1,400, 3,500 and 7,900 mi, respectively.

Tables 23, 24, and 25 are examples of further information developed from the study. Table 23 indicates the accident involvement rates for the various exposure groups. Al-

though the sample was small, definite trends in involvement and responsible involvement rates for both sexes indicate lower rates for the drivers in higher exposure groups.

In Table 24, 77 percent of the male drivers, who were "self-taught," were accident-free as compared to 88 percent accident-free for those taught by parents.

Table 25 shows male drivers with accidents in the low, medium, and high exposure groups to be 18, 16, and 20 percent, respectively. The percentage of female drivers with accidents seems to increase with exposure, being 6 percent in the low, 9 percent in the medium, and 14 percent in the high exposure group.

## TRENDS FROM OTHER TABLES

### Male Drivers

From tables not included with this paper, the following observations are made:

1. Size of household. No notable trend in size of household from one exposure group to another. The average size of household in all exposure groups was 3.
2. Age of respondent. In the low exposure group the average age was 45; in the medium group, 41; in the high group, 39.
3. Years of driving experience. The average member in the low group had 24 years of experience. In the medium group the average was 20; in the high, 24.
4. Year of car driven. In the low group the average car driven was a 1951 model. In the medium and high groups it was a 1952 model.

TABLE 20

## SCHENECTADY INTERVIEWED DRIVERS

Table A-5-1 Usual speed of female drivers on the open road with no speed control zones compared with exposure (miles driven) and accident status for the period from January 1, 1953 through June 30, 1955

Range of exposure - miles	0-6,810						6,915-11,756																	
	Average 2½ years exposure - miles						Average yearly exposure - miles																	
	1,351						3,474																	
CODE	Low												Medium											
	No Accident		Accident Involved				Total	No Accident		Accident Involved				Total										
	Obs'd	Expt'd	Responsible	Not Responsible	Obs'd	Expt'd		Obs'd	Expt'd	Responsible	Not Responsible	Obs'd	Expt'd											
0 Do not drive on open road	7	7	0	0	0	0	7	1	1	0	0	0	0	0	1									
1 Under 32 4 mph	5	6	1	0	0	0	6	0	0	0	0	0	0	0	0									
2 32 5 - 37 4 mph	7	7	0	0	0	0	7	0	0	0	0	0	0	0	0									
3 37 5 - 42 4 mph	25	27	3	1	0	0	28	5	6	2	1	0	0	1	7									
4 42 5 - 47 4 mph	40	39	1	2	0	0	41	5	4		0	0	0	5										
5 47 5 - 52 4 mph	52	51	2	3	0	0	54	24	23	1	2	2	2	27										
6 52 5 - 57 4 mph	10	10	1	1	0	0	11	5	6	1	1	1	1	7										
7 57 5 - 62 4 mph	8	8	0	0	0	0	8	3	3	0	0	1	0	4										
8 62 5 mph & over	2	2	0	0	0	0	2	0	0	0	0	0	0	0										
9 Not stated	2	2	0	0	0	0	2	2	2	0	0	0	0	2										
X Depends on road, not on speed control	0	0	0	0	0	0	0	1	1	0	0	0	0	1										
Totals	158	159	8	7	0	0	166	46	46	4	4	4	4	54										

Range of exposure - miles	11,808-40,814						0-40,814																	
	Average 2½ years exposure - miles						Average yearly exposure - miles																	
	7,927						3,059																	
CODE	High												Totals											
	No Accidents		Accident Involved				Total	No Accident		Accident Involved				Total										
	Obs'd	Expt'd	Responsible	Not Responsible	Obs'd	Expt'd		Obs'd	Expt'd	Responsible	Not Responsible	Obs'd	Expt'd											
0 Do not drive on open road	0	0	0	0	0	0	8	7	0	0	0	0	0	8										
1 Under 32 4 mph	0	0	0	0	0	0	0	5	6	1	0	0	0	6										
2 32 5 - 37 4 mph	0	0	0	0	0	0	0	7	6	0	0	0	0	7										
3 37 5 - 42 4 mph	4	4	0	0	0	0	4	34	36	5	2	0	1	39										
4 42 5 - 47 4 mph	6	5	0	0	0	0	6	51	48	1	3	0	1	52										
5 47 5 - 52 4 mph	27	27	2	1	1	1	30	103	102	5	6	3	3	111										
6 52 5 - 57 4 mph	9	9	0	0	1	0	10	24	26	2	1	2	1	28										
7 57 5 - 62 4 mph	12	12	1	1	0	1	13	23	23	1	1	1	1	55										
8 62 5 mph & over	0	1	0	0	1	0	1	2	3	0	0	1	0	3										
9 Not stated	0	0	0	0	0	0	0	4	4	0	0	0	0	4										
X Depends on road, not on speed control	0	0	0	0	0	0	0	1	1	0	0	0	0	1										
Totals	58	58	3	2	3	2	64	262	262	15	13	7	7	264										

TABLE 21

SCHENECTADY INTERVIEWED DRIVERS

Table A-6-1 Usual speed of male drivers on the open road with no speed control zones compared with exposure (miles driven) and accident status for the period from January 1, 1953 through June 30, 1955

Range of exposure-miles		0-13,085				13,107-22,879										
Average 2½ years exposure-miles		7,170				17,342										
Average yearly exposure-miles		2,868				6,937										
CODE	Low								Medium							
	No Accident		Accident Involved				Total		No Accident		Accident Involved				Total	
	Obs'd	%	Responsible	Not Responsible	Obs'd	%	Obs'd	%	Obs'd	%	Responsible	Not Responsible	Obs'd	%	Obs'd	%
1 Under 24 4 mph	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
2 24 5 - 37 4 mph	3	1	0	0	0	0	0	3	1	0	0	0	0	0	0	0
3 37 5 - 42 4 mph	4	3	1	4	0	0	5	3	1	1	0	0	0	0	1	1
4 42 5 - 47 4 mph	22	14	2	9	1	13	25	13	10	8	1	6	0	0	11	7
5 47 5 - 52 4 mph	27	17	2	9	0	0	29	15	16	12	3	17	1	7	20	12
6 52 5 - 57 4 mph	63	41	12	52	6	74	81	43	60	45	8	43	8	53	76	46
7 57 5 - 62 4 mph	20	13	1	4	1	13	22	12	19	15	2	11	3	20	24	15
8 62 5 mph and over	10	6	5	22	0	0	15	8	16	12	3	17	3	20	22	13
9 Not stated	1	1	0	0	0	0	1	1	8	6	1	6	0	0	9	5
Totals	155	100	23	100	8	100	186	100	131	100	18	100	15	100	164	100

Range of exposure-miles		22,921-161,844				0-161,844										
Average 2½ years exposure-miles		40,312				21,431										
Average yearly exposure-miles		16,125				8,572										
CODE	High								Totals							
	No Accident		Accident Involved				Total		No Accident		Accident Involved				Total	
	Obs'd	%	Responsible	Not Responsible	Obs'd	%	Obs'd	%	Obs'd	%	Responsible	Not Responsible	Obs'd	%	Obs'd	%
1 Under 24 4 mph	1	1	0	0	0	0	1	1	4	1	0	0	0	0	4	1
2 24 5 - 37 4 mph	0	0	0	0	0	0	0	0	5	1	1	1	0	0	6	1
3 37 5 - 42 4 mph	10	7	1	4	0	0	11	6	42	10	4	6	1	3	47	9
4 42 5 - 47 4 mph	15	10	2	8	0	0	17	10	58	14	7	10	1	3	66	13
5 47 5 - 52 4 mph	53	37	14	53	3	43	70	40	176	41	34	52	17	57	227	43
6 52 5 - 57 4 mph	26	18	3	12	1	14	30	17	65	15	6	9	5	17	76	14
7 57 5 - 62 4 mph	27	19	4	15	2	29	33	18	53	12	12	18	5	17	70	13
8 62 5 mph & over	10	7	1	4	1	14	12	7	19	4	2	3	1	3	22	4
9 Not stated	1	1	1	4	0	0	2	1	7	2	1	1	0	0	8	2
Totals	143	100	26	100	7	100	176	100	429	100	67	100	30	100	526	100

5. Instructor. There was a rather strong tendency for the high exposure group to reply "self" (49 percent vs 39 percent for an average of all).
6. Education. In the low and medium groups the average respondent had completed the 11th grade. The average male in the high exposure group graduated from high school.
7. Present marital status. Of all male drivers, 75 percent replied "married". But those in the low exposure group were below this average (67 percent), whereas those in the medium group were relatively high (82 percent).
8. Opinion of night driving. There was a small downtrend as exposure increased in the frequency of the reply "I object because of lights" (19, 17, 11 percent), whereas for the response "don't object", the trend was up as exposure increased (64, 65, 73 percent).
9. Share of worries in past three years. There is no evidence that the responses given by the interviewees differ from group to group in any indicative fashion when small values are discounted.
10. Whether respondent smokes now or has in past three years. As exposure increases, there was a slightly decreasing tendency to reply "Have not smoked in past three years" (23, 17, 15 percent). However, the exposure groups separately do not vary much from the average for all males.
11. Amount of smoking. As exposure increased there was a decreasing tendency to answer "one pack of cigarettes per day" (38, 36, 33 percent).
12. Whether or not they smoke while driving. As exposure increases, there was an upward trend for the response "yes" (47, 49, 62 percent). In the high exposure group, the response "yes" was given substantially higher than average (62 vs 53 percent). The

TABLE 22

## SCHENECTADY INTERVIEWED DRIVERS

Table A-7-1 Usual speed of female drivers on the open road with no speed control zones compared with exposure (miles driven) and accident status for the period from January 1, 1953 through June 30, 1955

Range of exposure-miles	0-8,810						6,915-11,756									
	Average 2½ years exposure-miles						Average yearly exposure-miles									
	1,351						3,474									
CODE	Low												Medium			
	No Accident		Accident Involved				Total		No Accident		Accident Involved				Total	
	Obs'd	%	Responsible	Not Responsible	Responsible	Not Responsible	Obs'd	%	Responsible	Not Responsible	Responsible	Not Responsible	Obs'd	%		
0 Do not drive on open road	7	4	0	0	0	0	7	4	1	2	0	0	0	0	1	2
1 Under 32 4 mph	5	3	1	13	0	0	6	4	0	0	0	0	0	0	0	0
2 32 5 - 37 4 mph	7	4	0	0	0	0	7	4	0	0	0	0	0	0	0	0
3 37 5 - 42 4 mph	25	16	3	37	0	0	28	16	5	11	2	50	0	0	7	13
4 42 5 - 47 4 mph	40	26	1	13	0	0	41	25	5	11	0	0	0	0	5	9
5 47 5 - 52 4 mph	52	34	2	24	0	0	54	33	24	52	1	25	2	50	27	50
6 52 5 - 57 4 mph	10	6	1	13	0	0	11	7	5	11	1	25	1	25	7	13
7 57 5 - 62 4 mph	8	5	0	0	0	0	8	5	3	7	0	0	1	25	4	7
8 62 5 mph & over	2	1	0	0	0	0	2	1	0	0	0	0	0	0	0	0
9 Not stated	2	1	0	0	0	0	2	1	2	4	0	0	0	0	2	4
X Depends on road, not on special control	0	0	0	0	0	0	0	0	1	2	0	0	0	0	1	2
Totals	158	100	8	100	0	0	166	100	46	100	4	100	4	100	54	100

Range of exposure-miles	11,808-40,814						0-40,814									
	Average 2½ years exposure-miles						Average yearly exposure-miles									
	7,927						3,059									
CODE	High												Totals			
	No Accident		Accident Involved				Total		No Accident		Accident Involved				Total	
	Obs'd	%	Responsible	Not Responsible	Responsible	Not Responsible	Obs'd	%	Responsible	Not Responsible	Responsible	Not Responsible	Obs'd	%		
0 Do not drive on open road	0	0	0	0	0	0	0	0	8	3	0	0	0	0	8	3
1 Under 32 4 mph	0	0	0	0	0	0	0	0	5	2	1	7	0	0	6	2
2 32 5 - 37 4 mph	0	0	0	0	0	0	0	7	3	0	0	0	0	7	2	
3 37 5 - 42 4 mph	4	7	0	0	0	0	4	8	34	13	5	33	0	0	39	14
4 42 5 - 47 4 mph	6	10	0	0	0	0	6	9	51	19	1	7	0	0	52	18
5 47 5 - 52 4 mph	27	46	2	67	1	33	30	47	103	39	5	33	3	43	111	40
6 52 5 - 57 4 mph	9	16	0	0	1	33	10	16	24	9	2	13	2	29	28	10
7 57 5 - 62 4 mph	12	21	1	33	0	0	13	20	23	9	1	7	1	14	25	9
8 62 5 mph & over	0	0	0	0	1	33	1	2	2	1	0	0	1	14	3	1
9 Not stated	0	0	0	0	0	0	0	0	4	2	0	0	0	0	4	1
X Depends on road, not on speed control	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
Totals	58	100	3	100	3	99	64	100	262	100	15	100	7	100	264	100

medium group replied "only occasionally" with moderately higher than average frequency.

13. Whether or not they drink. In the medium group "yes" was given as a response somewhat less than average (27 vs 35 percent). "Sometimes" was stated somewhat higher than average (24 vs 18 percent), as was "moderately" (15 vs 9 percent). The reverse of these trends holds for both the high and low exposure groups.

14. Whether or not they drive after drinking on occasion. As exposure increased, there was a decided tendency to reply "yes" (26, 32, 40 percent). The response "yes" was given less than average in the low group (26 vs 33 percent), and higher than average (40 vs 33 percent), and higher than average (40 vs 33 percent) by the high group. In comparison with the over-all average for the answer "no", the low exposure group had a rather high frequency (30 vs 22 percent) and the high group was low (15 percent).

15. Whether or not they wear glasses. The response, "for reading but not driving", had a slight uptrend (10, 14, 15 percent) as exposure increased. The response "yes" was somewhat below average in the high exposure group (27 vs 34 percent).

16. Whether or not they wear sunglasses while driving on sunny days. As exposure increased there was a fairly strong uptrend for the response "yes" (31, 38, 43 percent). "No" had a moderate downtrend (53, 47, 44 percent) as exposure increased.

17. Usual speed on the open road with no speed control zones. As exposure increased, there was a decreasing tendency for interviewees to answer "37.5 to 42.4" (13, 7, 6 percent). The same was true for the response "42.5 to 47.4" (15, 12, 10

TABLE 23

**DRIVER ACCIDENT INVOLVEMENT RATES PER 100 MILLION VEHICLE-MILES  
BY SEX AND AMOUNT OF EXPOSURE**

Sex	Male			Female		
	Low	Medium	High	Low	Medium	High
Exposure group						
Number of drivers	186	164	176	166	54	64
Number of involvements <sup>a</sup>	31	33	33	8	8	6
Number of responsible involvements	23	18	26	8	4	3
Average mileage <sup>a</sup>	7,170	17,342	40,312	3,777	8,685	19,817
Involvement rate	2,324	1,160	465	1,276	1,706	473
Responsible involvement rate	1,725	633	366	1,276	853	236

<sup>a</sup> Study period January 1, 1953, through June 30, 1955.

percent). However, as exposure increased there was a small consistent upward tendency for interviewees to reply "52.5 to 57.4" (12, 15, 17 percent). There was a large increase as exposure increased for the reply "57.5 to 62.4" (8, 13, 18 percent). The reply "62.5 mph and over" also increased with exposure, but a lesser degree (1, 5, 7 percent). By far the most frequent reply for all exposure groups was "47.5 to 52.4", but in general the rate of speed increased with exposure.

18. Opinion of own driving skill. As exposure increased, the males showed an increasing tendency to reply "above average" (11, 15, 20 percent). Other trends and divergences from average were trivial.

19. Relative ease in finding their way on a strange road. As exposure increased, male interviewees had an increasing tendency to reply "easy" (40, 43, 51 percent). Other trends and divergences from average were negligible.

TABLE 24

**PERCENT OF MALE DRIVERS WHO WERE ACCIDENT-FREE  
BY TYPE OF DRIVING INSTRUCTOR**

Instructor	Exposure range							
	Low		Medium		High		Total	
	Number of drivers	Percent accident free	Number of drivers	Percent accident free	Number of drivers	Percent accident free	Number of drivers	Percent accident free
Parent	30	90	30	87	27	89	87	88
Relative	30	93	25	80	21	81	76	86
Friend	41	85	40	80	32	84	113	83
Self	63	76	53	75	87	79	203	77
Other	22	77	16	81	9	67	47	77

TABLE 25  
ACCIDENT EXPERIENCE OF DRIVERS SEPARATED EQUALLY BY EXPOSURE RANGES

Sex	Low mileage 0-7,600				Medium mileage 7,601-18,000				High mileage 18,001-161,000			
	Number of drivers	Number accident free	Percent no accident	Percent accident	Number of drivers	Number accident free	Percent no accident	Percent accident	Number of drivers	Number accident free	Percent no accident	Percent accident
Male	90	74	82	18	194	162	84	16	242	193	80	20
Female	180	169	94	6	76	69	91	9	28	24	86	14
Total	270	243	90	10	270	231	86	14	270	217	80	20

### Female Drivers

1. Size of household. The size of the average household was three for the low and medium group, but two for the high exposure group.

2. Age. In the low exposure group the average age of female drivers was 35. It was 37 for the medium group, and 36 for the high exposure group.

3. Years of experience. In the low exposure group, the average female driver had 5 years of driving experience. The average for the medium group was 13 years; for the high, 15 years. There is a strong tendency for females with relatively little experience to do relatively little driving.

4. Year of vehicle driven. The average age of vehicles driven was the same (4 years) for all three exposure groups.

5. Instructor. As exposure increased, there was a moderate downtrend in the frequency with which the females replied "commercial school" (11, 7, 0 percent). The medium exposure group, compared with females as a whole, had a high frequency for the response "parent" (22 vs 13 percent), and was low for the response "relative" (26 vs 36 percent).

6. Education. The medium exposure group of females responded "college graduate" somewhat above average (19 vs 12 percent), but the average female in all groups was a high school graduate.

7. Marital status. As exposure increased, there was a strong downtrend in the frequency of the reply "married" (72, 69, 50 percent). The frequency of the response "married" in the high exposure group was well below the average for all females (50 vs 67 percent).

8. Labor force status. As exposure increased, there was a considerable increase for the response "employed" (31, 35, 63 percent). Likewise, there was a strong downtrend for the reply "housewife" (60, 59, 27 percent). The high group was much above average with respect to the response "employed" (63 vs 39 percent), and considerably below average for the response "housewife" (27 vs 52 percent).

9. Opinion of night driving. As exposure increased, the frequency of the response "don't object" sharply rose (61, 63, 80 percent). The occurrence of this response in the high group was relatively high in relation to that for all females (80 vs 66 percent).

10. Smoking now or in the past three years. No trends were found in the frequency of responses made, nor any but trivial divergences from average on the part of the various exposure groups.

11. Amount of smoking now. The responses to this question showed only slight trends and divergences from average. It may be noted that 51 percent of all females replied "I do not smoke now."

12. Wearing of sunglasses while driving on sunny days. The reply "no" was given decreasingly as the exposure increased, (40, 28, 27 percent). Those in the medium exposure group replied "yes" appreciably higher than average (61 vs 52 percent).

13. Usual speed on open road with no speed control zones. In all exposure groups, the speed group most often claimed was "47.5 to 52.4."



14. Opinion of driving skill. As exposure increased there was a moderate increase in the frequency of the reply "experienced" (19, 30, 34 percent). The trend of decreasing responses of "average to fair" as exposure increased was quite strong (51, 48, 31 percent). In comparison to females as a whole, the high group had a high frequency for the reply "experienced" (34 vs 24 percent). However, the relative frequency in the high group for the "average to fair" response was very low (31 vs 46 percent).

15. Interviewees own opinion as to being slow or fast driver. As exposure increased there was a moderate consistent increase for the response "fast" (7, 9, 19 percent). The medium exposure group of females fell considerably below the average in the frequency with which they responded "slow" (13 vs 29 percent), but were somewhat above average for the reply "average" (69 vs 57 percent).

16. Relative ease of finding way on strange roads. As exposure increased there was a large increase in the frequency of the response "easy" (26, 33, 52 percent). But the trend of the reply "difficult" was large downward as exposure increased (49, 26, 22 percent). Compared to the average frequency, the high group had a large frequency for the reply "easy" (52 vs 33 percent), whereas the reply "difficult" was low (22 vs 38 percent).

17. Opinion as to whether traffic laws are enforced strictly enough. The response "no" was given somewhat below average by the female interviewees in the medium group (24 vs 32 percent), but above average in the high group (41 vs 32 percent).

## Appendix B—Interview and Report Forms

NEW YORK STATE

COOPERATIVE RESEARCH PROJECT

Driver Behavior and Highway Safety Research

Department of Public Works  
 Department of Health  
 United States Bureau of Public Roads

August, 1955  
 Draft 5  
 SA #3

Schedule for Schenectady Sample

Hello. My name is . . . . I'm from the Department of Public Works which together with the Health Department is carrying on this special study. We are trying to learn more about people and their driving in order that better highways can be planned. Would you mind helping us by answering some questions related to your driving?

Random Start in Household _____		Code Card I
Edited by _____	Blank	1. _____
Coded by _____	Schedule Number	2-5. <u>1456</u>
	Card Number	6-8. _____
	Block Number	9. _____
	Household Number	10. _____
	Interviewer _____	11. _____
Address _____		12. _____
_____		13. _____
Record of visits:		1/. _____

Visit	Date	Day of Week	Time	Comment
1				
2				
3				
4				



Schenectady Sample

Card I

(For introduction to random start driver if you have not seen him or her before.) My name is . . . . (Miss, Mr., Mrs.) . . . . I'm from the Department of Public Works, which together with the Health Department is carrying on a special study. Very little is known about how much people drive. In order to plan highways we need to obtain this information directly from people who do the driving.

38 \_\_\_\_\_

39 \_\_\_\_\_

40-41 \_\_\_\_\_

To begin with, we wondered when you first drove a car? \_\_\_\_\_

42 \_\_\_\_\_

(Put replies to next questions in chart below.)

43 \_\_\_\_\_

What kind of a car or cars do you drive now?

What year was it made?

44-47 \_\_\_\_\_

Are you the owner? (A car owned by husband is also considered to be owned by the wife. A family car is not owned by sons or daughters.)

What is the month and year you started driving this car (these cars)?

What was the speedometer reading when you started driving it?

What is the speedometer reading now?

$$\frac{\text{SR Now} - \text{SR Beg.} \times \%}{\text{Months Driven}} = \text{Av. Mi./Mo.}$$

What percentage of that mileage did you drive?

How many cars and commercial vehicles are owned altogether in this household now? \_\_\_\_\_ X =

Car Driven	Car Year	Own		Date Started Driving		Speedometer Reading Beginning	Speedometer Reading Now	% Driven by R. Start
		Yes	No	Month	Year			
Buick	19__							
Chevrolet	19__							
Chrysler	19__							
DeSoto	19__							
Dodge	19__							
Ford	19__							
Hudson	19__							
Nash	19__							
Oldsmobile	19__							
Plymouth	19__							
Pontiac	19__							
Studebaker	19__							
Truck or Comm. Vehicle	19__							
Other	19__							
	19__							

Schenectady Schedule  
Card I

(Interviewer: We need a record of cars driven since January 1953. Repeat these questions until you can record all cars since then. Put all replies for cars prior to present on the chart below.)

48-49 \_\_\_\_\_  
50 \_\_\_\_\_  
51 \_\_\_\_\_

What kind of car or cars did you drive before this one since the beginning of 1953?

52-55 \_\_\_\_\_

For each one:

What year was it made?

56-57 \_\_\_\_\_  
58 \_\_\_\_\_

What is the month and year you started driving the car?

What was the speedometer reading when you began driving it?

59-62 \_\_\_\_\_

What percentage of this mileage did you drive?

$\frac{SR(end) - SR(beg.) \times \%}{Months\ driven} = \frac{\text{Ave.}}{mi./mo.}$

63 \_\_\_\_\_

Did you drive any trucks or cars with commercial licenses since that time? (1) Yes (2) No

Months driven

64-65 \_\_\_\_\_

If yes: Ask the same list of questions and put answers on chart.

- X -

66 \_\_\_\_\_

67-70 \_\_\_\_\_

71-72 \_\_\_\_\_

73 \_\_\_\_\_

74-77 \_\_\_\_\_

78 \_\_\_\_\_

79 \_\_\_\_\_

80 \_\_\_\_\_

Card II

1 \_\_\_\_\_

2-5 \_\_\_\_\_

6 2 \_\_\_\_\_

7-8 \_\_\_\_\_

9 \_\_\_\_\_

10-13 \_\_\_\_\_

14-15 \_\_\_\_\_

16 \_\_\_\_\_

17-20 \_\_\_\_\_

21 \_\_\_\_\_

22-23 \_\_\_\_\_

24 \_\_\_\_\_

25-28 \_\_\_\_\_

29 \_\_\_\_\_

Car Driven	Car Year	Date Began Driving Car month year	Date Stopped Driving Car month year	Speedomtr Reading Beginning	Speedomtr Reading End	% Driven by R.S.D.
Buick	19 _____ 19 _____					
Chevrolet	19 _____ 19 _____					
Chrysler	19 _____ 19 _____					
DeSoto	19 _____ 19 _____					
Dodge	19 _____ 19 _____					
Ford	19 _____ 19 _____					
Hudson	19 _____ 19 _____					
Nash	19 _____ 19 _____					
Oldsmobile	19 _____ 19 _____					
Plymouth	19 _____ 19 _____					
Pontiac	19 _____ 19 _____					
Studebaker	19 _____ 19 _____					
Truck or Commercial Vehicle	19 _____ 19 _____					
Other	19 _____ 19 _____					

Did you drive yesterday? (1) Yes \_\_\_\_\_ (2) No \_\_\_\_\_

Comment \_\_\_\_\_

(Write day of week: \_\_\_\_\_)

If No: When was the last time you did any driving? \_\_\_\_\_

What day of the week was it? \_\_\_\_\_

What trips did you make that day? \_\_\_\_\_

(Definition of trip: "When you get in a car, it begins a trip, and when you have to get out of your car, that ends one.")

(Interviewer: Put each trip separately on the chart.)

Trip	From	To	Miles	EW	RT
1					
2					
3					
4					
5					
6					
Interviewer Calculation Total					

What time did you begin and end the first trip?

Time begun: \_\_\_\_\_ A.M. \_\_\_\_\_ P.M. Time ended: \_\_\_\_\_ A.M. \_\_\_\_\_ P.M.

What route or street did you take for the first trip?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

30 \_\_\_\_\_

31 \_\_\_\_\_

32 \_\_\_\_\_

33 \_\_\_\_\_

34 \_\_\_\_\_

35 \_\_\_\_\_

36 \_\_\_\_\_

37 \_\_\_\_\_

38 \_\_\_\_\_

39 \_\_\_\_\_

40 \_\_\_\_\_

41 \_\_\_\_\_

42 \_\_\_\_\_

43 \_\_\_\_\_

44 \_\_\_\_\_

45 \_\_\_\_\_

46 \_\_\_\_\_

47 \_\_\_\_\_

48 \_\_\_\_\_

What time did you begin and end the second trip?

Time begun: \_\_\_\_\_ A.M. \_\_\_\_\_ P.M. Time ended: \_\_\_\_\_ A.M. \_\_\_\_\_ P.M.

49 \_\_\_\_\_

What route or street did you take for the second trip?

50 \_\_\_\_\_

51 \_\_\_\_\_

52 \_\_\_\_\_

53 \_\_\_\_\_

54 \_\_\_\_\_

55 \_\_\_\_\_

56 \_\_\_\_\_

What time did you begin and end the third trip?

Time begun: \_\_\_\_\_ A.M. \_\_\_\_\_ P.M. Time ended: \_\_\_\_\_ A.M. \_\_\_\_\_ P.M.

57 \_\_\_\_\_

58 \_\_\_\_\_

What route or street did you take for the third trip?

59 \_\_\_\_\_

60 \_\_\_\_\_

61-62 \_\_\_\_\_

63-65 \_\_\_\_\_

66-69 \_\_\_\_\_

What time did you begin and end the fourth trip?

Time begun: \_\_\_\_\_ A.M. \_\_\_\_\_ P.M. Time ended: \_\_\_\_\_ A.M. \_\_\_\_\_ P.M.

What route or street did you take for the fourth trip?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



What time did you begin and end the fifth trip?

Time begun: \_\_\_\_\_ A.M. \_\_\_\_\_ P.M. Time ended: \_\_\_\_\_ A.M. \_\_\_\_\_ P.M.

What route or street did you take for the fifth trip?

---



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---

What time did you begin and end the sixth trip?

Time begun: \_\_\_\_\_ A.M. \_\_\_\_\_ P.M. Time ended : \_\_\_\_\_ A.M. \_\_\_\_\_ P.M.

What route or street did you take for the sixth trip?

---



---



---



---

Who was your instructor when you were learning to drive?

70 \_\_\_\_\_

(1) Friend \_\_\_\_\_ (2) Parent \_\_\_\_\_ (3) Relative \_\_\_\_\_ (4) Self \_\_\_\_\_

(5) High School \_\_\_\_\_ (6) Commercial School \_\_\_\_\_

Other \_\_\_\_\_  
specify

How many times did you take the exam for your first license?

71 \_\_\_\_\_

(1) Once \_\_\_\_\_ (2) Twice \_\_\_\_\_ (3) Three Times \_\_\_\_\_ (0) Never took one \_\_\_\_\_

Other \_\_\_\_\_  
specify



What is the highest grade or year in school that you completed? \_\_\_\_\_ 72 \_\_\_\_\_

What is your present marital status? (1)Single \_\_\_\_\_ (2)Married \_\_\_\_\_ Other \_\_\_\_\_  
\_\_\_\_\_ 73 \_\_\_\_\_

Have you ever been widowed, separated, or divorced? (1)Yes \_\_\_\_\_ (2)No \_\_\_\_\_ 74 \_\_\_\_\_  
If yes: which of these was it? (3)Widowed \_\_\_\_\_ (4)Separated \_\_\_\_\_ (5)Divorced \_\_\_\_\_

What kind of work do you do? Housework \_\_\_\_\_ Other \_\_\_\_\_ 75 \_\_\_\_\_  
\_\_\_\_\_ specify \_\_\_\_\_

Are you employed at present?  
(1)Yes \_\_\_\_\_ (2)Housework \_\_\_\_\_ (3)Retired \_\_\_\_\_ (4)Too ill to work \_\_\_\_\_  
(5)Temporary layoff \_\_\_\_\_ Other \_\_\_\_\_ 76 \_\_\_\_\_  
\_\_\_\_\_ specify \_\_\_\_\_

If employed: Where do you work?  
(1)G.E. \_\_\_\_\_ Other \_\_\_\_\_ 77 \_\_\_\_\_  
\_\_\_\_\_ specify \_\_\_\_\_

If retired, ill, or temporary layoff: Where did you work?  
(1) G.E. \_\_\_\_\_ Other \_\_\_\_\_ 78 \_\_\_\_\_

Now thinking back from January through June of this year, what kind of work did you do during that period?  
(1)Same as now \_\_\_\_\_ Other \_\_\_\_\_ 79 \_\_\_\_\_  
\_\_\_\_\_ specify \_\_\_\_\_

Where did you live then? (1)Here \_\_\_\_\_ Other \_\_\_\_\_ Street and City \_\_\_\_\_  
\_\_\_\_\_ Street and City \_\_\_\_\_ 80 \_\_\_\_\_

Did you drive back and forth to work during the first half of this year? Card III  
(1)Yes \_\_\_\_\_ (2)No \_\_\_\_\_ Other \_\_\_\_\_ 1 \_\_\_\_\_  
\_\_\_\_\_ specify \_\_\_\_\_

If yes: How many miles was it each day? \_\_\_\_\_ 2-5 \_\_\_\_\_  
How many days a week did you drive? \_\_\_\_\_ 6 3 \_\_\_\_\_  
How many weeks in the six months period did you drive back and forth to work? \_\_\_\_\_ 7 \_\_\_\_\_  
If reply is "all weeks", ask: Was any vacation or other time taken during this period? (1)Yes \_\_\_\_\_ (2)No \_\_\_\_\_ Other \_\_\_\_\_ 8 \_\_\_\_\_  
\_\_\_\_\_ specify \_\_\_\_\_

If yes: How many weeks? \_\_\_\_\_ 9-12 \_\_\_\_\_

Editing  
Calculation : ( \_\_\_\_\_ )  
(Miles RT X days/week X weeks in 6 months = Total to and from work)

Did you drive as part of your job from January through June of this year?

Card III

(1) Yes \_\_\_\_\_ (2) No \_\_\_\_\_ Other \_\_\_\_\_  
specify

If Yes: How many miles did you travel each week on the job? \_\_\_\_\_

How many weeks did you drive on the job for the six months? \_\_\_\_\_

(Editing \_\_\_\_\_ = \_\_\_\_\_ )  
(Calculation: Miles/week X Weeks/6 mos. = Miles on the Job )

13-16 \_\_\_\_\_

Did you drive on any vacations or long trips up through June?

(1) Yes \_\_\_\_\_ (2) No \_\_\_\_\_ Other \_\_\_\_\_  
specify

If Yes: How many miles did you drive? \_\_\_\_\_  
(Write out places traveled to and number of times only if miles unknown.)

Destination	Mileage	Number of times

17-20 \_\_\_\_\_

(Editing \_\_\_\_\_ = \_\_\_\_\_ )  
(Calculation: Miles / Trip X No. of trips = Miles on Vacation)

Did you drive on weekend or day trips up through June?

(1) Yes \_\_\_\_\_ (2) No \_\_\_\_\_ Other \_\_\_\_\_

If Yes: On how many trips did you drive? \_\_\_\_\_

Where did you go?

(Interviewer: List places on the chart. Only if places are unknown to you or unlikely to be on a map, should you ask for the mileage. Other mileages can be secured by plotting on a map during editing.)

Destination	Mileage	Number of times

21-24 \_\_\_\_\_

(Editing

Did you drive for evening trips or visiting during the first six months of this year?

(1)Yes\_\_\_\_(2)No\_\_\_\_ Other\_\_\_\_\_ specify\_\_\_\_\_

If yes: How many trips a month did you average? \_\_\_\_\_  
How many miles did you average on each trip? \_\_\_\_\_

25-28 \_\_\_\_\_

Editing  
Calculation =  $\left( \frac{\text{Trips/month} \times 6 \times \text{Average miles/trip}}{\text{Total for evening or visiting}} \right)$

Did you drive for shopping or other purposes during the first half of 1955?

(1)Yes\_\_\_\_(2)No\_\_\_\_ Other\_\_\_\_\_ specify\_\_\_\_\_

If yes: How many trips a week did you average? \_\_\_\_\_  
How many miles did you average for each trip? \_\_\_\_\_

Is there any other driving you have done from January through June that I have missed?

(1)Yes\_\_\_\_(2)No\_\_\_\_ Other\_\_\_\_\_ specify\_\_\_\_\_

If yes: About how many miles would this be? \_\_\_\_\_

(Interviewer: Calculate these miles in with miles driven for shopping and other purposes.

Calculation: \_\_\_\_\_ 29-32 \_\_\_\_\_  
 $\text{Trips/week} \times \text{Miles/trip} \times 26, \text{ other driving} = \text{Total for shopping and other purposes}$

Interviewer Calculation Summary  
for 1955

Type of travel	Schedule Page	Miles
To and from work	8	
On the job	9	
Vacations and long trips	9	
Weekend and day trips	9	
Evening and visiting	10	
Shopping and other purposes	10	
Total		

33-37 \_\_\_\_\_  
38 \_\_\_\_\_  
39 \_\_\_\_\_

For the purposes of this study we need to know how many miles you drove altogether in 1954 : \_\_\_\_\_ Card III

Now, going back to the whole year of 1954, where did you live during that year?

(1) Here \_\_\_\_\_ Other \_\_\_\_\_ Street \_\_\_\_\_ and \_\_\_\_\_ City \_\_\_\_\_ 40 \_\_\_\_\_

Where did you work that year? (1) Same as now \_\_\_\_\_ Other \_\_\_\_\_ 41 \_\_\_\_\_ specify

Did you drive back and forth to work during 1954?

(1) Yes \_\_\_\_\_ (2) No \_\_\_\_\_ Other \_\_\_\_\_ specify

If Yes: How many miles was it each day? \_\_\_\_\_

How many days a week did you drive? \_\_\_\_\_

How many weeks in the 12 month period did you drive back and forth to work? \_\_\_\_\_

If reply is "all weeks" ask: Was any vacation or other time taken during his period?

(1) Yes \_\_\_\_\_ (2) No \_\_\_\_\_ Other \_\_\_\_\_ specify

(Editing \_\_\_\_\_ = \_\_\_\_\_ 42-46 )  
(Calculation: Miles RT x days/wk. X weeks worked = Total to and from work )

Did you drive as part of your job during 1954?

(1) Yes \_\_\_\_\_ (2) No \_\_\_\_\_ Other \_\_\_\_\_ specify

If Yes: How many miles did you travel each week on the job? \_\_\_\_\_

How many weeks did you drive this during 1954? \_\_\_\_\_

(Editing \_\_\_\_\_ = \_\_\_\_\_ )  
(Calculation : Miles /week X weeks/12 mos. = Miles on the job ) 47-51

Did you drive on any vacations or long trips that year?

(1) Yes \_\_\_\_\_ (2) No \_\_\_\_\_ Other \_\_\_\_\_ specify

If Yes: How many miles did you drive on vacation. (Write out places traveled to and number of times only if miles unknown by respondent.)

Card III

Destination	Mileage	Number of times

(Editing \_\_\_\_\_ )  
 (Calculation: Miles/trip X No. of trips = Miles on Vacation )

52-56 \_\_\_\_\_

Did you drive on weekend or day trips any time during the year?

(1) Yes \_\_\_\_\_ (2) No \_\_\_\_\_ Other \_\_\_\_\_  
 specify \_\_\_\_\_

If Yes: On how many trips did you drive? \_\_\_\_\_

Where did you go?

(Interviewer: List places on the chart. Only if places are unknown or unlikely to be on a map, should you ask for the mileage. Other mileages can be secured by plotting on a map during editing.)

Destination	Mileage	Number of times

(Editing \_\_\_\_\_ )  
 (Calculation: Number of miles X number of times = Weekend and day trips )

57-61 \_\_\_\_\_

Did you drive for evening trips or visiting during the year, 1954?

(1) Yes \_\_\_\_\_ (2) No \_\_\_\_\_ Other \_\_\_\_\_  
 specify \_\_\_\_\_

If Yes: How many trips a month did you average? \_\_\_\_\_

How many miles did you average on each trip? \_\_\_\_\_

62-66 \_\_\_\_\_

( Editing \_\_\_\_\_ )  
 (Calculation: Trips/month X 12 X Average miles/trip = Total for evening and visiting )

Did you drive for shopping or other purposes during 1954?

(1) Yes \_\_\_\_\_ (2) No \_\_\_\_\_ Other \_\_\_\_\_  
specify

If Yes: How many trips a week did you average? \_\_\_\_\_

How many miles did you average for each trip? \_\_\_\_\_

Was there any driving you did during 1954 that we may have missed?

(1) Yes \_\_\_\_\_ (2) No \_\_\_\_\_ Other \_\_\_\_\_  
specify

If Yes: How many miles was this? \_\_\_\_\_

67-70 \_\_\_\_\_

(Editing \_\_\_\_\_ = \_\_\_\_\_ )  
(Calculation: Trips/week X Miles/trip X 52 + other miles = Total for \_\_\_\_\_ )  
other purposes

Interviewer Calculation Summary for 1954

Type of Travel	Schedule page	Miles
To and from work	11	
On the job	11	
Vacations and long trips	12	
Weekend and day trips	12	
Evening and visiting	12	
Shopping and other purposes	13	
Total Calculated		
Total Estimated	11	

71-75 \_\_\_\_\_

76-80 \_\_\_\_\_

We need just a little more information on your driving in 1953.

1 \_\_\_\_\_

First of all, where did you live from January to December of that year?

2-5 \_\_\_\_\_

(1)Here \_\_\_\_\_ (2)Other \_\_\_\_\_  
Street and City

6 4

7 \_\_\_\_\_

Where did you work in 1953? (1)Same as now \_\_\_\_\_ Other \_\_\_\_\_

8 \_\_\_\_\_

\_\_\_\_\_ specify

Did you drive back and forth to work during that year?

(1)Yes \_\_\_\_\_ (2)No \_\_\_\_\_ Other \_\_\_\_\_  
specify

Did you take vacation or other long trips that year?

(1)Yes \_\_\_\_\_ (2)No \_\_\_\_\_ Other \_\_\_\_\_  
specify

How much more or how much less did you drive in 1953 than in 1954?

(1)Same \_\_\_\_\_ (2)More \_\_\_\_\_ (3)Less \_\_\_\_\_ Other \_\_\_\_\_  
No. of miles No. of miles

\_\_\_\_\_ specify

Editing : 1954 \_\_\_\_\_ miles  
Calculation : 1953 \_\_\_\_\_ miles

9-13 \_\_\_\_\_

Now (Mr., Mrs., Miss....), most people's driving is affected by the way they feel. What are your feelings when you take the wheel to drive?

\_\_\_\_\_ 14-15 \_\_\_\_\_

In general, do you enjoy driving or not?

16 \_\_\_\_\_

(1)Enjoy \_\_\_\_\_ (2)Don't enjoy \_\_\_\_\_ Comment \_\_\_\_\_  
specify

Do you object to driving at night or not?

(1) Object \_\_\_\_\_ (2) Don't object \_\_\_\_\_ Comment \_\_\_\_\_  
specify

17 \_\_\_\_\_

Are you satisfied or dissatisfied with the mechanical performance and the way your car drives?

(1) Satisfied \_\_\_\_\_ (2) Dissatisfied \_\_\_\_\_ Comment \_\_\_\_\_  
specify

18 \_\_\_\_\_

Why do you feel this way? \_\_\_\_\_

19-20 \_\_\_\_\_

Are you satisfied or dissatisfied with the appearance of the car you drive?

(1) Satisfied \_\_\_\_\_ (2) Dissatisfied \_\_\_\_\_ Comment \_\_\_\_\_  
specify

21 \_\_\_\_\_

What are your reasons? \_\_\_\_\_

22,23 \_\_\_\_\_

We would like to learn more about how people drive under different conditions. Do you think that most people vary their driving according to the way they feel?

(1) Yes \_\_\_\_\_ (2) No \_\_\_\_\_ Comment \_\_\_\_\_  
specify

24,25 \_\_\_\_\_

When you are disturbed about something with other people, does it relax you to drive?

(1) Yes \_\_\_\_\_ (2) No \_\_\_\_\_ Comment \_\_\_\_\_

26 \_\_\_\_\_

Can you tell me how your driving is affected when you are angry?

27,28 \_\_\_\_\_



Can you tell me how your driving is affected when you are sad or depressed? 29,30 \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

What do you do to wake yourself up when you get sleepy at the wheel? 31,32 \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Do you consider yourself more nervous, less nervous, or about as nervous as other people? 33 \_\_\_\_\_

(1) More \_\_\_\_\_ (2) Same \_\_\_\_\_ (3) Less \_\_\_\_\_ Comment \_\_\_\_\_  
specify

\_\_\_\_\_

During the last three years have you had more or less than your usual share of worries? 34 \_\_\_\_\_

(1) More \_\_\_\_\_ (2) Same \_\_\_\_\_ (3) Less \_\_\_\_\_ Comment \_\_\_\_\_

\_\_\_\_\_

Do you smoke?

(1) Yes \_\_\_\_\_ No \_\_\_\_\_ Comment \_\_\_\_\_ 35 \_\_\_\_\_

If Yes: How much do you smoke? \_\_\_\_\_ 36,37 \_\_\_\_\_

(Be sure to note what they smoke)

Do you smoke while you are driving?

(1) Yes \_\_\_\_\_ (2) No \_\_\_\_\_ Other \_\_\_\_\_ 38 \_\_\_\_\_

specify

If No: Have you smoked in the last three years?

Yes \_\_\_\_\_ No \_\_\_\_\_ Comment \_\_\_\_\_

Do you drink? 39 \_\_\_\_\_

(1) Yes \_\_\_\_\_ (2) No \_\_\_\_\_ Comment \_\_\_\_\_

If Yes: Are there occasions when you drive after having a drink? 40 \_\_\_\_\_

(1) Yes \_\_\_\_\_ (2) No \_\_\_\_\_ Comment \_\_\_\_\_

\_\_\_\_\_

The Health Department is interested in learning more about the general health of the people in the survey.

Card IV

First of all, how tall are you? \_\_\_\_\_

41 \_\_\_\_\_

How much do you weigh? \_\_\_\_\_

(Editing: Age of respondent from page 2 \_\_\_\_\_)

Are you troubled with:	Yes	No	If yes: Does this interfere with your normal routine?		
			Yes	No	
Hay fever					42 _____
Asthma					43 _____
Diabetes					44 _____
High Blood Pressure					45 _____
Stomach Ulcer					46 _____
Arthritis, rheumatism, or neuritis					47 _____
Limited use of either your arms or legs					48 _____
Fainting spells or epilepsy					49 _____

Have you ever had any nervous or emotional illness?

50 \_\_\_\_\_

(1) Yes \_\_\_\_\_ (2) No \_\_\_\_\_ Comment \_\_\_\_\_  
specify

Have you ever had any other chronic condition or long drawn-out illness?

51 \_\_\_\_\_

(1) Yes \_\_\_\_\_ (2) No \_\_\_\_\_ Comment \_\_\_\_\_  
specify

Do you have trouble hearing? (1) Yes \_\_\_\_\_ (2) No \_\_\_\_\_

52 \_\_\_\_\_

Comment \_\_\_\_\_

Do you have trouble getting to sleep?

(1)Yes\_\_\_\_(2)No\_\_\_\_ Comment\_\_\_\_\_ 53\_\_\_\_\_  
specify

Do you wear glasses? (1)Yes\_\_\_\_(2)No\_\_\_\_ Other\_\_\_\_\_ 54\_\_\_\_\_  
specify

Do you usually wear sunglasses when you drive on sunny days?

(1)Yes\_\_\_\_(2)No\_\_\_\_ Comment\_\_\_\_\_ 55\_\_\_\_\_

What is your usual speed on the open road where there are no speed control zones?  
\_\_\_\_\_ 56\_\_\_\_\_

How courteous do you think other drivers are?\_\_\_\_\_ 57-58\_\_\_\_\_

Comparing yourself with other drivers, how would you rate yourself in terms of driving skill?  
\_\_\_\_\_ 59\_\_\_\_\_

specify

Would you say you are a slow or a fast driver?

(1)Slow\_\_\_\_(2)Fast\_\_\_\_ Comment\_\_\_\_\_ 60\_\_\_\_\_  
specify

Along the highways there are usually warning signs pointing out special conditions, dangers, or places where caution is called for.

Do you think that most people notice these signs as they are driving?

(1)Yes\_\_\_\_(2)No\_\_\_\_ Comment\_\_\_\_\_ 61\_\_\_\_\_  
specify

Do you believe stop signs are generally observed?

Card 17

(1) Yes \_\_\_\_\_ (2) No \_\_\_\_\_ Comment \_\_\_\_\_  
specify

62 \_\_\_\_\_

Do you believe that it is necessary for drivers to come to a full stop at a corner stop sign they know when no one is in sight?

(1) Yes \_\_\_\_\_ (2) No \_\_\_\_\_ Comment \_\_\_\_\_  
specify

63 \_\_\_\_\_

Would you say it was easy or difficult to find your way on strange roads?

(1) Easy \_\_\_\_\_ (2) Difficult \_\_\_\_\_ Comment \_\_\_\_\_  
specify

64 \_\_\_\_\_

In your opinion are route signs too small, about right, or too large?

(1) Too small \_\_\_\_\_ (2) About right \_\_\_\_\_ (3) Too large \_\_\_\_\_

65 \_\_\_\_\_

Comment \_\_\_\_\_

What is the fastest you have ever driven on the open highway? \_\_\_\_\_

66 \_\_\_\_\_

Have you ever been involved in a motor vehicle accident, large or small?

(1) Yes \_\_\_\_\_ (2) No \_\_\_\_\_ Comment \_\_\_\_\_

67 \_\_\_\_\_

If Yes: Were you driving?

(1) Yes \_\_\_\_\_ (No) \_\_\_\_\_ Comment \_\_\_\_\_

How many have you had since you've been driving? \_\_\_\_\_

68 \_\_\_\_\_

Did any happen to you since January, 1953?

(1) Yes \_\_\_\_\_ (2) No \_\_\_\_\_ Comment \_\_\_\_\_

If Yes: How many were there? \_\_\_\_\_

69 \_\_\_\_\_

If had any accident since January, 1953: Now for the first one that happened to you:

Where did you have the accident? \_\_\_\_\_ 70  
City and State

What was the approximate date? \_\_\_\_\_ 71-72  
Month and Year

About what time did it occur? \_\_\_\_\_ A.M. \_\_\_\_\_ P.M. 73

Was this with another car, object, or pedestrian?

- (1) Another car \_\_\_\_\_
- (2) An object \_\_\_\_\_
- (3) Pedestrian \_\_\_\_\_
- (4) None of these \_\_\_\_\_

Other \_\_\_\_\_ 74  
specify

Was anyone injured? (1) Yes \_\_\_\_\_ (2) No \_\_\_\_\_ Other \_\_\_\_\_ 75  
specify

What was the total damage in terms of money to your car in the accident? 76-78  
\$ \_\_\_\_\_

If another car involved: What was the total damage to the other car in terms of money? \$ \_\_\_\_\_

If an object involved: What were the damages to the object? \$ \_\_\_\_\_ 79

Was this accident reported to the Bureau of Motor Vehicles?

(1) Yes \_\_\_\_\_ (2) No \_\_\_\_\_ Other \_\_\_\_\_ 80  
specify

Card V

Now for the second accident.

Where did you have the accident? \_\_\_\_\_ 1  
City and State 2-5  
6 5  
7

What was the approximate date? \_\_\_\_\_ 8-9  
Month and Year

What time did it occur? \_\_\_\_\_ A.M. \_\_\_\_\_ P.M. 10

Was this with another car, object, or pedestrian?

- (1) Another car \_\_\_\_\_
- (2) An object \_\_\_\_\_
- (3) Pedestrian \_\_\_\_\_
- (4) None of these \_\_\_\_\_

(5) Other \_\_\_\_\_ 11  
specify

Was anyone injured? (1) Yes \_\_\_\_\_ (2) No \_\_\_\_\_ Other \_\_\_\_\_ 12  
specify

What was the total damage in terms of money to your car in the accident?

\$ \_\_\_\_\_

13-15 \_\_\_\_\_

If another car involved: What was the total damage to the other car  
in terms of money? \$ \_\_\_\_\_

If an object involved: What were the damages to the object?  
\$ \_\_\_\_\_

Was this accident reported to the Bureau of Motor Vehicles?

(1)Yes \_\_\_\_\_ (2)No \_\_\_\_\_ Other \_\_\_\_\_ specify \_\_\_\_\_ 16 \_\_\_\_\_

Now for the third accident.

Where did you have the accident? \_\_\_\_\_ and \_\_\_\_\_ State \_\_\_\_\_ 17 \_\_\_\_\_  
City

What was the approximate date? \_\_\_\_\_ 18-19 \_\_\_\_\_  
Month and Year

About what time did it occur? \_\_\_\_\_ A.M. \_\_\_\_\_ P.M. 20 \_\_\_\_\_

Was this with another car, object, or pedestrian?

(1)Another car (2)An object \_\_\_\_\_

(3)Pedestrian (4)None of these \_\_\_\_\_

(5)Other \_\_\_\_\_

21 \_\_\_\_\_

Was anyone injured? (1)Yes \_\_\_\_\_ (2)No \_\_\_\_\_ Other \_\_\_\_\_ specify \_\_\_\_\_ 22 \_\_\_\_\_

What was the total damage in terms of money to your car in the accident?

\$ \_\_\_\_\_

If another car involved: What was the total damage to the other car in  
terms of money? \$ \_\_\_\_\_

If an object involved: What were the damages to the object? \$ \_\_\_\_\_ 23-25 \_\_\_\_\_

Was this accident reported to the Bureau of Motor Vehicles?

(1)Yes \_\_\_\_\_ (2)No \_\_\_\_\_ Other \_\_\_\_\_ specify \_\_\_\_\_ 26 \_\_\_\_\_

How many times since January, 1953 have you had to stop along the road  
because your car or other vehicle you were driving broke down or would  
not run right?

(1)Once \_\_\_\_\_ (2)Twice \_\_\_\_\_ (3)Three times \_\_\_\_\_ (4)Four times \_\_\_\_\_

Add comments \_\_\_\_\_ 27 \_\_\_\_\_

Do you think traffic laws are enforced strictly enough?

(1) Yes \_\_\_\_\_ (2) No \_\_\_\_\_ Comment \_\_\_\_\_  
specify

28 \_\_\_\_\_

Why do you think so? \_\_\_\_\_

29-30 \_\_\_\_\_

Let's see, I have one more question. In order to make some comparisons of the people who are interviewed, we need to know the approximate amount of the income of everyone in your household put altogether. Would you mind looking at this card and telling me the letter next to the figure that represents what your family income was for 1954?

- |              |              |              |
|--------------|--------------|--------------|
| (01) A _____ | (07) G _____ | (13) M _____ |
| (02) B _____ | (08) H _____ | (14) N _____ |
| (03) C _____ | (09) I _____ | (15) O _____ |
| (04) D _____ | (10) J _____ | (16) P _____ |
| (05) E _____ | (11) K _____ | (17) Q _____ |
| (06) F _____ | (12) L _____ |              |

31-32 \_\_\_\_\_

Thank you very much for giving us this information. Your answers will be kept confidential with no one seeing them other than a few of us doing the research. Are there any questions you would like to ask about the study?

One of the most important pieces of information needed in planning highways is how many miles people drive. Aside from very crude estimates based on amount of gasoline used, we have almost no good basis to go on. For this reason we wonder if we could ask your help in having some further accounts of the miles you drive in the months to come. We would like to have you, especially, do this because you are part of a sample of Schenectady citizens. I will be a very valuable contribution to our nation's road building program.

NOTE TO INTERVIEWER: Complete this section immediately after you leave the house.

Card V

Schedule No. \_\_\_\_\_

A. Rate the house the family lived in by checking one of these descriptive phrases:

- Large houses in good condition \_\_\_\_\_ 03
- Large houses in medium condition; medium-sized houses in good condition. \_\_\_\_\_ 06
- Large houses in bad condition \_\_\_\_\_ 09
- Medium-sized houses in medium condition; apartments in regular apartment buildings. ~~\_\_\_\_\_ 12~~
- Small houses in good condition; small houses in medium condition; dwellings over stores. \_\_\_\_\_ 15
- Medium-sized houses in bad condition; small houses in bad condition. \_\_\_\_\_ 18
- All houses in very bad condition; dwellings in structures not originally intended for homes. \_\_\_\_\_ 21

33-34 \_\_\_\_\_

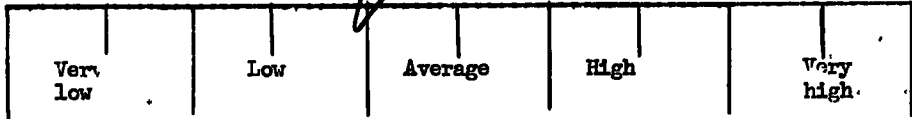
B. Rate the area the family's house was in by checking one of these descriptive phrases:

- Very exclusive; Gold Coast. \_\_\_\_\_ 02
- The better suburbs and apartment house areas, houses with spacious yards. \_\_\_\_\_ 04
- Above average; areas all residential, larger than average space around houses; apartment areas in good condition. \_\_\_\_\_ 06
- Average; residential neighborhoods, no deterioration in the area. \_\_\_\_\_ 08
- Below average; area not quite holding its own, beginning to deteriorate, business entering. \_\_\_\_\_ 10
- Low, considerably deteriorated, run-down and semi-slum. ~~\_\_\_\_\_ 12~~
- Very low; slum. \_\_\_\_\_ 14

35-36 \_\_\_\_\_

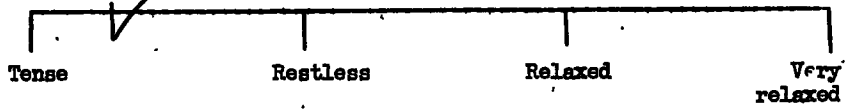
Give your overall impression of the family, house, and furnishings, by checking the place on the scale that corresponds to your judgment.

37 \_\_\_\_\_



Respondent rating:

38 \_\_\_\_\_





## *Appendix C—Control Data*

Control data are those which help form the background for evaluation of other findings in a study. Some of these can be indicated here before other results are given.

The 1,567 households visited in Schenectady formed the basic sample of the city. Of these, 810 were driver or interview households. The remaining 757 were called no-interview households because the only information secured was household composition. This group contained households in which no one had driven since January 1953, in which there was one driver but a random start of two, in which no complete contact could be made after one to six visits because of the termination of the field work, and in which the person refused to give any more than a fragment of the information needed (see Table 2).

Fewer than 19 percent of the people who would not completely answer the questions were important to the study, because of these only 1.1 percent were drivers who should have been contacted and 0.8 percent were in households in which the presence or absence of drivers was unknown.

Household composition was examined in several ways. As shown in Table 26, the number of people in most households was five or fewer, with about one-half having two or three members. Interviewed households tended to be larger, which is expected, since the random start of two for one-half of all households visited meant at least two members had to be of driving age, which put many one-person and one-driver households on the no-interview side. Table 27 shows that more than one-half of all households had no members under 16 years, with the higher proportion being in no-interview households.

Table 28 shows that more than one-half of all households had two members 16 years of age and over, who were therefore potential drivers.

In Table 29, two-thirds of all households were found to have one male adult member. Interview households were characterized by a higher proportion of male adult members and a lower proportion of no adult males than were no-interview households. Table 30 indicates somewhat greater similarity between the two types of households in total number of female adults.

Of all the sample households, about one-third contained one driver, less than one-third had two drivers, about 7 percent had three to five drivers, and about one-fourth had no drivers (Table 31).

Almost six out of ten sample households had a male driver and three out of ten had no male drivers. In contrast to these data (Table 32), Table 33 shows that more than three out of ten households had female drivers and less than six out of ten had no female drivers.

Other aspects of contacts made with households are instructive in terms of the interview methodology. With respect to the random start, the expected distribution was for one-half of the households to be one's and for the remaining to be two's. Table 34 shows that this was followed quite closely, with 51.6 percent of the households having a random start of one, which meant the oldest driver had to be interviewed, and 47.7 percent had a two, which meant an interview with the second oldest driver only.

In the training of interviewers, the importance was stressed of repeat visits to households until the necessary information was secured and in mastering good approach techniques. Table 35 shows that most people were interviewed in one or two visits, but that the number of visits required in some households was more than 10. This emphasis on securing everyone in the sample was partly responsible for the extremely low refusal rate in this work. This should be a basic consideration in any sample, as it had been demonstrated that distinct distortions in findings occur where the refusal rate is high or where volunteers are relied on to give data.

Time of day of final contact is of interest because, as expected, drivers had to be interviewed in the evenings. The distribution in Table 36 shows that more than six out of ten were interviewed after 4:00 P.M. Fewer no-interview households were completed during this time, as the composition information needed could be secured from anyone who answered rather than only the driver.

The day of week of final contact (Table 37) was fairly even for everyone visited. The smaller number on Sundays reflects the customary expectation of a rest day on the part of interviewers as well as respondents. These weekly figures are resolved by months in Table 38.

TABLE 26  
NO-INTERVIEW AND INTERVIEW HOUSEHOLDS  
COMPARED BY TOTAL NUMBER OF PERSONS  
IN HOUSEHOLD

No. in Household	No-Interview Households		Interview Households		Total	
	No.	%	No.	%	No.	%
1	152	20.0	30	3.7	182	11.6
2	232	30.6	219	27.0	451	28.8
3	120	15.9	202	25.0	322	20.5
4	80	10.6	183	22.6	263	16.8
5	43	5.7	115	14.2	158	10.1
6	20	2.6	43	5.3	63	4.0
7	5	0.7	10	1.2	15	1.0
8	3	0.4	3	0.4	6	0.4
9	1	0.1	2	0.2	3	0.2
10	47	6.2	2	0.2	49	3.1
11	---	---	1	0.1	1	0.1
Unknown	54	7.1	---	---	54	3.4
Total	757	100.1	810	99.9	1,567	100.0

TABLE 27  
NO-INTERVIEW AND INTERVIEW HOUSEHOLDS  
COMPARED BY TOTAL NUMBER OF HOUSEHOLD  
MEMBERS 15 YEARS OF AGE AND UNDER

No 15 yr. or Under	No-Interview Households		Interview Households		Total	
	No	%	No.	%	No	%
1	88	11.6	157	19.4	245	15.6
2	73	9.6	137	16.9	210	13.4
3	36	4.8	73	9.0	109	7.0
4	13	1.7	26	3.2	39	2.5
5	3	0.4	1	0.1	4	0.3
6	---	---	2	0.3	2	0.1
7	---	---	1	0.1	1	0.1
0	483	63.8	411	50.8	894	57.0
Unknown	60	7.9	2	0.3	62	4.0
10 or more	1	0.1	---	---	---	---
Total	757	99.9	810	100.1	1,566	100.0

TABLE 28  
NO-INTERVIEW AND INTERVIEW HOUSEHOLDS  
COMPARED BY TOTAL NUMBER OF HOUSEHOLD  
MEMBERS 16 YEARS OF AGE AND OVER

No. 16 yr or over	No-Interview Households		Interview Households		Total	
	No	%	No	%	No	%
1	176	23.2	37	4.6	213	13.6
2	363	48.0	506	62.5	869	55.5
3	80	10.6	168	20.7	248	15.8
4	24	3.2	70	8.6	94	6.0
5	6	0.8	19	2.3	25	1.6
6	2	0.3	6	0.7	8	0.5
7	---	---	1	0.1	1	0.1
0	45	5.9	---	---	45	2.9
10 or more	---	---	1	0.1	1	0.1
Unknown	61	8.1	2	0.2	63	4.0
Total	757	100.1	810	99.8	1,567	100.1

TABLE 29  
NO-INTERVIEW AND INTERVIEW HOUSEHOLDS  
COMPARED BY TOTAL NUMBER OF MALE  
HOUSEHOLD MEMBERS 16 YEARS OF AGE AND OVER

No. of Males 16 yrs. or over	No-Interview Households		Interview Households		Total	
	No	%	No.	%	No	%
1	434	57.3	622	76.8	1,056	67.4
2	56	7.4	116	14.3	172	11.0
3	7	0.9	25	3.1	32	2.0
4	---	---	2	0.2	2	0.1
5	---	---	5	0.6	5	0.3
0	197	26.0	38	4.7	235	15.0
DK	63	8.3	2	0.2	65	4.1
Total	757	99.9	810	99.9	1,567	99.9

TABLE 30  
NO-INTERVIEW AND INTERVIEW HOUSEHOLDS  
COMPARED BY TOTAL NUMBER OF FEMALE  
HOUSEHOLD MEMBERS 16 YEARS OF AGE AND OVER

No of Females 16 yrs or over	No-Interview Households		Interview Households		Total	
	No	%	No	%	No	%
1	480	63.4	588	72.6	1,068	68.2
2	91	12.0	157	19.4	248	15.8
3	16	2.1	32	4.0	48	3.1
4	2	0.3	4	0.5	6	0.4
0	106	14.0	27	3.3	133	8.5
10 or more	---	---	1	0.1	1	0.1
DK	62	8.2	1	0.1	63	4.0
Total	757	100.0	810	100.0	1,567	100.1

TABLE 31  
NO-INTERVIEW AND INTERVIEW HOUSEHOLDS  
COMPARED BY TOTAL NUMBER OF DRIVERS  
IN HOUSEHOLD

No Drivers	No-Interview Households		Interview Households		Total	
	No	%	No	%	No	%
1	293	38.7	249	30.7	542	34.6
2	23	3.0	463	57.2	486	31.0
3	---	---	73	9.0	73	4.7
4	5	0.7	18	2.2	23	1.5
5	1	0.1	7	0.9	8	0.5
None	383	50.0	---	---	383	24.4
DK	52	6.9	---	---	52	3.3
Total	757	99.4	810	100.0	1,567	100.0

TABLE 32

NO-INTERVIEW AND INTERVIEW HOUSEHOLDS  
COMPARED BY TOTAL NUMBER OF MALE DRIVERS  
IN HOUSEHOLDS

No Male Drivers	No-Interview Households		Interview Households		Totals	
	No	%	No	%	No	%
	1	271	35.8	650	80.2	921
2	5	0.7	85	10.5	90	5.7
3	3	0.4	15	1.8	18	1.1
4	---	---	2	0.2	2	0.1
5	---	---	3	0.4	3	0.2
0	427	56.4	55	6.8	482	30.8
DK	51	6.7	---	---	51	3.3
Total	757	100.0	810	99.9	1,567	100.0

TABLE 34

NO-INTERVIEW AND INTERVIEW HOUSEHOLDS  
COMPARED BY RANDOM START IN HOUSEHOLD

No Random Starts	No-Interview Households		Interview Households		Totals	
	No	%	No	%	No	%
	1	262	34.6	548	67.4	808
2	483	63.8	264	32.6	747	47.7
Unknown	12	1.6	---	---	12	0.7
Total	757	100.0	810	100.0	1,567	100.0

TABLE 36

NO-INTERVIEW AND INTERVIEW HOUSEHOLDS  
COMPARED BY TIME OF DAY OF FINAL CONTACT

Hour of Contact	No-Interview Households		Interview Households		Total	
	No	%	No	%	No	%
	8-11 59 AM	27	3.6	22	2.7	49
12-3:59 PM	251	33.2	194	24.0	445	28.4
4-7 59 PM	320	42.3	416	51.4	736	47.0
8-11 59 PM	83	11.0	84	10.4	167	10.7
8-11 59 PM <sup>1</sup>	62	8.2	91	11.2	153	9.8
No Answer	14	1.8	3	0.4	17	1.1
Total	757	100.0	810	100.0	1,567	100.0

<sup>1</sup> Or later

TABLE 33

NO-INTERVIEW AND INTERVIEW HOUSEHOLDS  
COMPARED BY TOTAL NUMBER OF FEMALE  
DRIVERS IN HOUSEHOLD

No Female Drivers	No-Interview Households		Interview Households		Totals	
	No	%	No	%	No	%
	1	61	8.1	485	60.0	546
2	5	0.7	54	6.7	59	3.8
3	1	0.1	6	0.7	7	0.5
None	609	80.4	265	32.7	874	55.8
DK	81	10.7	---	---	81	5.2
Total	757	100.0	810	100.0	1,567	100.0

TABLE 35

NO-INTERVIEW AND INTERVIEW HOUSEHOLDS  
COMPARED BY ACTUAL NUMBER OF VISITS MADE

No of Day Visits	No-Interview Households		Interview Households		Total	
	No	%	No	%	No	%
	1	414	54.7	304	37.5	718
2	151	19.9	241	29.8	392	25.0
3	69	9.1	127	15.7	196	12.5
4	44	5.8	56	6.9	100	6.4
5	17	2.2	38	4.7	55	3.5
6	25	3.3	19	2.3	44	2.8
7	8	1.0	10	1.2	18	1.1
8	12	1.6	7	0.9	19	1.2
9	8	1.0	2	0.3	10	0.6
10 or more	9	1.2	6	0.7	15	1.0
Total	757	99.8	810	100.0	1,567	99.9

TABLE 37

NO-INTERVIEW AND INTERVIEW HOUSEHOLDS  
COMPARED BY DAY OF WEEK OF FINAL CONTACT

Day of Week	No-Interview Households		Interview Households		Total	
	No	%	No	%	No	%
	Sunday	24	3.2	24	2.9	48
Monday	122	16.1	132	16.3	254	16.2
Tuesday	124	16.4	130	16.0	254	16.2
Wednesday	129	17.0	151	18.6	280	17.9
Thursday	98	12.9	108	13.3	206	13.1
Friday	142	18.7	151	18.6	293	18.7
Saturday	112	14.8	113	13.9	225	14.3
No answer	3	0.4	1	0.1	4	0.2
Total	757	99.5	810	99.7	1,567	99.6

TABLE 38

NO-INTERVIEW AND INTERVIEW HOUSEHOLDS  
COMPARED BY MONTH OF FINAL CONTACT

Month	No-Interview Households		Interview Households		Total	
	No	%	No	%	No	%
	January	101	13.3	75	9.3	176
August	141	18.6	162	19.9	303	19.3
September	78	10.3	59	7.3	136	8.7
October	98	12.9	123	15.0	221	14.1
November	124	16.3	182	22.5	306	19.5
December	214	28.2	208	25.7	422	26.9
No answer	1	0.1	1	0.1	2	0.1
Total	757	99.7	810	99.8	1,567	99.8