

Relation of Accidents to Speed Habits and Other Driver Characteristics

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The purpose of this study is to relate accident experience to speed habits and other driver characteristics. It is an extension of the New York State driver report titled, "Speed Habits of Automobile Drivers Observed Repeatedly on a Rural Highway," presented at the 33rd Annual Meeting of the Highway Research Board. In that report, the individual speed habits of drivers, speed consistency by groups of drivers and the association of the driver and vehicle characteristics with differences in average speed were explored. Spot speeds, time of day and registration numbers of cars were recorded. Driver characteristics and the identity of the drivers were determined by use of a post-card survey; 8,587 speed observations were obtained, during the morning and evening peak hours, on a two-lane rural highway, at two adjacent locations presenting tangent and horizontal curve characteristics; 1,600 different drivers and 22 observation periods were involved.

All highway accident cases of record (from October 1949 through 1953) maintained by the New York State Motor Vehicle Bureau were examined and the reported details and accident type extracted for each driver. The drivers were divided into accident and no-accident groups. Accident information for the accident group was collated by driver with their respective speed, headroom, and other driver and car characteristics. Various driver and vehicle characteristics for each group were combined for comparative analysis and the relation of accidents to road and light conditions and accident type are discussed.

It appears that faster drivers have more accidents than slower drivers, especially when judged by their speeds in the afternoon, and that drivers who have very short headways in the morning have more accidents than those who do not. Higher accident rates are associated with younger drivers, larger amounts of travel, and newer cars. The majority of the accidents of record, for which information was available, occurred on dry road surfaces, during daylight, and involved other vehicles.

To complete the data, a home-interview questionnaire for the drivers was conducted furnishing information related to those medical and social characteristics more frequently associated with accidents. Comparative analysis of these human factors for the accident and no-accident groups of drivers are presented.

The interview data established that: (1) accident drivers are definitely an older group of people and do more driving per year than the no-accident drivers, (2) nearly half of the drivers in each group, both accident and no-accident drivers, claim they don't get drowsy while driving, (3) fewer than 10 percent in each group claim any difficulty in hearing, (4) fewer than 3 percent in each group claim any emotional illness history, (5) of the accidents described to interviewers, about two thirds occurred on working days and one third on days off from work, (6) nearly 90 percent of the accidents reported occurred on routes traveled frequently and (7) the accidents per driver of the accident group have a life-time rate of 1.8 accidents per driver while the no-accident group drivers (no accidents from January 1951 through 1953) have a life-time accident rate of 0.8 accidents per driver.

● IT has been frequently stated that high speed is the cause of accidents. Law enforcement agencies control speeds along the highways by patrolling and by placing warning signs on the highway in an effort to restrict speeds in an area. It is claimed that by lowering speeds, the number of accidents have been reduced.

There are also many who assert that there is no relationship between accidents and speeds. This is based on the belief that one individual, because of his quicker thinking and faster reflexes, may be a far better and safer driver at 60 mph. than his contemporary whose time and judgement rate him as a 30-mph. driver.

Consideration should also be given to the variations which exist in the vehicles themselves. The most-modern vehicle in excellent condition equipped with the latest and most-efficient driving mechanisms can be operated with greater ease and safety than a car equipped with faulty brakes and in poor mechanical condition.

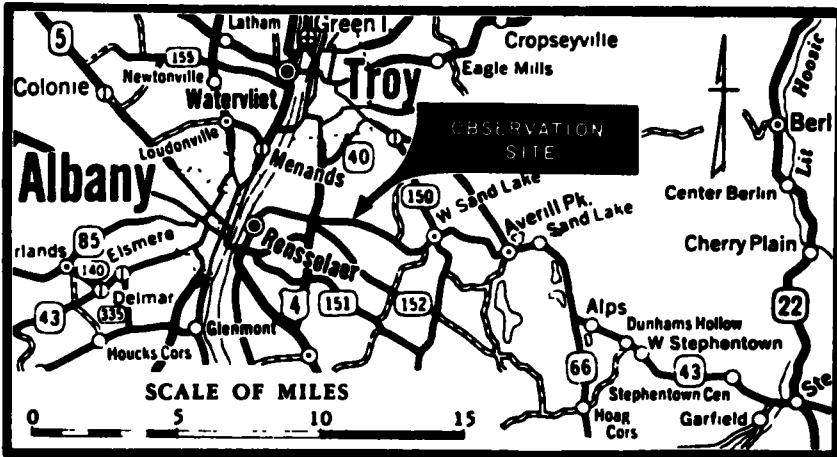


Figure 1. Location of the observation site for collection of speed, headway and other driver data.

An operator's physical condition plays an important part in his driving ability. For example, it is to be expected that a driver would be far more alert in the morning after a good night's rest than in the late afternoon or evening after a fatiguing day.

The third variable is related to driving conditions and includes: (1) physical characteristics of the roadway, (2) weather conditions, and (3) light conditions.

However, we may assume that the average experienced driver has weighed all of these factors and will normally drive at a speed which he considers safe for the conditions as they exist.

Can we say, therefore, that a fast driver has a greater number of accidents than one who normally travels at a lower speed?

The main purpose of the present study is to explore this question. A related question is this: If some drivers have more accidents than others, what else is different about them? We shall attempt to find out what characteristics of the drivers and their cars are associated with differences in accident rates.

A third question is also of interest: What is the relationship between accidents by accident type, road and light conditions? These factors have been examined for the study drivers whose accident records are on file with the Motor Vehicle Bureau.

In addition, a home-interview study was conducted in the summer of 1954, during which a portion of the study drivers were questioned about their driving habits, medical and social characteristics, attitudes, accidents, and the particular situation surrounding the accidents in which they had been involved. These results are reported in the supplement of the report.

COLLECTION OF DATA

For a previous companion study¹ of the speed habits of drivers, an observation site was selected on a rural two-lane highway about 5 miles east of Albany, New York (Figure 1). Data concerning 1,604 drivers and cars observed were collected. These data, with the addition of information about the accidents in which the drivers of these cars were involved, are used in the present report.

Two locations were established at the site. The westerly, near the center of a level tangent, is referred to as the tangent. The other, referred to as the curve location is about 600 feet to the east and at the end of the tangent. Figure 2 shows the plan and profile of the study area.

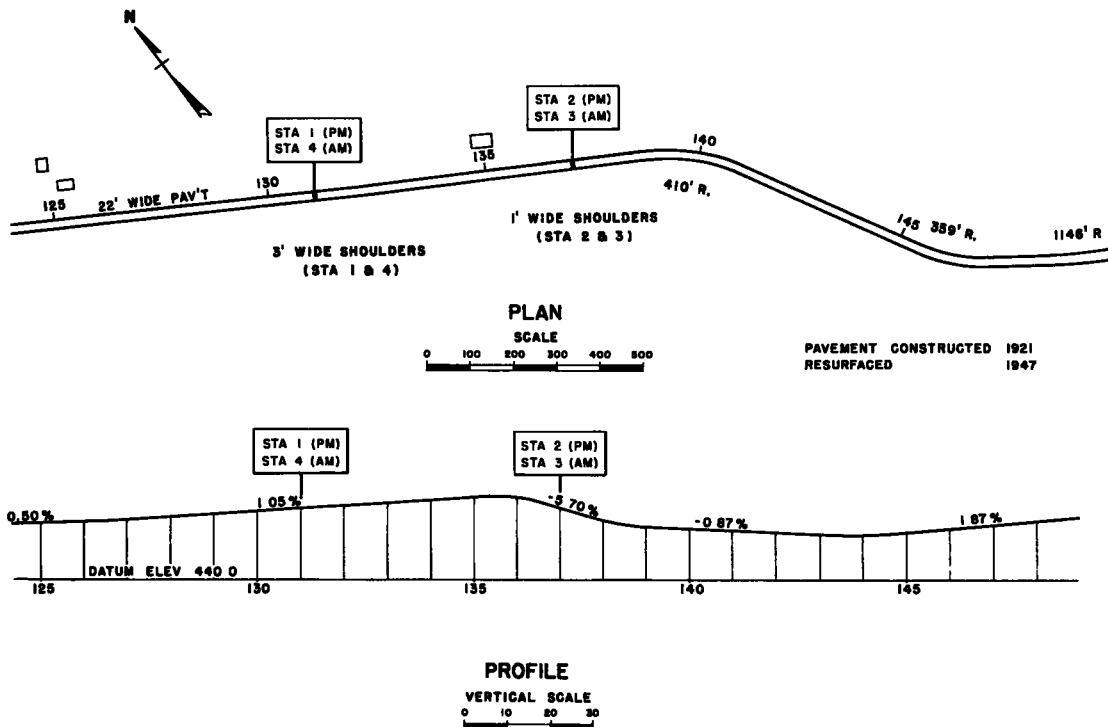


Figure 2. Plan and profile of the observation site for collection of speed, headway and other driver data.

To identify the various observations, they have been given station numbers as follows: Station 1, tangent location, traffic eastbound; Station 2, curve location, traffic eastbound; Station 3, curve location, traffic westbound; and Station 4, tangent location, traffic westbound. The photographs in Figure 3 show the drivers' view of these locations.

The companion study describes in detail the technique and equipment used in collecting the field data.

Speed information for vehicles passing the two established locations, citybound in the morning and outbound in the afternoon for eight summer week days in 1950 and six in 1951, was mechanically recorded. In addition, for the vehicles observed in 1951, the time of day to the nearest 0.0001 hour was mechanically recorded. Only the data for passenger cars with New York State registration plates were used in the analysis. Immediately after the observations in 1951 were completed, the names and addresses of the car owners were secured by a commercial firm, and by means of a postal-card

¹"Speed Habits Observed on a Rural Highway," Highway Research Board Proceedings, Vol. 33, pp. 409-428.

questionnaire, statistical information about the drivers and cars were obtained.

The names and addresses secured were later used to search the accident record files of the Motor Vehicle Bureau. The accident-record files contained the reports submitted



APPROACHING STATION 1



APPROACHING VERTICAL CURVE



APPROACHING STATION 2

VIEWS WHEN OUT BOUND



AT STATION 3



APPROACHING STATION 4

VIEWS WHEN CITY BOUND

Figure 3.

TABLE 1
ACCIDENTS BY YEAR OF ACCIDENT

Year	No. of Accidents ^a
1950	149
1951	128
1952	127
1953	98
Total	502

^a With 30% of the study drivers no longer registered in 1954, the progressive annual decrease in the number of accidents is of about the expected size. There is no evidence of any change in reporting standards over the period considered.

1,393 drivers whose accident record files were searched.² The number of accidents of record in each year for these drivers is listed in Table 1 and shown graphically in Figure 4. Accidents in which the cars used by the study drivers were struck while parked are not included. Except for this exclusion, there was no attempt to designate responsibility for the accidents; therefore, all other accidents involving these individuals as drivers have been included irrespective of negligence. It will be noted that the number of accidents decreased from year to year. An examination of the 1953 reregistration of the drivers included in the sample shows a decrease of about 20 percent over the same period. This is the normal attrition to be expected due to death, moving out of the state, and associated reasons. The rate of decrease for the recorded accidents represents a similar reduction.

Accidents by Faster and Slower Drivers for Each Station

Using the speed data collected at each station, the individual drivers were arranged in order of their average observed speeds and divided into two approximately equal groups. Thus, the drivers were divided into the "faster half" at Station 1 and the "slower half" at Station 1; into the "faster half" at Station 2 and the "slower half" at Station 2; and similarly at Stations 3 and 4. Table 2 shows, for each of these groups of drivers, how many had no accidents, how many had one accident, how many had two accidents, and so on. The table also gives the average number of accidents per driver for each group of drivers.

Figure 5 presents these accident rates in a bar diagram, showing how the faster half of the drivers compare with the slower half at each station. The drivers who constituted the faster half at Station 1 had a significantly higher accident rate than

by drivers for automobile accidents in which a personal injury was sustained or when the property damage was \$50 or more. The reports of record for the observed drivers were searched for the four year period 1950 through 1953, and all pertinent information was coded and entered on punch cards. These cards were collated with the cards containing the observed and postal card information for analysis.

RELATION OF ACCIDENTS TO SPEED Accident Records

For the 4-year period from January 1, 1950, through December 31, 1953, 502 automobile accident records are on file with the Motor Vehicle Bureau for the

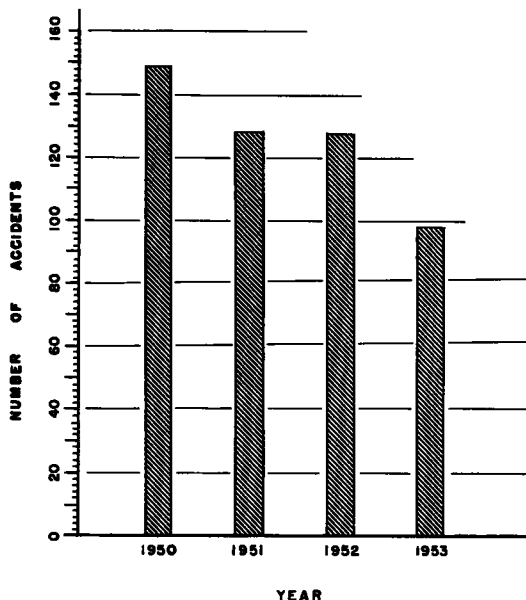


Figure 4. Number of motor vehicle accidents of record involving the study drivers during years 1950 through 1953.

² There were 1,604 drivers observed in the study. No speeds were secured for 35 of these drivers and 176 drove fleet cars or could not be positively identified.

TABLE 2
ACCIDENTS BY FASTER AND SLOWER DRIVERS AT EACH STATION

Station	Average Speed of Driver (mph)	Number of Drivers with					Drivers Totals (Number)	Accidents Totals (Number)	Accidents per Driver	
		0 Acc.	1 Acc.	2 Acc.	3 Acc.	4 Acc.				5 Acc.
1 (Tangent, PM)	0 - 44.0	446	97	30	6	2	1	582	188	0.323
	44.1 & over	386	132	44	9	0	0	571	247	0.433
2 (Curve, PM)	0 - 38.3	422	103	27	8	2	0	562	189	0.336
	38.4 & over	385	127	42	7	0	1	562	237	0.422
3 (Curve, AM)	0 - 38.2	224	71	12	1	0	0	308	98	0.318
	38.2 & over	215	63	27	3	0	1	309	131	0.424
4 (Tangent, AM)	0 - 44.0	217	80	16	4	0	1	318	129	0.406
	44.1 & over	200	56	23	0	0	0	279	102	0.366

those in the slower half. The faster half at Station 2, comprising many but not all of the same drivers as the faster half at Station 1, also had a significantly higher accident rate than the slower half at the same station. Stations 1 and 2 are the stations where traffic was observed in the afternoon.

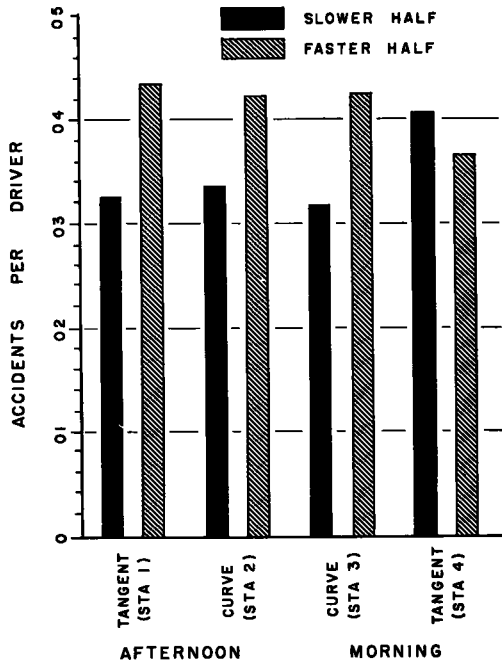


Figure 5. Comparison of accidents per driver (1950-1953) for the slower half and faster half at each station.

The drivers who were in the faster half at Station 3, the curve in the morning, also had a higher accident rate than the slower drivers at the same station. But Station 4, the tangent in the morning, gives a different result. Here the difference in accident rates between the faster half and slower half is small, too small to be statistically significant, and is in the opposite direction from the other differences. Apparently the faster half at the morning tangent were a markedly different group of drivers from the faster half at any of the other stations.

Accidents by Drivers in the Speed Groups over and below 50 mph. for the Tangent Locations

A similar comparison is presented in Table 3. Here the accident records are compared for those drivers whose average observed speeds at the tangent location (morning and afternoon combined) were between 35 and 45 mph., on the one

TABLE 3
ACCIDENTS BY AVERAGE SPEEDS OF DRIVERS OBSERVED AT THE TANGENT LOCATIONS

Station	Average Speed of Driver (mph)	Number of Drivers with					Drivers Totals (Number)	Accidents Totals (Number)	Accidents per Driver	
		0 Acc.	1 Acc.	2 Acc.	3 Acc.	4 Acc.				5 Acc.
1 (Afternoon)	35-44.9	400	93	25	5	2	1	526	171	0.325
	50 & over	133	50	18	2	-	-	203	92	0.453
4 (Morning)	35-44.9	194	72	16	3	-	1	286	118	0.413
	50 & over	74	20	9	-	-	-	103	38	0.369

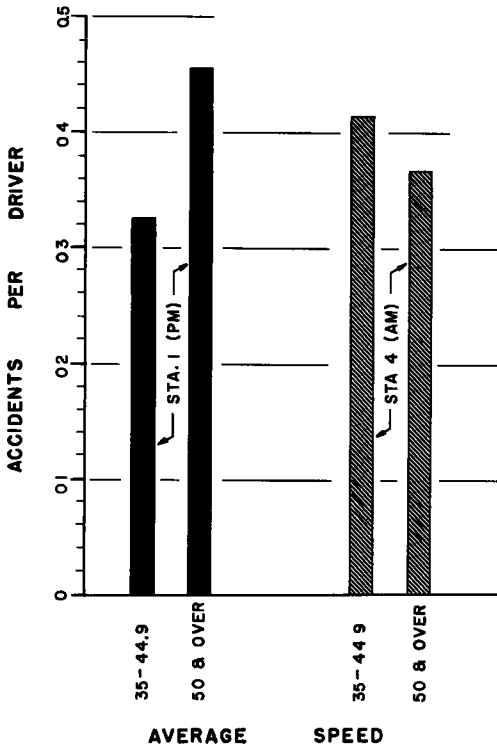


Figure 6. Accidents per driver (1950-1953) by speed at the tangent location.

hand, and over 50 mph., on the other. Again, it is seen that the group of drivers who drove the fastest in the afternoon (Station 1) had more accidents per driver than the slower group of drivers. In the morning (Station 4) the difference is in the opposite direction, but again it is too small to be statistically significant. These comparisons are illustrated graphically in Figure 6.

Speeds of Accident and No-Accident Groups of Drivers

In our comparisons, so far, we have considered the accident records of drivers when classified by speed behavior. Let us now group the drivers according to their accident records and see how their speeds differ. Figures 7 and 8 show the distributions of individual speed observations in the afternoons and mornings, respectively, with separate curves for those drivers who had at least one reported accident on file (accident driver) and for those drivers who did not have an accident record on file (no-accident driver) during the 4-year period of investigation. At both of the afternoon stations (see Figure 7) the accident group had slightly higher speeds than the no-

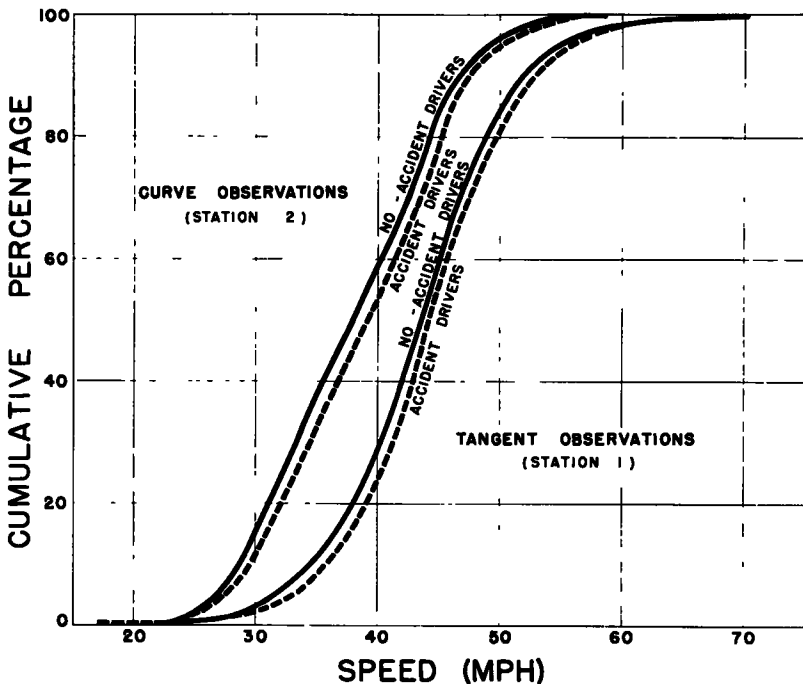


Figure 7. Distributions of afternoon speed observations for accident and no-accident drivers.

accident group at all percentile values. At the morning stations (Figure 8), it is the no-accident group whose speeds are slightly higher at both locations for all percentile values, except near the lower end of the speed range. The average speeds for each group of drivers at each of the four stations and the tangent stations combined are given in Table 4.

TABLE 4
NUMBER OF DRIVERS AND AVERAGE SPEED AT EACH LOCATION FOR ACCIDENT AND NO-ACCIDENT DRIVERS

Station	Accident Drivers		No-Accident Drivers	
	Number	Ave. Speeds (mph)	Number	Ave. Speeds (mph)
1 (tangent, PM)	321	45.4	832	44.5
2 (curve, PM)	317	39.5	807	38.6
3 (curve, AM)	178	38.1	439	38.5
4 (tangent, AM)	180	43.7	417	44.4
1 & 4 combined	398	44.7	995	44.5

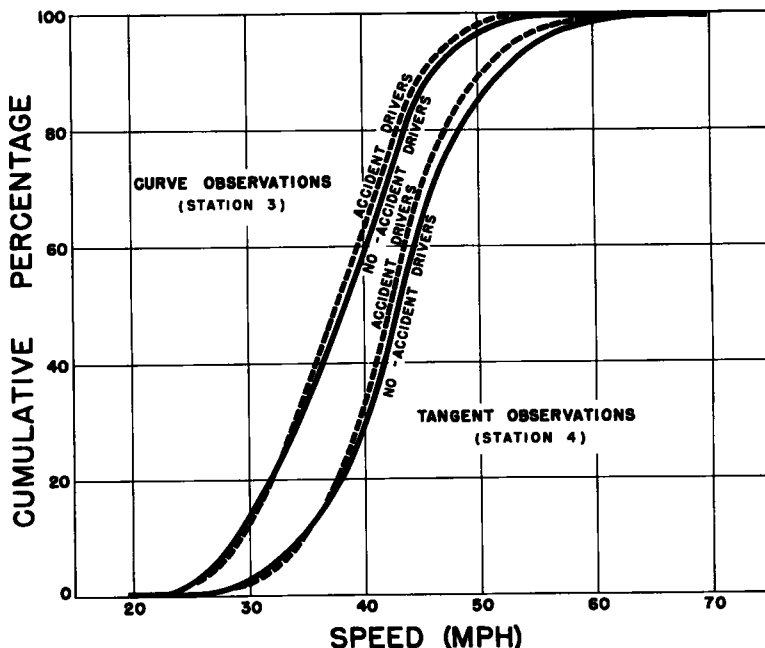


Figure 8. Distributions of morning speed observations for accident and no-accident drivers.

TABLE 5

ACCIDENT AND SPEED DATA FOR DRIVERS RELATED TO THEIR SHORTEST HEADWAYS OBSERVED IN THE MORNING AND AFTERNOON

Time of Day	Shortest Headway Observed		Number of Accidents	Number of Drivers	Accidents per Driver	Average Speeds of Drivers	
	.0001 of Hour	Seconds				Tangent (mph)	Curve (mph)
Morning	6 & under	2 & under	31	60	0.517	46.2	39.1
	7 - 12	2.5 - 4.3	5	17	0.294	45.2	38.6
	13 - 26	4.7 - 9.4	4	32	0.125	44.9	39.6
	27 & over	10 & over	61	161	0.379	44.8	37.9
Afternoon	6 & under	2 & under	38	112	0.339	45.3	39.4
	7 - 12	2.5 - 4.3	24	64	0.375	44.7	38.4
	13 - 26	4.7 - 9.4	35	79	0.443	45.4	40.4
	27 & over	10 & over	124	285	0.436	45.1	39.8

RELATION OF ACCIDENTS TO DRIVER AND CAR CHARACTERISTICS

Headway and Accidents

For the observations in 1951, a timing device, giving the time of day to the nearest 0.0001 hour that each car passed the stations, was operated in conjunction with the speedmeter. The drivers for these time observations have been classified according to the shortest interval of time at which they followed the car ahead.

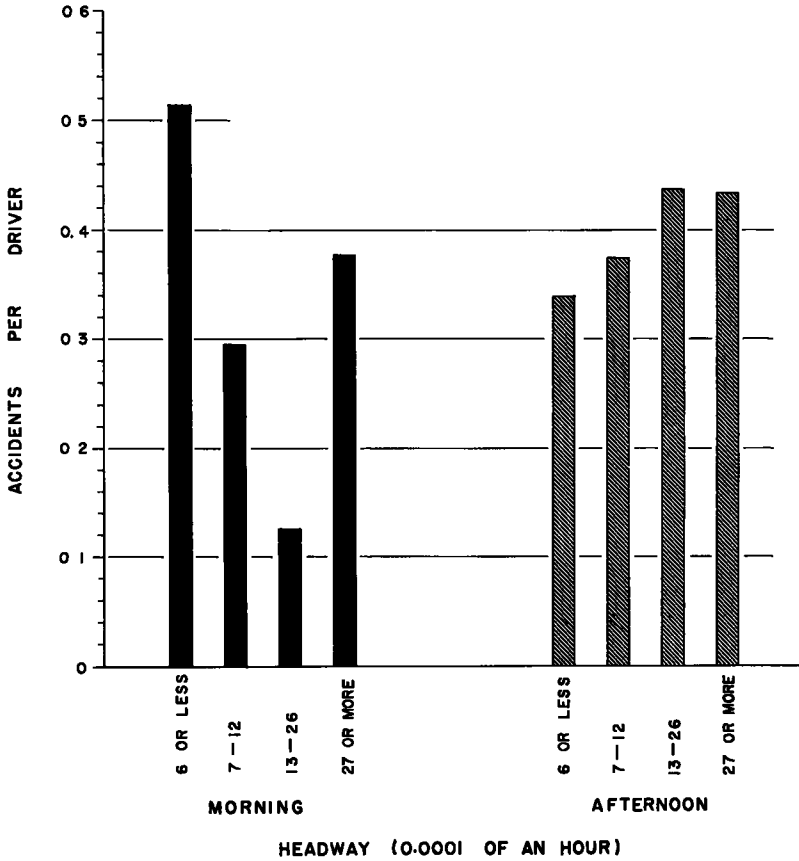


Figure 9. Accidents per driver (1950-1953) by minimum headway observed in the morning and afternoon.

Table 5 has been prepared grouping the drivers observed in 1951 according to their shortest headways recorded in the mornings and afternoons in relation to their accident records on file for the 4-year period under investigation. Accidents per driver and average speeds under tangent and curve locations for each group of drivers are shown. Figure 9 illustrates the relation between accidents per driver and the morning and afternoon headway groupings.

Drivers who had very short headways in the morning had higher accident rates than those whose minimum headways were longer. Drivers whose minimum headways exceeded 0.0027 hour (9.7 seconds) were assumed to be uninfluenced by other traffic and are, therefore, excluded from this comparison.

Apparently the drivers with short headways in the morning did not necessarily

TABLE 6
ACCIDENTS PER DRIVER BY AGE OF DRIVER

Age of Driver (years)	No. of Accidents	No. of Drivers	Accidents per Driver
Under 30	38	72	0.507
30-39	38	95	0.400
40-49	49	130	0.377
50-59	31	84	0.369
Over 59	8	35	0.229
Unknown	338	977	0.346
Totals	502	1393	0.360

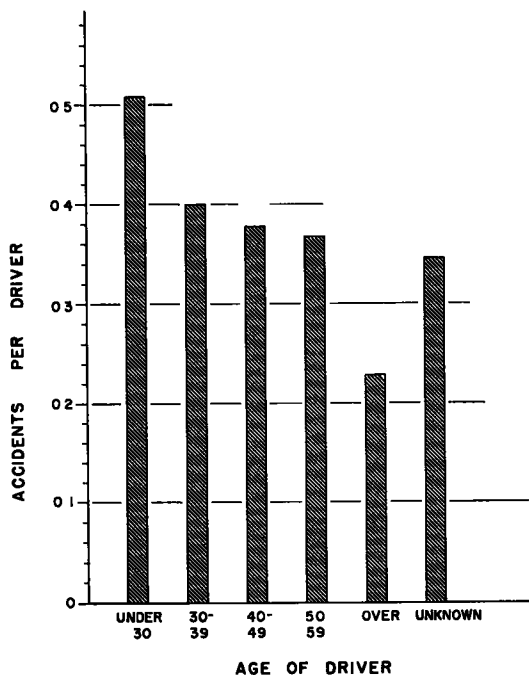


Figure 10. Accidents per driver (1950-1953) by age of driver.

have short headways in the afternoon, and vice versa, for the classification of the drivers by their minimum afternoon headways gives a different result from that described above. When the drivers are classified by their afternoon headways, there is no significant difference in accident rates between the various groups, and such variation as exists is in the opposite direction from the trend discussed in the preceding paragraph.

Age of Driver and Accidents

In Table 6 and Figure 10, the drivers are arrayed by their age, in 10-year groups, as reported from the post-card survey, according to accidents per driver. For each age group, the table gives the number of drivers, the number of accidents involving these drivers for the period of

TABLE 7

ACCIDENTS PER DRIVER BY MILES DRIVEN PER YEAR

Miles Driven per Year	No. of Accidents	No. of Drivers	Accidents per Driver
Under 5,000	28	100	0.280
5,000 - 10,000	47	125	0.376
10,000-15,000	42	102	0.412
Over 15,000	43	84	0.512
Unknown	342	982	0.348
Totals	502	1393	0.360

investigation, and the average number of accidents per driver. Although the accident rates decrease steadily for the increasing age groups of the drivers, a test of significance shows that the decrease may be entirely due to chance. The average accidents per driver for the known drivers shown in Table 6 is 0.390. It is only the drivers under 30 and over 59 years of age whose accident rates appear to differ appreciably from this average rate.

Annual Mileage and Accidents

A similar classification in which the drivers are grouped by their annual mileage, in 5,000 mile groupings, is presented in Table 7 and Figure 11. Here we find a steady increase in the accident rate with increasing annual mileage. This is to be expected, as exposure to accidents increases with the amount of travel. The average number of miles driven per year for the known drivers shown in Table 7 is about 10,000 miles per year. This relatively high mileage is to be expected, as the majority of the drivers are daily

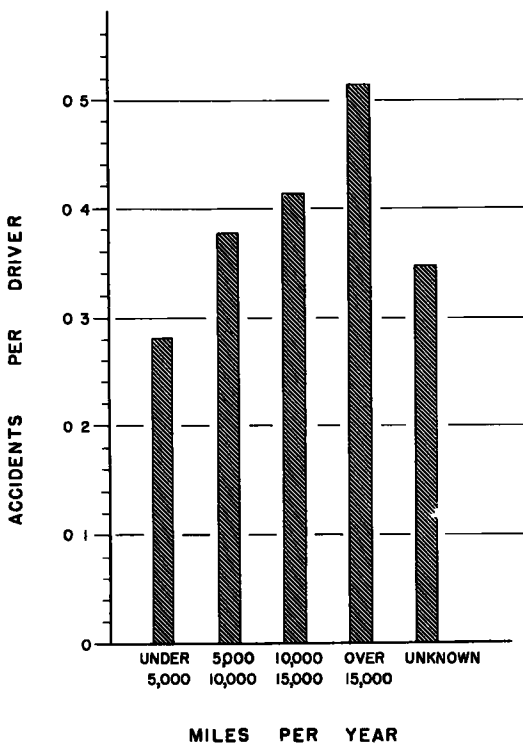


Figure 11. Accidents per driver (1950-1953) by annual mileage.

TABLE 8
ACCIDENTS PER DRIVER BY AGE OF CAR

Age of Car (Year)	No of Accidents	No of Drivers	Accidents per Drivers
0 - 3	230	536	0.429
4 - 6	102	336	0.304
7 - 12	83	228	0.364
13 & over	83	281	0.295
Unknown	4	12	0.333
Totals	502	1393	0.360

data had been stated more precisely or had covered the same period as the accident records. In fact, however, the drivers were simply asked to indicate which of the six mileage groups they belonged in, and the question was asked during the earlier part of the period covered by the accident survey.

Age of Car and Accidents

Table 8 has been prepared grouping all the cars observed in both years into four age-of-car groups. For each group are shown the number of drivers, the number of accidents involving these drivers for the period, and the average number of accidents per driver. Figure 12 illustrates the relation between accidents per driver in the four age groups of the cars.

It is noted from Figure 12 that the accident rates vary somewhat with the ages of the cars but that there is no consistent pattern to the variation. The highest accident rate is associated with the newer cars, while the lowest rate is associated with the older cars.

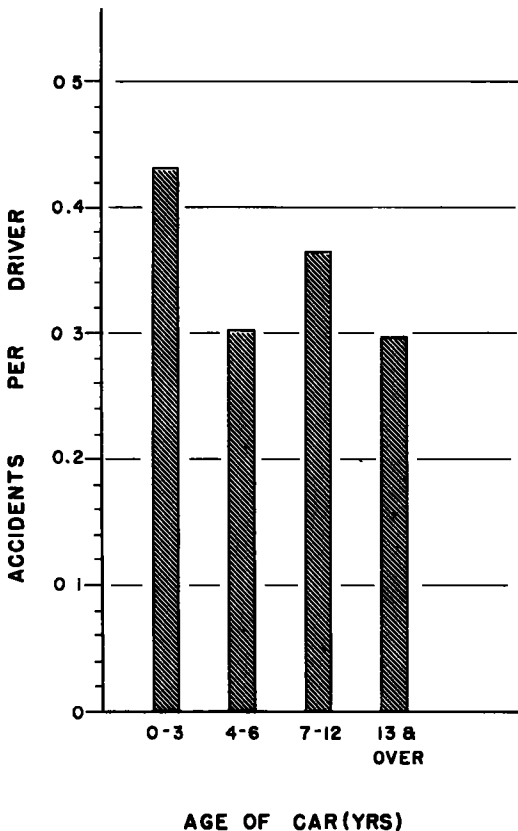


Figure 12. Accidents per driver (1950-1953) by age of car.

commuters. The accident rate per driver for those traveling over 15,000 miles per year is almost twice that for those traveling under 5,000 miles per year.

From this it follows that the high-mileage drivers have considerably fewer accidents per vehicle-mile than the low-mileage drivers. This point would be worth investigating further, if the mileage

RELATION OF ACCIDENTS TO ROAD AND LIGHT CONDITIONS AND ACCIDENT TYPE

Accidents by Road Condition and Light Condition

Table 9 lists the various conditions of the road surface upon which the accidents took place related to the light condition prevailing at the time. All of the listings are in terms of number of accidents. The road condition was missing from a total of 288 of the 502 accident records investigated. Information is not available to show the number of rainy, snowy, or icy days that prevailed during the period of accident reporting. Also, similar information about the traffic volumes during the different hours of the day is lacking. These data are necessary for a valid estimation of the accident producing qualities that each of the road and light conditions may contain.

It is noted that, of all the accidents reported under conditions of dry road surfaces, 71 percent occurred in daylight, or 33 percent of all the accidents for which the road condition was reported.

There were 61 accidents reported as occurring in daylight under conditions of wet, snowy, and icy road surfaces, or 29 percent of all the accidents for which the road condition was reported.

TABLE 9

ACCIDENTS BY ROAD CONDITION AND LIGHT CONDITION

Road Condition	Light Condition				Totals
	Light	Dawn or Dusk	Dark	Unknown	
Dry	71	6	24	-	101
Wet	20	2	17	-	39
Snowy	8	3	7	-	18
Icy	33	3	17	3	56
Unknown	165	11	77	35	288
Totals	297	25	142	38	502

Of all the accidents reported under conditions of dry road surfaces, 24 percent occurred on dark, unlighted highways.

This represents 11 percent of all the accidents for which the road condition was reported.

Accidents by Accident Type and Light Conditions

In Table 10, the accidents that were recorded during the period of investigation are classified by accident type (pedestrian, motor vehicle, etc.) according to the light condition existing at the time of the accident; 89 percent of the accidents involved collisions with other motor vehicles; 66 percent of the accidents for which the light condition was known occurred under daylight conditions and 29 percent occurred during hours of darkness. The daylight accidents predominate for most of the accident types; however, most of the accidents involving fixed objects occurred under dark conditions.

CONCLUSIONS

Relation of Accidents to Speeds

It appears that faster drivers have more accidents than slower drivers, especially when judged by their speeds in the afternoon. The individual speeds of the drivers with accident records are slightly higher than those for the drivers without accident records; while in the morning, it is the drivers without accident records whose speeds are slightly higher.

Relation of Accidents to Driver and Car Characteristics

It appears that drivers who have very short headways in the morning have more accidents than those who do not. No relation was found between afternoon headways and accident rates.

Higher accident rates are associated with younger drivers, larger amount of travel, and newer cars.

Relation of Accidents to Road and Light Conditions and Accident Type

The majority of the accidents of record, for which information was available, occurred on dry road surfaces, during daylight, and involved other vehicles. Accidents with fixed objects usually occurred during hours of darkness.

ACKNOWLEDGMENTS

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The files of the New York State Bureau of Motor Vehicles were searched for the accident data contained in this report by members of the staffs of Deputy Commissioners Victor F. Veness and James L. Cain.

Grateful appreciation is expressed for the assistance and advice given, in the preparation for the collection of the interview data, by George James, Walter Boek, William Beadenkopf, and Mrs. Adele Polan, of the New York State Health Department. The

TABLE 10

ACCIDENTS BY ACCIDENT TYPE AND LIGHT CONDITION

Accident Type	Light Condition				Totals
	Light	Dawn or Dusk	Dark	Unknown	
Pedestrian	14	2	2	1	19
Motor Vehicle	271	20	119	14	424
R. R. Train	1	-	1	-	2
Motorcycle	1	-	-	-	1
Fixed Object	2	1	17	-	20
Bicycle	4	-	1	-	5
Non Collision	2	2	1	-	5
Other Collisions	-	-	1	-	1
Unknown	2	-	-	23	25
Totals	297	25	142	38	502

collection of the interview data was supervised by Francis A. J. Ianni, of Russell Sage College, Troy, New York.

Appendix

Interview Data

Recently, a mutual interest in the subject of highway safety was explored by the New York State Department of Public Works and the Department of Health. In conferences with representatives of the Department of Public Works and the United States Bureau of Public Roads, the Department of Health's interest in the significance of the automobile accident, death and injury toll was developed into exploratory epidemiological field studies of accidents, using the home interview method, in the city of Oneonta and the natural trading area of Saratoga Springs³. These information and advisory conferences resulted in the feeling that a greater contribution could be made to the reduction of accidents if the talents of both departments were concentrated on a joint project.

Departmental approvals were obtained in early 1954 for a joint interview type of study directed toward the extension of the West Sand Lake Highway Study into the field of medical and social aspects of accidents.

OBJECTIVE

The objective of the home interview research was to acquire a knowledge about the relationship between the drivers observed on the West Sand Lake Highway and their driving behavior, medical and social characteristics, attitudes, accidents and the particular situation surrounding the accidents they had been involved in.

METHOD

The drivers for whom road measurements were taken in the summers of 1950 and 1951 on the West Sand Lake Highway, were divided into two groups for study. In one group were those drivers who had motor vehicle accidents of record with the Motor Vehicle Bureau from January 1, 1950 through December 31, 1953. This group contained over 400 drivers. The other group consisted of over 1,000 drivers who had not had a motor vehicle accident of record with the Motor Vehicle Bureau during this period.

Random selected for the interview were 300 drivers from the accident group with the most recent accident records and 300 drivers from the group with no-accident records. A third group consisting of 200 drivers (counterparts) who were involved in accidents with the accident group drivers completed the selection.

The schedule of questions from the Saratoga Springs research was the basis for developing the instrument to collect the interview data. It was modified to adequately cover these general areas.

1. Driving habits and experience: (a) amount of driving; (b) type of driving, when and where; (c) speed that interviewees report as usual for them on a rural highway.
2. Past history of accidents and traffic violations: (a) how many since started driving; (b) what type; and (c) frequency.
3. Description of accidents since January 1, 1946: (a) personal circumstances of driver just prior to accident and (b) description of accident.
4. Attitude on traffic regulations: (a) speed and (b) other.
5. Medical aspects: (a) use of alcohol and tobacco; (b) use of medication; and (c) state of health.
6. Social stress: (a) use of driving to relieve tension; (b) development of tension from driving; and (c) amount of worrying.
7. Other characteristics: (a) age; (b) sex; and (c) economic level.

Some 282 questions were used covering these areas.

The interviews were conducted during a 7-week period from July 15 to August 31, 1954, at the homes of drivers in the three groups. Most of the drivers resided in the

³A method of determining some epidemiological aspects of motor vehicle accidents, New York State Department of Health, Albany, N. Y., Public Health Reports, in press.

TABLE 11
PLANNED VERSUS COMPLETED INTERVIEWS

Reason for No Interview	Number
1 - Could not locate interviewee.	68
2 - Questionnaire not returned from counties outside of local area. ^a	57
3 - Interviewee on vacation.	48
4 - Refusal.	28
5 - Interviewee dead or paralyzed.	15
6 - Interviewee in armed service.	11
7 - Interviewee hospitalized.	8
8 - Interviewees from out of state	5
9 - Interviewee in prison	1
10 - Miscellaneous.	44
Total interview not completed	285
Total interviews completed	517
Total interviews planned for	802

^a The permanent addresses of 91 cases were scattered throughout the state. County health officers were contacted to complete these interviews.

ing 285 persons for a variety of reasons. Table 11 shows this category. It is to be noted that the cooperation of the individual was splendid. Only 28 of the drivers refused to be questioned.

The individual questionnaire items were coded and transferred to punch cards. Four cards were required for each completed questionnaire. An additional card was punched for each motor vehicle accident described by the interviewee. Tabulations were run from the cards, for each item for the accident group of drivers, the no-accident group of drivers and the counterpart drivers.

RESULTS

In addition to the objective of acquiring new knowledge, it is expected that the application of the findings will help to increase highway safety by the development of a general health and education program. It will also be valuable as a pretest for more extensive inter-departmental research.

To better understand the attributes of the drivers and to obtain a cross section of their more important characteristics and driving habits, items from pertinent areas of the questionnaire were selected for presentation and discussion at this time. Inasmuch as our primary interest lies in comparing the accident drivers with the no-accident drivers, the counterpart group of drivers have been omitted from the discussion. The counterpart group of drivers were interviewed to obtain a description of the accidents from both drivers involved.

The related data for the accident and no-accident groups of drivers are presented under five headings: (1) general characteristics of the drivers, (2) exposure, (3) speed, (4) skill, and (5) safety-mindedness. The last four headings cover the factors that generally are recognized as determining a driver's possible susceptibility to accidents. Tables 12 through 27 present the statistical data from the questionnaires for the accident and no-accident drivers. Bar diagrams have been prepared to illustrate these data. The analysis includes 161 accident drivers and 196 no-accident drivers.

General Characteristics of the Drivers

Sex. Table 12 shows the composition of the sample by sex for each group of drivers, and Figure 13 depicts the percentage of the drivers by sex in each group. The percentage of males is slightly lower in the no-accident group than in the accident group while the percentage of females in the no-accident group is about twice that in the accident group. In the sample, 85 per-

Capital Area in the vicinity of Albany. Those who resided in other counties were contacted by arrangements made by the health department with their local county health officers.

The interviewing was done, under the supervision of Francis Ianni, by senior students of the Sociology Department Russell Sage College. The interviews followed a constant pattern which was specified in detail in a questionnaire schedule. Pre-testing of the questions was conducted by personnel of the Health and Public Works Departments.

Interviews were successfully obtained for 517 of the 802 individuals planned for. Interviews were not obtained on the remain-

TABLE 12
INTERVIEW DATA-SEX OF DRIVERS WITH AND WITHOUT
MOTOR VEHICLE ACCIDENT RECORDS

Sex	Accident Drivers ^a		No-Accident Drivers ^b	
	Number	Percent	Number	Percent
Male	145	90.1	160	81.6
Female	16	9.9	36	18.4
Totals	161	100	196	100

^a In Tables 12-27 this heading refers to drivers for whom there were records of motor vehicle accidents in the three years 1951-1953.

^b In Tables 12-27 this heading refers to drivers for whom there was no record of any motor vehicle accidents in the four years 1950-1953.

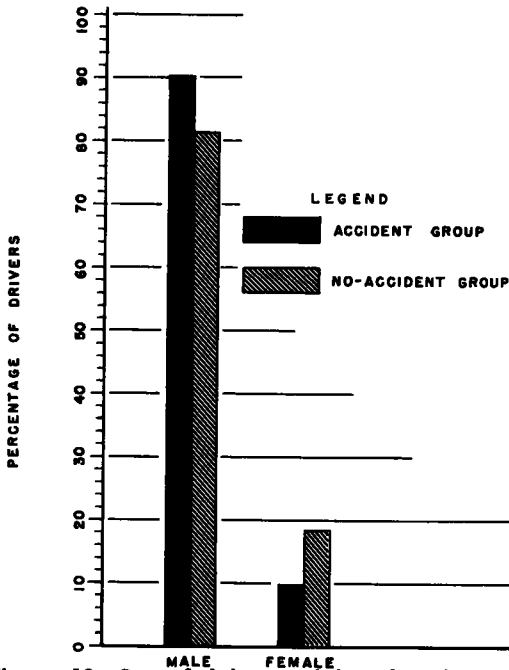


Figure 13. Sex of drivers with and without motor-vehicle-accident records.

drivers was computed for several age groups. The suggestion from that table that older drivers had lower accident rates seems to conflict with the fact that the accident group is older on an average than the no-accident group.

In attempting to explain the difference between the two tables, it may be noted that in the earlier table it is only the drivers under 30 and over 59 whose accident rates appear to differ appreciably from the average. Moreover, it is not the same group of drivers whose characteristics are compared in the two tables. The age distribution in Table 6 involves only those drivers who were observed in 1951 and answered the postal car questionnaire, while the drivers listed in Table 13 included many who were not in this group.

Motor-Vehicle-Accident History of Drivers. In order to determine what proportion of the drivers had been involved in motor-vehicle accidents and the relative number of accidents for each group of drivers, information was collected pertaining to the number of motor vehicle accidents, regardless of type, that they had been involved in during their lifetime up to the present date. Table 14 shows this information. This statistical record was extended to collecting the details of each postwar motor vehicle accident reported as occurring since the first of January 1946.

There were 262 motor vehicle accidents reported for the no-accident drivers. The rate for the accident group is 1.6 and it is 0.8 for the no-accident group. Figure 15 depicts the percentage distribution of the drivers for each group according to their

cent were males and 15 percent were females.

Age Distribution of Drivers. The composition of the sample by age for each group of drivers is shown in Table 13. Figure 14 depicts the percentage of the drivers for each group by age groups. About 3 percent of the drivers were under age 25 in both the accident and no-accident groups. About 5 percent of the drivers in each group were over 65 years of age. The median age is 47 years in the accident group and 44 years in the no-accident group.

The age distribution for the sample when compared with the driving population of upstate New York⁴ shows that those drivers 30 years of age or under comprise 11 percent of the sample distribution and 26 percent of the upstate while the sample shows a 32 percent distribution for the drivers between the ages of 41 to 50 as compared to a 21 percent distribution for the upstate.

It is of interest to compare this distribution with the one presented in Table 6, where the average number of accident

TABLE 13
INTERVIEW DATA-AGES OF DRIVERS WITH AND WITHOUT
MOTOR VEHICLE ACCIDENT RECORDS

Age of Driver Years	Accident Drivers		No-Accident Drivers	
	Number	Percent	Number	Percent
Under 21	1	.6	1	.5
21 - 25	4	2.5	5	2.6
26 - 30	10	6.2	17	8.7
31 - 35	18	11.3	25	12.8
36 - 40	25	15.5	32	16.3
41 - 45	15	9.3	26	13.3
46 - 50	25	15.5	41	20.9
51 - 55	25	15.5	16	8.2
56 - 60	15	9.3	11	5.6
61 - 65	13	8.1	7	3.5
66 - 70	7	4.4	7	3.5
Over 70	2	1.2	3	1.5
Not Stated	1	.6	5	2.6
Totals	161	100	196	100
	Median Age 47		Median Age 44	

⁴Based on a sample of licenses of drivers registered with the New York State Bureau of Motor Vehicles in upstate New York for 1954.

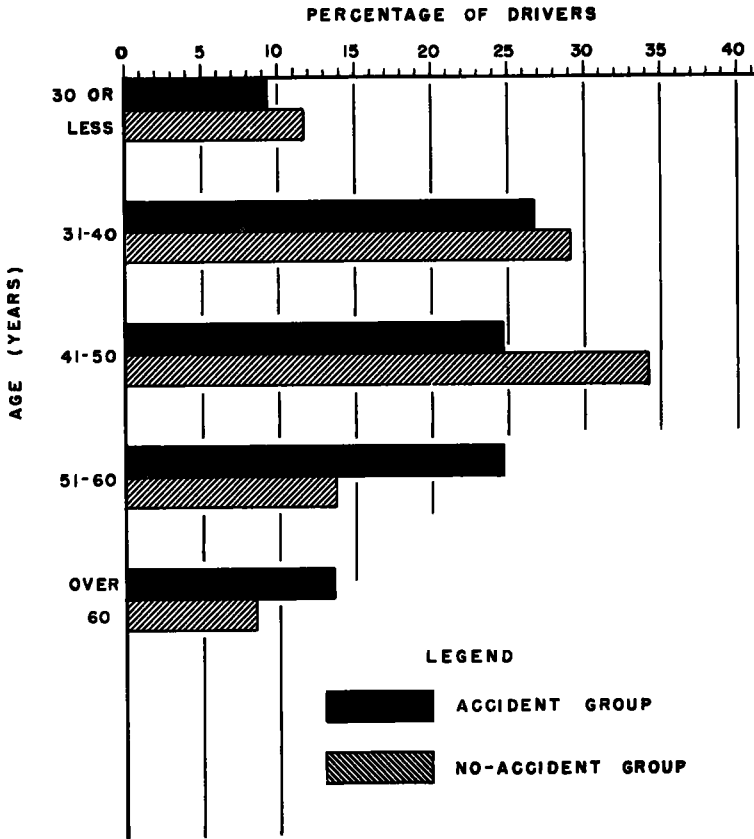


Figure 14. Age distribution of drivers.

accident history. It is to be noted that 13 percent of the accident drivers reported no accidents to the interviewers, although the Motor Vehicle Bureau records show accidents involving them in the period from January 1, 1951, to December 31, 1953.

From the details of the motor-vehicle accidents described to the interviewers as occurring since January 1, 1946, about two thirds happened on regular working days and a third on days off from work. Nearly 90 percent occurred on routes traveled frequently.

Non-Motor-Vehicle Accidents Since January 1946. In an attempt to show the relation between motor-vehicle and non-motor-vehicle accidents for the two groups of drivers, information was collected pertaining to the number of non-motor-vehicle accidents which kept the interviewees from work or their normal activities for a day or more. Table 15 shows the number and percentage of accident drivers and no-accident drivers with non-vehicle accidents and those with one or two since January 1946. Figure 16 depicts the percentage distribution of the drivers for each group according to the number of accidents. It is interesting to note that, although the total number of non-vehicle accidents for

TABLE 14
INTERVIEW DATA-MOTOR VEHICLE ACCIDENTS IN LIFETIME OF DRIVERS WITH AND WITHOUT MOTOR VEHICLE ACCIDENT RECORDS

Number of Motor Vehicle Accidents in Entire Lifetime as Reported to Interviewer.	Accident Drivers ^a		No-Accident Drivers ^b	
	Number	Percent	Number	Percent
None	21	13.0 ^c	94	48.0
One	65	40.5	59	30.1
Two	36	22.4	20	10.2
Three	24	14.9	12	6.1
Four	7	4.3	4	2.0
Five	5	3.1	1	.5
Not Stated	3	1.8	6	3.1
Total Drivers	161	100	196	100
Total Accidents	262		156	
Accidents per Driver	1.6		.8	

^a In Tables 12-27 this heading refers to drivers for whom there were records of motor vehicle accidents in the three years 1951 - 1953.

^b In Tables 12-27 this heading refers to drivers for whom there was no record of any motor vehicle accidents in the four years 1950 - 1953.

^c These drivers reported no accidents to the interviewer, although the Motor Vehicle Bureau records show accidents involving them in 1951 - 1953.

each group of drivers is only about 10 percent of the corresponding number of lifetime motor-vehicle accidents (Table 14), in each case the rate of accidents per driver for the accident drivers is twice that of the corresponding rates for the no-accident drivers.

Years of Driving Experience. In Table 16, driving experience is examined for each group of drivers. These data were based upon the question: "When did you first drive

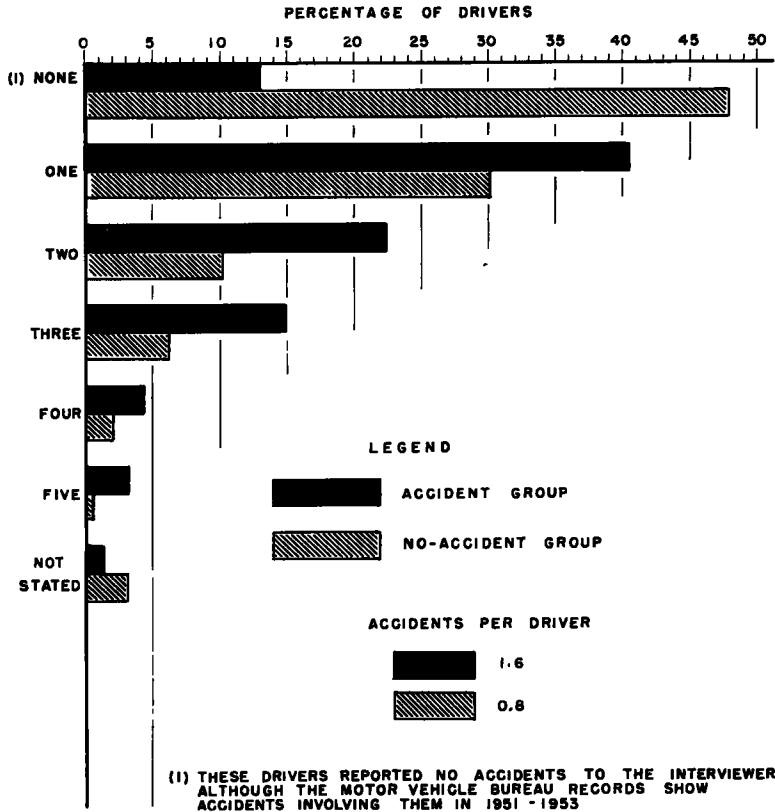


Figure 15. Motor vehicle accidents in lifetime of drivers.

a car?" Additional questions were asked about the number of years in which no driving was done in order to make an estimate of the number of years of actual driving. The average number of years of driving experience for the accident drivers is 26 years, dating back to 1928, and for the no-accident drivers, it is 24 years, dating back

TABLE 15

INTERVIEW DATA-NON-MOTOR VEHICLE ACCIDENTS
SINCE JANUARY 1946 FOR DRIVERS WITH AND WITHOUT
MOTOR VEHICLE ACCIDENT RECORDS.
FROM OCTOBER 1949 THROUGH 1953

Non-Motor Vehicle Accidents	Accident Drivers		No-Accident Drivers	
	Number	Percent	Number	Percent
None	134	83.2	173	88.3
One	22	13.7	15	7.6
Two	2	1.2	-	-
Not Stated	3	1.9	8	4.1
Total Drivers	161	100	196	100
Total No. Accidents	26		15	
Accident per Driver	.16		.08	

TABLE 16

INTERVIEW DATA-YEARS OF DRIVING EXPERIENCE FOR
DRIVERS WITH AND WITHOUT MOTOR VEHICLE
ACCIDENT RECORDS

Driving Experience Number of Years	Accident Drivers		No-Accident Drivers	
	Number	Percent	Number	Percent
Less than 4	2	1.3	1	.5
5 - 9	6	3.7	13	6.6
10 - 14	22	13.7	19	9.7
15 - 19	14	8.7	25	12.8
20 - 24	24	14.9	38	19.4
25 - 29	30	18.6	42	21.4
30 - 34	28	17.4	25	12.7
35 - 39	25	15.5	17	8.7
Over 39	10	6.2	15	7.7
Not Stated	-	-	1	.5
Totals	161	100	196	100
Ave. No. of Years	26		24	

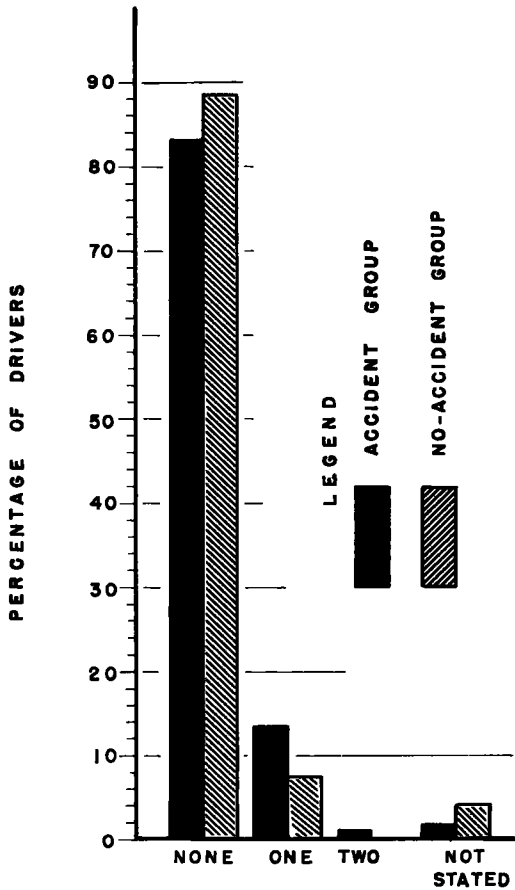


Figure 16. Non-motor-vehicle accidents since January 1946 for drivers.

to 1930. This is to be expected from the age distributions of the two groups.

Smoking. In the area of social characteristics, an attempt was made to find out something about the smoking habits of the drivers. In Table 17 and Figure 17, the smoking habits for the accident and no-accident groups are examined. These data were based upon the question: "Do you smoke? If no, did you ever smoke?" and "Why did you happen to stop?" A far larger proportion of the accident drivers than the no-accident drivers are smokers. Based on a chi-square test and a 5-percent level for statistical significance, a smaller proportion of the accident drivers than the no-accident drivers never smoked.

These data were further examined to see whether the apparent conclusion about smoking might be simply a reflection of the higher proportion of men in the accident group. On the extreme assumption that all the women are non-smokers, it

TABLE 17
INTERVIEW DATA-SMOKING RECORD FOR DRIVERS
WITH AND WITHOUT MOTOR VEHICLE ACCIDENT
RECORDS

Description of Smoking	Accident Drivers		No-Accident Drivers	
	Number	Percent	Number	Percent
Smokes now	122	75.8	106	54.1
Does not smoke now but used to smoke	21	13.0	25	12.8
Does not smoke now and never smoked	17	10.6	63	32.1
Not Stated	1	.6	2	1.0
Totals	161	100	196	100

still remains true that there are significantly more smokers in the accident group than in the no-accident group.

Miscellaneous. From the information collected under the general health section of the interview, it is of interest to note that fewer than 10 percent of the drivers in each group claimed any difficulty in hearing. Three of the drivers in the accident group and two in the no-accident group use hearing aids most of the time. In answer to the question, "Have you ever had any emotional illness?" fewer than 3 percent of the drivers in each group claimed any emotional illness.

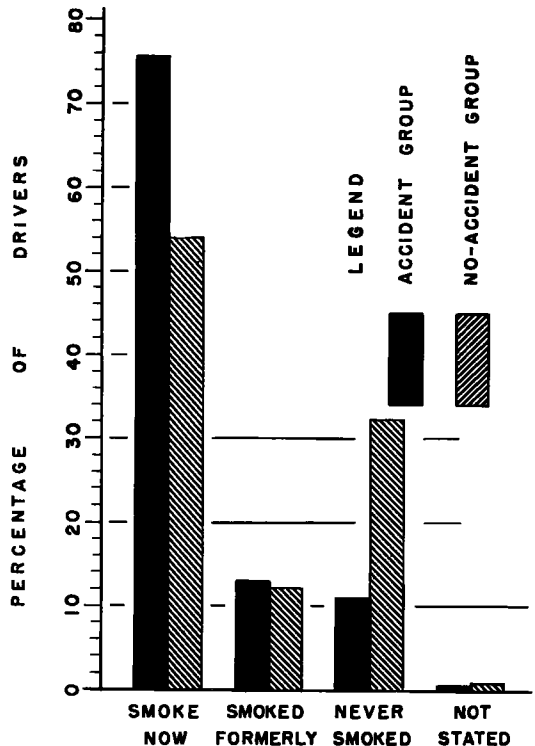


Figure 17. Smoking record for drivers.

Exposure

Annual Mileage. Table 18 presents for each group of drivers the number of miles the individual stated he had driven during the past year. Wide variations exist within each

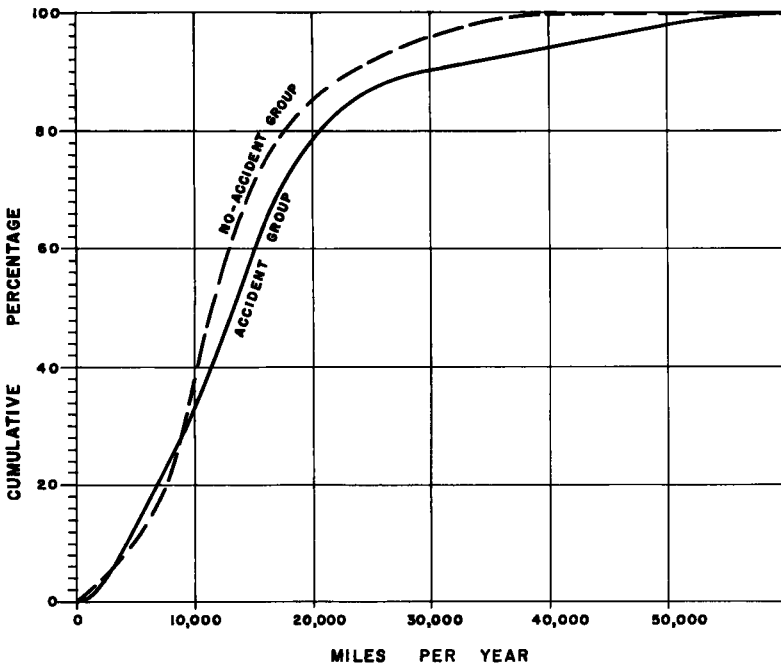


Figure 18. Distributions of miles driven in year preceding interview.

group. The median number of miles for the accident group of drivers is 12,000 miles per year. It is slightly lower for the no-accident group, at 11,000 miles per year. These two estimated average annual mileages are considerably higher than the national estimated average of 8,000 miles per driver⁵. This is to be expected as the

TABLE 18

INTERVIEW DATA-MILES DRIVEN IN YEAR PRECEDING INTERVIEW FOR DRIVERS WITH AND WITHOUT MOTOR VEHICLE ACCIDENT RECORDS

Miles Driven Preceding Year	Accident Drivers		No-Accident Drivers	
	Number	Percent	Number	Percent
Under 1,000	1	.6	4	2.0
1,000 - 5,000	20	12.4	15	7.7
5,000-10,000	31	19.3	52	26.5
10,000-15,000	43	26.7	62	31.6
15,000-20,000	31	19.3	28	14.3
20,000-25,000	14	8.7	11	5.6
25,000-30,000	5	3.1	8	4.1
30,000-40,000	6	3.7	7	3.6
40,000-50,000	7	4.3	-	-
Over 50,000	3	1.9	1	.5
Did not drive	-	-	1	.5
Not stated	-	-	7	3.6
Totals	161	100	196	100
Median Miles	12,000		11,000	

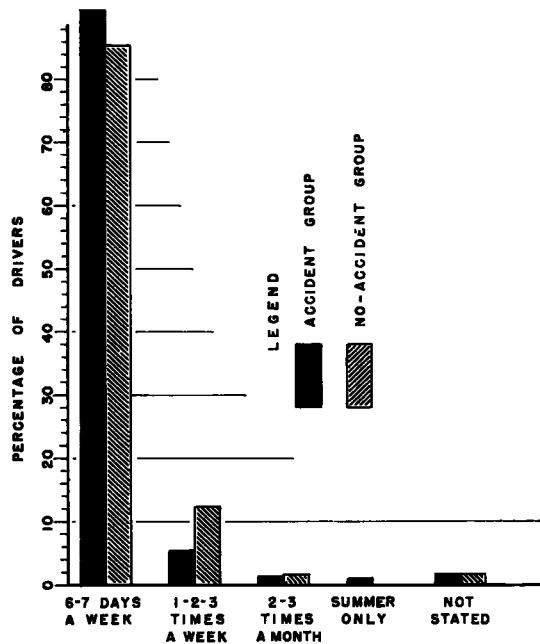


Figure 19. Frequency of driving.

⁵Accident Facts - Page 43, 1953 edition published by the National Safety Council.

TABLE 19

INTERVIEW DATA-FREQUENCY OF DRIVING FOR DRIVERS WITH AND WITHOUT MOTOR VEHICLE ACCIDENT RECORDS

Frequency of Driving	Accident Drivers		No-Accident Drivers	
	Number	Percent	Number	Percent
6-7 days a week	146	90.8	167	85.3
1, 2, 3 times a week	9	5.6	22	11.2
2-3 times a month	2	1.2	3	1.5
Summer only	1	.6	-	-
Does not drive now	1	.6	1	.5
Not stated	2	1.2	3	1.5
Totals	161	100	196	100

majority of the drivers are daily commuters. Figure 18 depicts for each group of drivers the distribution of the miles driven in the year preceding the interview.

Frequency of Driving. In Table 19 an examination is made of the frequency of driving for each group of drivers. Figure 19 depicts the percentage distribution of the drivers in each group according to their frequency of driving. Most of the drivers in each group use their cars nearly every day.

Speed

Opinion of Own Driving Speed. In Table 20, examination is made of each group of drivers' opinion of their own driving speed. These data are based upon the question: "What kind of a driver do you consider yourself, would you say that you are a slow or a fast driver?" About 70 percent of the drivers in each group consider their driving speeds as representative of the average driver on the road. Equal percentages

of the accident drivers, about 16 percent in each case, consider their driving speeds slower or faster than the average. A greater percentage of the no-accident drivers consider their driving speeds slower rather than faster than the average. Figure 20 presents the percentage distribution of these data.

The average of the observed speeds at the tangents of the West Sand Lake highway study was computed for the accident and no-accident drivers in each of the three

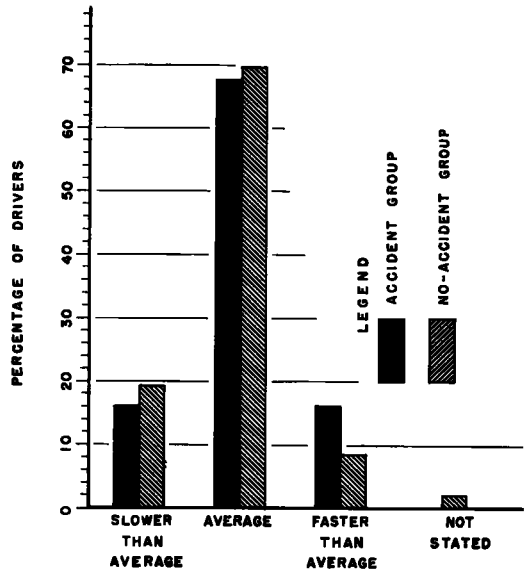


Figure 20. Opinion of own driving speed.

TABLE 20

OPINION OF OWN DRIVING SPEED FROM INTERVIEW AND AVERAGE OF RECORDED SPEEDS AT TANGENTS OF STUDY SITE FOR DRIVERS WITH AND WITHOUT MOTOR VEHICLE ACCIDENT RECORDS

Degree of Speed	Accident Drivers			No-Accident Drivers		
	Number	Percent	Average ^a Speed at Tangents mph.	Number	Percent	Average ^a Speed at Tangents mph.
Slower than average	26	16.1	44.0	38	19.4	42.0
Average	109	67.8	44.2	137	69.9	44.2
Faster than average	26	16.1	44.3	17	8.7	44.9
No opinion	-	-	-	1	.5	-
Not stated	-	-	-	3	1.5	-
Totals	161	100	44.2	196	100	43.8

^a Average of observed speed for Group of Drivers at Stations 1 and 4 of Speed Study Combined.

TABLE 21

USUAL SPEED ON LONG TRIPS (FROM INTERVIEW) AND AVERAGE OF RECORDED SPEEDS AT TANGENTS OF STUDY SITE FOR DRIVERS WITH AND WITHOUT MOTOR VEHICLE ACCIDENT RECORDS

Speed on long trips mph.	Accident Drivers			No-Accident Drivers		
	Number	Percent	Average ^a Speed at Tangents mph.	Number	Percent	Average ^a Speed at Tangents mph.
Less than 37	4	2.5	For all drivers in this group	1	.5	For all drivers in this group
37 - 41	10	6.2		13	6.6	
42 - 46	17	10.6		20	10.2	
47 - 51	78	48.4		108	55.1	
52 - 56	28	17.4		28	14.3	
57 - 61	14	8.7	44.2	16	8.2	43.8
62 - 66	3	1.9	mph.	2	1.0	mph.
67 - 71	2	1.2		-	-	
Not stated	5	3.1		8	4.1	
Totals	161	100		196	100	
Median Speed	50 mph.			49 mph.		

^a Average of observed speed for Group of Drivers at Stations 1 and 4 of Speed Study Combined.

opinion categories of degree of speed (Table 20). It is to be noted that the judgement of the drivers, as to their category of degree of speed, is properly related to the corresponding average of the observed speeds at tangents. The average of the observed speeds at tangents for those drivers who consider themselves to be "average speed drivers" is 44.2 mph.

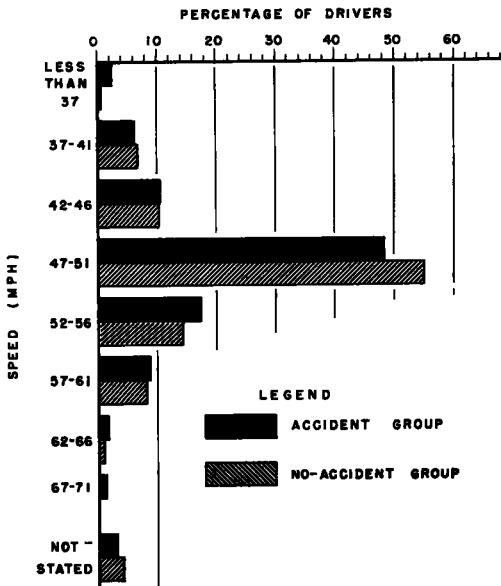


Figure 21. Usual speed on long trips.

Usual Speed on Long Trips. In Table 21, the usual speeds that the interviewees stated they drove on long trips, on the open road are shown for both groups of drivers. A trip of 50 miles or more was defined as a long trip. The median speed for accident and no-accident drivers is about 50 mph. The average of the observed speeds at tangents for each group of drivers is shown. It is noted that about 30 percent of the drivers in each group stated that they exceed the 50-mph. legal speed limit. This agrees with the percentage of passenger cars exceeding the 50-mph. speed limit as indicated by the state-wide speed study⁶. Figure 21 depicts the percentage distribution of the drivers according to 5-mile groupings of the stated speed on long trips.

Opinion of 50-mph. Speed Limit. In Table 22 and Figure 22, the opinion of the interviewees as to the New York State speed limit is examined for both groups of drivers. Over 70 percent of both groups of drivers

⁶ Speed characteristics on rural highways, New York State Department of Public Works in cooperation with the United States Bureau of Public Roads.

TABLE 22

INTERVIEW DATA-OPINION OF 50 MPH. SPEED LIMIT ON OPEN HIGHWAY FOR DRIVERS WITH AND WITHOUT MOTOR VEHICLE ACCIDENT RECORDS

50 mph Speed Limit on Open Highway	Accident Drivers		No-Accident Drivers	
	Number	Percent	Number	Percent
Too high	15	9.3	13	6.6
Too low	20	12.4	19	9.7
About right	114	70.8	154	78.6
No opinion	12	7.5	10	5.1
Totals	161	100	196	100

are of the opinion that the legal speed limit of 50 mph. is about right.

Skill

Opinion of Own Driving Skill. In Table 23 and Figure 23, examination is made of each group of drivers' opinion of their own driving skill. About 50 percent of the drivers in each group consider themselves as relatively skillful drivers. About 30 percent of the drivers in each group considered themselves as about average drivers; 16 percent of the accident drivers and about 12 percent of the no-accident drivers consider themselves as better than average drivers. Very few of the drivers consider themselves below average.

Instructor When First Learning to Drive. In Table 24 and Figure 24, the drivers in each group are classified according to who taught them to drive. Very few of the drivers in either group received professional instruction. About 65 percent were taught to drive by a friend or relative, and about 25 percent taught themselves. Among people learning to drive today, the portion learning without professional instruction is probably much lower.

Number of Times Driver Examination Was Taken. In Table 25 and Figure 25, an examination is made for each group of drivers of the number of times a driver test had to be taken in order to receive a driving license. Of the drivers who took examinations, 77 percent of the accident group and 83 percent of the no-accident group passed the test the first time. The difference between these percentages is not statistically significant.

About 14 percent of all the drivers never took a driver examination. These are the drivers who obtained their driving licenses before an examination was required by statute.

Safety Mindedness

Drowsiness while Driving. When asked about drowsiness while driving, nearly 50

TABLE 23

INTERVIEW DATA-OPINION OF OWN DRIVING SKILL FOR DRIVERS WITH AND WITHOUT MOTOR VEHICLE ACCIDENT RECORDS

Degree of Skill	Accident Drivers		No-Accident Drivers	
	Number	Percent	Number	Percent
Skillful	80	49.8	104	53.1
Better than average	26	16.1	24	12.2
About average	52	32.3	56	28.6
Below average	1	.6	4	2.0
Not stated	2	1.2	8	4.1
Totals	161	100	196	100

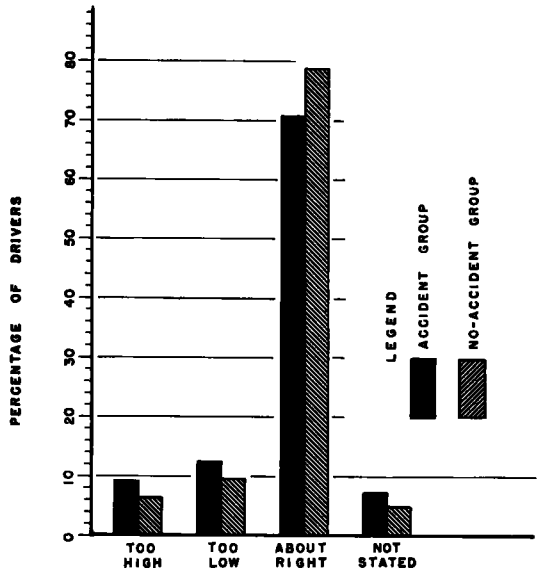


Figure 22. Opinion of 50-mph. speed limit on open highways.

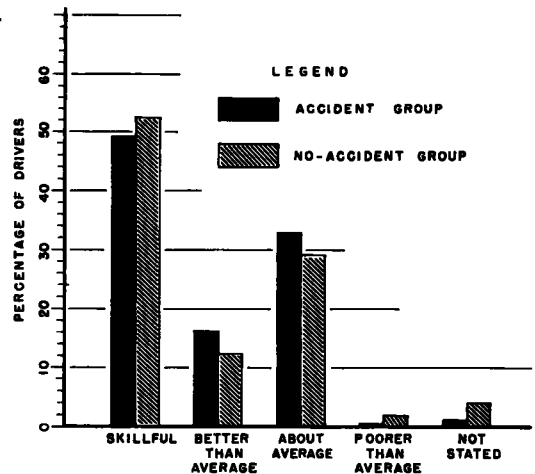


Figure 23. Opinion of own driving skill.

TABLE 24

INTERVIEW DATA-INSTRUCTOR WHEN FIRST LEARNING TO DRIVE FOR DRIVERS WITH AND WITHOUT MOTOR VEHICLE ACCIDENT RECORDS

Instructor when Learning to Drive	Accident Drivers		No-Accident Drivers	
	Number	Percent	Number	Percent
Friend or relative	95	59.0	130	66.3
Self	50	31.1	48	24.5
Commercial Driving School	8	4.9	4	2.0
Auto dealer	4	2.5	6	3.1
Army	3	1.9	2	1.0
Not stated	1	.6	6	3.1
Totals	161	100	196	100

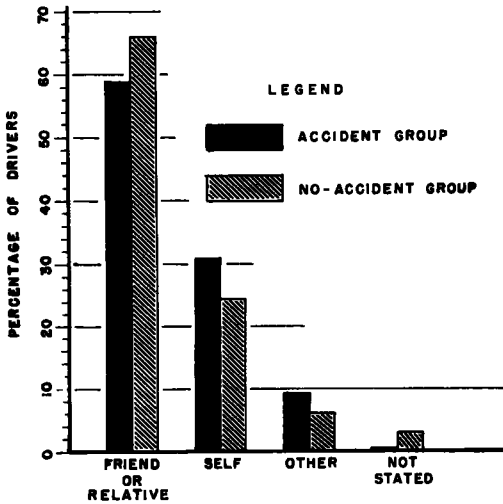


Figure 24. Instructor when first learning to drive.

TABLE 26

INTERVIEW DATA-REASONS FOR BECOMING DROWSY WHILE DRIVING FOR DRIVERS WITH AND WITHOUT MOTOR VEHICLE ACCIDENT RECORDS

Reasons for Becoming Drowsy	Accident Drivers		No-Accident Drivers	
	Number	Percent	Number	Percent
Don't get drowsy	77	47.3	100	48.1
Long trips	27	16.6	27	13.0
Tired, fatigued at start	24	14.7	27	13.0
Driving over familiar road	5	3.1	4	1.9
Straight, monotonous road	5	3.1	10	4.8
Lack of sleep	7	4.3	9	4.3
Excessive heat, hot days	3	1.8	9	4.3
Eye strain	1	.6	-	-
Humming of motor	2	1.2	2	1.0
After drinking	-	-	1	.5
Night driving	3	1.8	1	.5
Long night trips	-	-	5	2.4
Other	2	1.2	3	1.4
Not stated	7	4.3	10	4.8
Totals	163	100	208	100
Total drivers with reasons	77		86	
Total reasons	79		98	
Drivers Interviewed	161		196	

TABLE 25

INTERVIEW DATA-NUMBER OF TIMES DRIVER EXAMINATION WAS TAKEN FOR DRIVERS WITH AND WITHOUT MOTOR VEHICLE ACCIDENT RECORDS FROM OCTOBER 1949 THROUGH 1953

Times Driver Examination Was Taken	Accident Drivers		No-Accident Drivers	
	Number	Percent	Number	Percent
Once	100	62.1	144	73.5
Twice	26	16.2	25	12.8
Three times	3	1.9	3	1.5
Five times	1	.6	-	-
Six times	-	-	1	.5
Never took an exam	29	18.0	20	10.2
Not stated	2	1.2	3	1.5
Totals	161	100	196	100
Average		1.04 Times		1.08 Times

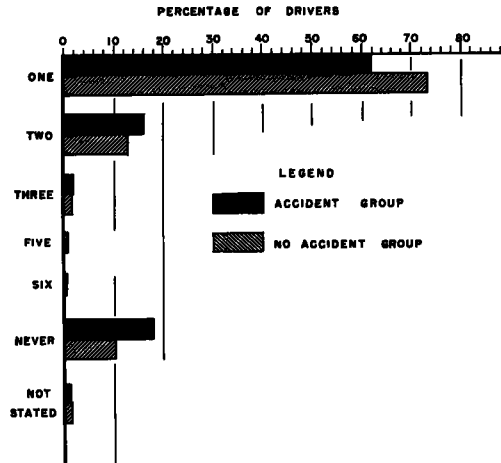


Figure 25. Number of times driver examination was taken.

percent of the drivers in each group claimed they do not get drowsy, as shown in Table 26 and Figure 26. About 15 percent of the drivers for both groups indicated that they had become drowsy on long trips, and about 14 percent said they become drowsy when they were fatigued at the start of trip. The balance of the drivers advanced other reasons for becoming drowsy.

Driving Speed after Drinking. In an attempt to explore driving speeds and the use of alcohol, the interviewees were asked how they thought their speeds were affected by drinking. Table 27 lists the answers for each group of drivers and Figure 27 shows the percentage distribution. About 45 percent of all drivers interviewed claimed that they do not drink before driving. About 20 percent of both the accident and no-accident drivers indicated no change in driving speed after drinking. Of the remaining drivers, more think they drive

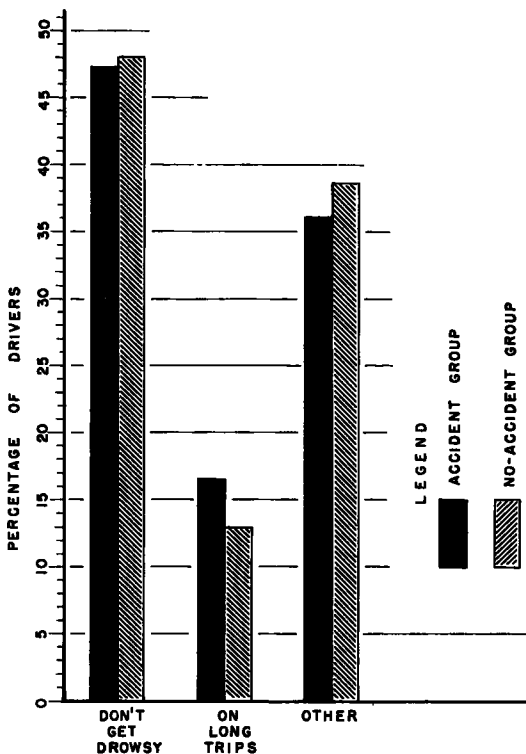


Figure 26. Reasons for becoming drowsy while driving.

slower after drinking than those who think they drive faster.

SUMMARY

General Characteristics of the Drivers

This analysis is based on data from 161 accident drivers (motor-vehicle-accident records from January 1, 1951, through December of 1953) and 196 no-accident

drivers (no motor-vehicle-accident records from October 1, 1949 through December 1953) whose speeds and headways were observed on the West Sand Lake Highway in 1950 and 1951. There is a higher proportion of men in the accident group than in the no-accident group. The ratio of females to males in the total sample is 1 to 6. The drivers in the accident group have a lifetime accident rate of 1.6 accidents per driver and in the no-accident group the rate is 0.8 accidents per driver.

Of accidents described to interviewers, about two thirds occurred on working days and a third on days off from work. Nearly 90 percent of the accidents occurred on routes traveled frequently. The average driving experience for the accident drivers dates back to 1928 and to 1930 for the no-accident drivers. Fewer than 10 percent in each group claim any difficulty in hearing, and fewer than 3 percent in each group claim any emotional illness.

Exposure

The accident drivers drive an average of 12,000 miles per year and the no-accident driver, 11,000 miles per year. Most of the drivers in each group use their cars nearly every day.

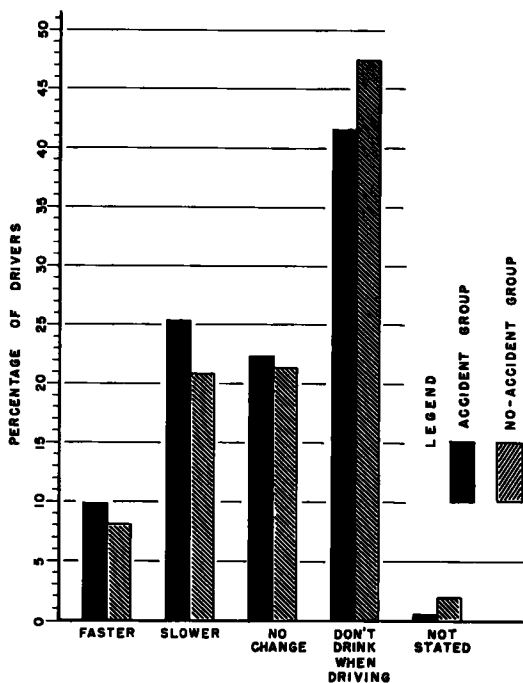


Figure 27. Opinion of driving speed after drinking.

TABLE 27

INTERVIEW DATA-DRIVING SPEEDS AFTER DRINKING FOR DRIVERS WITH AND WITHOUT MOTOR VEHICLE ACCIDENT RECORDS

Driving Speed after Drinking	Accident Drivers		No-Accident Drivers	
	Number	Percent	Number	Percent
Faster	16	9.9	16	8.2
Slower	41	25.5	41	20.9
No change	36	22.4	42	21.4
Does not drink when driving	67	41.6	93	47.5
Not stated	1	.6	4	2.0
Totals	161	100	196	100

Speed

About 70 percent of the drivers in each group consider their driving speed as representative of the average driver on the road; 30 percent of the drivers in each group claim they often exceed the 50-mph. legal speed limit on trips. About 20 percent of the drivers in each group are of the opinion that the speed limit is too low.

Skill

Some 50 percent of the drivers in each group consider themselves as relatively skillful drivers, and 30 percent consider themselves as good as the average, with most of the balance considering themselves better than the average. A great majority of the drivers in both groups passed their driving examination the first time. Very few of the drivers received professional instruction.

Safety Mindedness

Nearly half of the drivers in each group claim they do not get drowsy while driving. About 45 percent say they do not drive after drinking. More of the drivers think they drive more slowly after drinking than those who think they drive faster.