

NATIONAL TRANSPORTATION SAFETY BOARD

SPECIAL STUDY

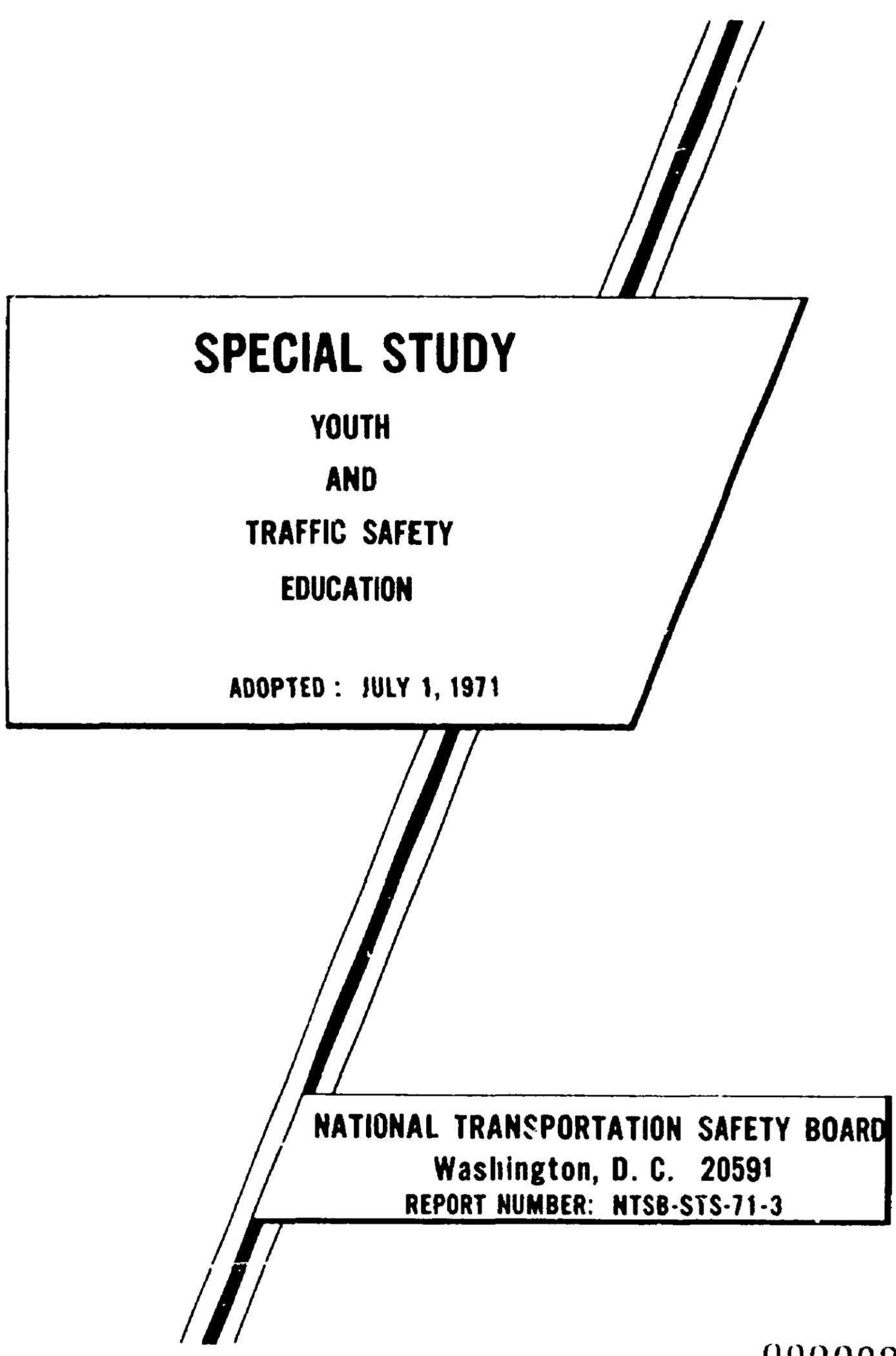
YOUTH
AND
TRAFFIC SAFETY
EDUCATION



NATIONAL TRANSPORTATION SAFETY BOARD
Washington, D. C. 20591

REPORT NUMBER: NTSB-STS-71-3

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ADOPTED : JULY 1, 1971

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<p>16. Abstract</p> <p>The status of knowledge is reviewed and possible reasons for the high death rate discussed; the high involvement of alcohol is shown. The presently unknown safety value of current programs of instruction is noted. The need for instruction of youth and for adult supervision and monitoring of new young drivers for extended periods after licensing is discussed. The central role of the driver licensing function is examined and the potential role of driver improvement programs. The relevant activities of NHTSA are reviewed and the need for integrated efforts focused on young drivers emphasized.</p> <p>Seven recommendations are directed to NHTSA, focusing on (a) a diagnostic approach to driver preparation, to driver licensing, and to driver improvement programs; (b) efforts in the Alcohol Safety Education Programs; (c) possible approaches to evaluation of driver education programs; (d) extension and improvement of current examinations for licensing; and (e) integration of efforts of State agencies. An eighth recommendation is made to the YOUTHS group and asks that group to find ways to develop an individual appreciation of their highway losses as the major threat to survival into adulthood. An extensive bibliography is included.</p>			
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YOUTH AND TRAFFIC SAFETY EDUCATION

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YOUTH AND TRAFFIC SAFETY EDUCATION

I. Background and Magnitude of the Problem

Drivers between the ages of 15 and 24 years have long been involved in death on the highway, far in excess of their proportionate numbers or their use of automobiles (2).^{*} These disproportionate losses fall upon not only the youth, but also upon other groups in the population which encounter youthful drivers on the highway. Highway accidents cause approximately half of all deaths among youth in this age range (2). In 1969, their total of highway fatalities was 17,700, and the elevated death rate for this age group reflected an excess loss of some 7,400 young lives; that is, there were 7,400 more fatalities among youth than would have occurred if their fatality rate were the same as that of persons aged 25 and older (2). The excess loss of 7,400 thus represents 42 percent of the total loss in the 15 to 24 age group. This excess loss also is 33 percent more than all the transportation fatalities in aviation, marine, railroad, pipeline and grade crossings combined for that year.

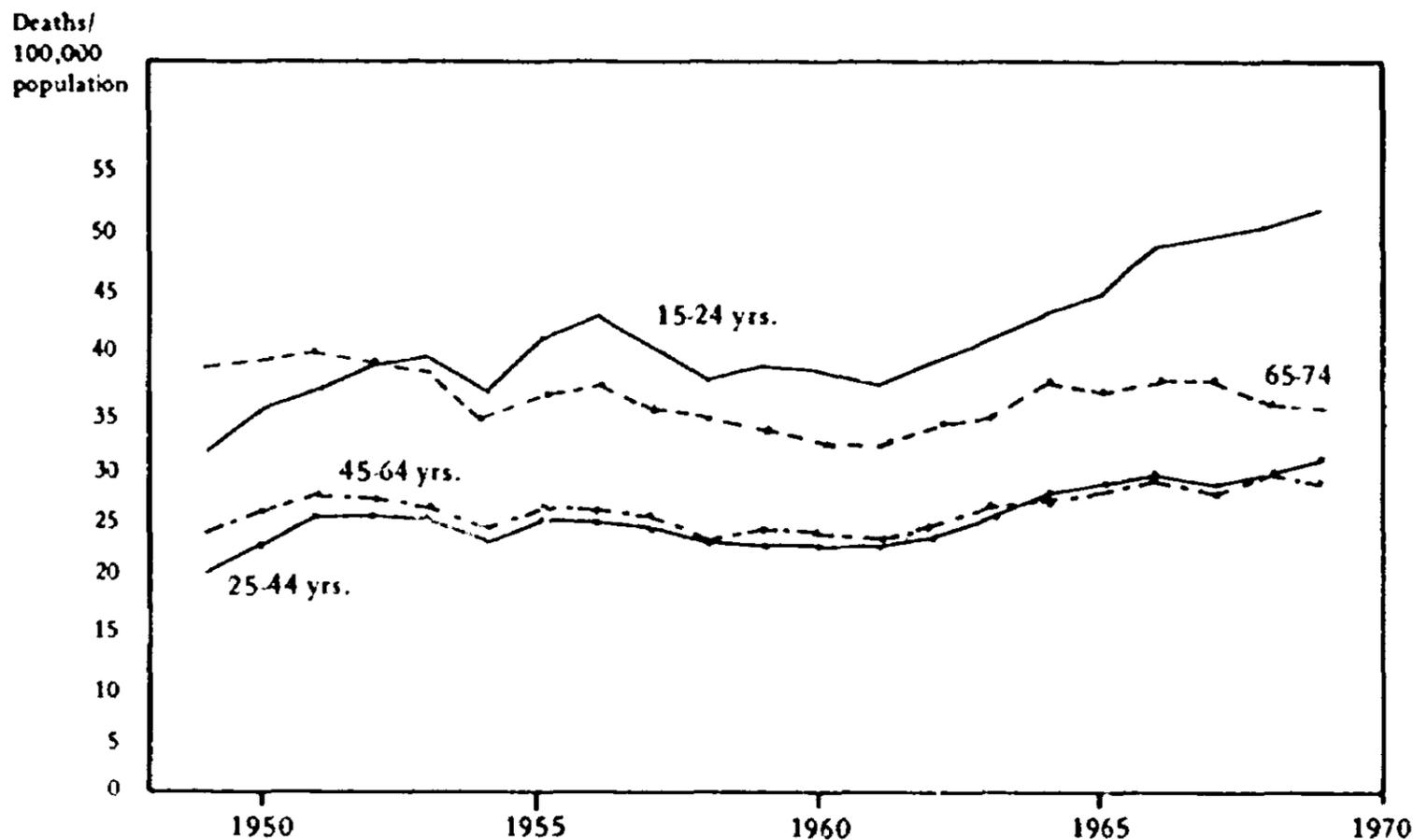
Highway deaths of youth of this age have exceeded fatalities of all ages in every year of the Viet Nam war, even in the years of largest loss (2, 82). Youthful drivers are involved in

fatal highway accidents—also in total accidents—60 percent more often than their proportion of the driving population or their use of the automobile would predict (2). In recognition of the disproportionately larger loss of life in this age group, Secretary Volpe recently established an advisory committee of young people entitled, "Youth Organizations United Toward Highway Safety." Called YOUTHS, this group is to advise the National Highway Traffic Safety Administration (NHTSA) in seeking to develop new programs to involve young people in the national effort for traffic safety.

The widespread desire or necessity to drive in this society, for both social and economic purposes, is evidenced by the fact that 94 percent of males and 63 percent of females of driving age were licensed to drive in 1969 (80,81). That the youthful driver is disproportionately involved both in accidents and in fatalities is not new. Figure 1 shows the population death rates for motor vehicle accidents over the past 20 years for the four major age groups in the licensing age range. From this figure, it is seen that the rate for the 15 to 24 year group is by far the highest in the past 17 years, and, since 1961, the gap has been widening, especially in the last 4 years. The increase in this gap, which reflects an increasing excess loss of lives, is probably due, primarily, to the increasing proportion of youngsters who

^{*}The numbers in parentheses throughout this study relate to the list of references attached.

Figure 1 MOTOR VEHICLE DEATH RATES FOR DIFFERENT AGE GROUPS, 1949-69



Source: Accident Facts (2)

become licensed as soon as they are old enough, and the improved financial capability of youth to own, operate, and maintain a car during periods of unprecedented general affluence. Changes in attitudes of youth in other areas of community life may also be at work here, such as with respect to alcohol and drugs and, possibly, changes in respect for law and order.

Of the total 56,400 fatalities in 1969, more than 31 percent (17,700) were in the age group 15 to 24. More than 93 percent of these young people were either operators of vehicles or passengers, and less than 6 percent of them were pedestrians, as compared with 17 percent pedestrians among total fatalities of all ages (2). That is, nearly one-third of the total fatalities in 1969 were in this age group, and the overwhelming majority of them were killed as operators or passengers of a vehicle, rather than as pedestrians. Although they comprised about 21 percent of the driving population, they were drivers in 34 percent of fatal accidents, and were

more than 34 percent of the drivers in all accidents (2), an over-representation of more than 60 percent in each category. This over-representation does not appear to be attributable to greater driving exposure. On the contrary, the best available data (11) show that drivers in this age range drive fewer miles per year than the older drivers—until the age of 55 for males and 75 for females. The mean accidents per year are higher for the 15 to 24 age group than for any other (11). The mean accidents per 100,000 miles driven are also higher until the age of 65 for males and 70 for females (11). In every age group, males drive more than females (11). In 1969, nearly 85 percent of the 70,700 drivers of all ages in fatal accidents were males (2). It is predominantly the young male who accounts for the disproportionate losses in the 15 to 24 age group.

The 60 percent over-representation of youthful drivers in both fatal and nonfatal accidents implies that youthful drivers almost certainly

involve older drivers in both fatal and nonfatal accidents; the losses in the excess involvement are hardly restricted to the youthful age group. Accordingly, the total excess of fatalities and injuries associated with the high involvement rate of youth includes additional losses among the older groups; these cannot, however, be estimated from currently available data.

The figures cited above include motorcycle data, which bear a closer examination. In 1965, of the 1,515 deaths of motorcycle riders, over 59 percent were in the age group 15 to 24; in 1966, this was just under 66 percent of 2,043; and in 1967, just under 64 percent of 1,971 (24). Figures are not available for the last 2 years except the total fatalities: 1,900 and 1,960, respectively (2). Motorcycle use is increasing at a great rate. More than double the number in 1964, there are now 2-1/4 million motorcycles in use (2).

II. Possible Reasons for the High Motor Vehicle Death Rate of the 15 to 24 Age Group

A. Youthfulness and Inexperience

A study many years ago compared the 3-year fatal accident rates per 1,000 newly licensed drivers at various ages. The newly licensed *young* drivers had higher fatal accident rates, and those licensed at 16 to 19 had the very highest (25). However, a recent study in the Netherlands on moped* drivers and automobile drivers suggests that inexperience plays a greater role in accidents than age per se (98). Another recent study in Germany examined the incidence of traffic offenses among drivers who commenced driving at various ages: "traffic maturity" as measured by traffic offenses appeared to be more highly related to years of driving than to age per se (71). Unfortunately, exposure data were entirely lacking in these studies.

*Generally, a two- or three-wheeled bike with engine not over 50 cc. and speed not over 30 m.p.h.

It is difficult to tell whether inexperience in driving or immaturity and exuberant attitudes of youth are more important from currently available data, particularly for the American scene. Presumably, both are important factors. A seemingly ready remedy for inexperience is, of course, experience; but the remedy for immaturity is a much more complex issue. It seems quite evident that in the military situation this age group is trainable to perform quite well and responsibly, but it is tightly supervised in that situation. It has been shown, for instance, that when men in uniform are involved in motor vehicle accidents, it is primarily off post and when they are driving private cars (64).

The years from 15 to 24 probably encompass the period of greatest and most rapid changes in the life of individuals—from school to college (or work) and marriage, from carefree youth to adulthood responsibility. The use of such a broad age range probably obscures many important factors that are at work at different ages within this 10-year period. Only recently has much research attention been given to this fact with respect to highway safety (21, 61, 62, 79, 94). Relatively, very little is known of the varying influences affecting highway safety in this age group.

B. Alcohol

A study in Illinois in 1967 (53) showed the following percentages of fatalities of persons aged 15 to 20 with measurable alcohol in their blood:

33 percent of 142 car drivers
38 percent of 95 car occupants
29 percent of 17 pedestrians

Of those drivers with alcohol in this study, over 57 percent had .10 percent or higher blood alcohol level (BAL).*

*BAL—Blood alcohol level, percent of alcohol by weight.

In a more recent study on Minnesota drivers killed in 1969, the data on young drivers aged 16 to 24 are even more extreme (4):

- a. over 60 percent of 103 had measurable alcohol;
- b. of those with alcohol, over 79 percent had .10 percent or higher BAL;
- c. in the 16 to 20 age group, over 50 percent of the 63 had alcohol; and
- d. of the 16 to 20 age group with alcohol, nearly 69 percent had .10 percent and higher BAL.

The figures above—57 percent, 79 percent, and 69 percent of drinking driver fatalities with .10 percent and higher BAL—compare with about 75 percent from other studies for drivers of all ages (72). In the Minnesota study, 93 percent of all driver fatalities with alcohol were males (4).

While .10 percent BAL is so high that practically everyone, including habitual heavy drinkers, would be impaired, the young driver has a double hazard in this connection: he is an inexperienced driver and an inexperienced drinker. The State of New York has taken cognizance of this vulnerability on the part of young driver-drinkers by establishing a presumptive level of .05 percent as defining "under the influence" for drivers under 21. The role of combined action of drugs with alcohol in these tragedies is not known. Presumably, with recent large increases in drug usage, the heaviest and most frequent abusers of drugs of all kinds in this country have been young people of high school and college age.

C. General Stress of Adolescence and Youth

Further evidence that the age between 15 and 24 is a turbulent period in the lives of many people comes from the data on crime. The 1967 figures for crime in the United States, published by the FBI (23), show over 446,000 suburban arrests for persons 15 to 24. This is over 46

percent of the total for all ages. In the cities, nearly 37 percent of the 4.8 million arrests for crime were in this group. Of all arrests for crime, nearly 38 percent of the 5.5 million were in this age group. But the 15 to 24 age group comprised less than 24 percent of the total population of 15 and above. Their over-representation in the total arrests for crime is just under 60 percent. It would appear that some of the same pressures that make for a disproportionately high crime rate and high involvement with drugs and alcohol may also make for a disproportionate number of tragedies on the highway.

D. Nighttime Driving

It is said that young people, especially males, drive a disproportionate number of miles at night, when driving conditions are more hazardous, and therefore they have a higher accident rate than older people. This is not borne out by the California study (11). Figure 2 shows a much higher nighttime accident rate per 100,000 miles for the young driver and, of course, the young males have the highest. Not until the age of 70 and above does the nighttime accident rate again rise so high. The reasons for this high rate among youths at night are not clear.

E. The Vehicle and Its Condition

Another possible variable affecting the fatality rate of young operators is the type or condition of the vehicle being driven. Reference has already been made to the motorcycle situation. With respect to automobiles, it is probably true that on the average the cars driven by young people are likely to be older and less well-maintained than the general population of cars and, therefore, vehicular deficiencies might be more frequent. But data are not available on which to answer this question. The type of car and condition of vehicle probably also vary with the region of the county, the relative socio-economic status of the region, and the degree of industrialization and/or urbanization.

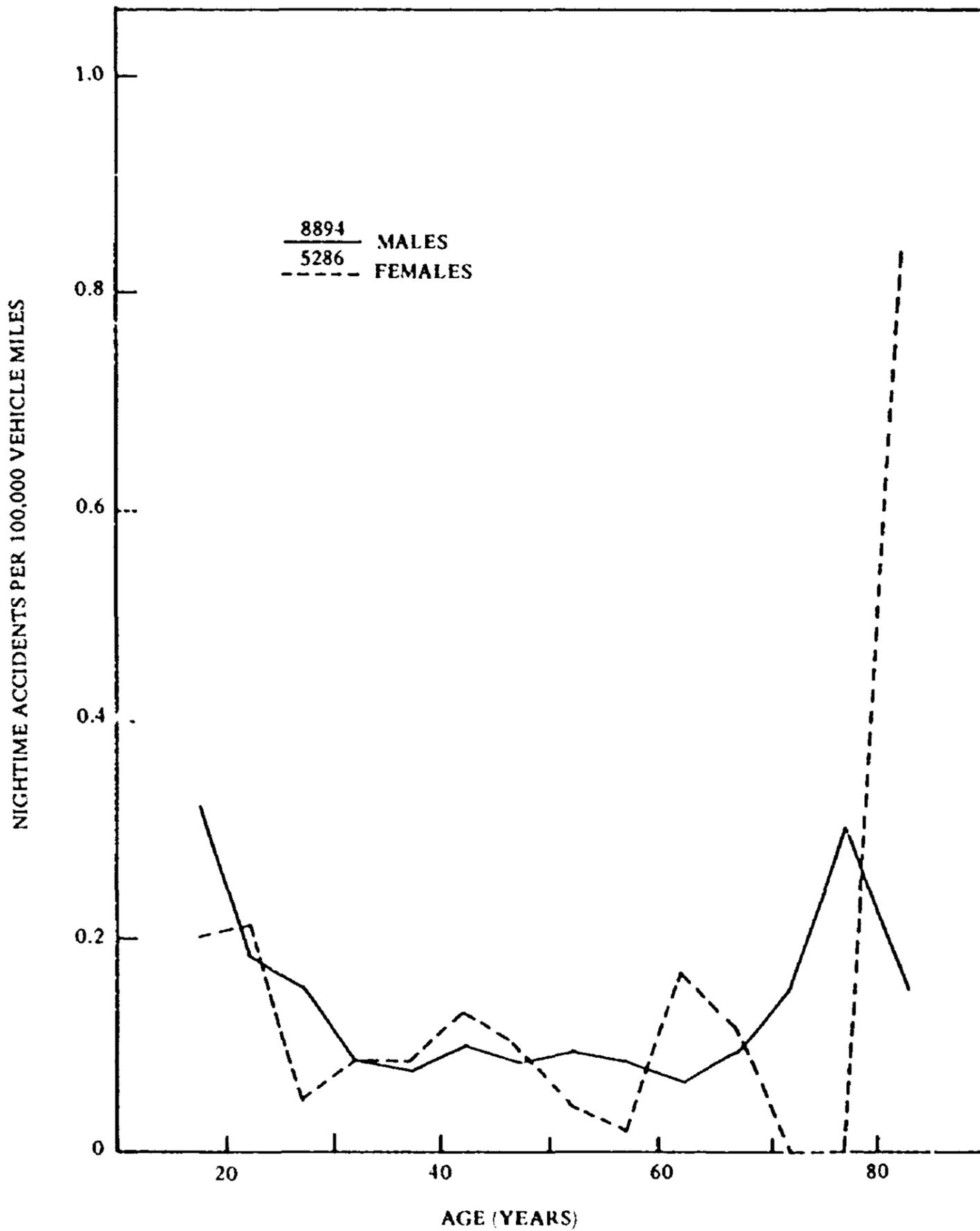


Figure 2 TEST SAMPLE NIGHTTIME ACCIDENT RATE BY AGE AND SEX

Source: Burg (11)

Young people are, in fact, more likely to drive motorcycles, which are more hazardous in terms of likelihood of injury or death in a collision or skidding accident. A survey in 1967 (24) showed nearly 32 percent of motorcycle owners in the age group 18 to 24, and another 20 percent under 18; that is, about 52 percent of the owners were 24 and under. This compares with 59 to 66 percent of motorcycle fatalities in the under 25 age group. Additionally, young people often rent motorcycles and the only qualification usually required is that they have a driver's license to operate an automobile. Special training for the operation of a motorcycle is not readily available other than basic and preliminary instruction from the dealer. We have here the prospect of the combination of untrained, inexperienced operators and a type of vehicle which is inherently more dangerous.

III. The Need for Instruction

Recognition of the need for special attention to the beginning driver led, in the early 1930's, to the development of courses in driver education in the public schools (97). Commercial schools had begun offering instruction in operation of a motor vehicle as early as 1909 (97). The logic of the instructional approach is based on common-sense experience, experience in industry and in the military. Errors are characteristically more frequent during the early phases of learning a new job or skill, and become fewer with increasing time on the job (62, 104). The learning curve has a characteristic form: rapid improvement in the early phases, then decelerating improvement, with plateaus often evident (104).

Given the present-day traffic situation in the United States and the high fatality rate of the young, it seems clear that some kind of preparation for driving in today's traffic is necessary. Further, it seems that some standards of preparation are necessary for everyone's protection--the new driver himself and others on the highway. If some ways of doing things are better than others, in terms of lessened accident

potential, then society should impart these things formally to every driver before he takes to the road, unless they are ideas and skills which one picks up automatically or easily in this particular culture.

A recent study in California (44) showed that 27 percent of graduates of high school driver training courses failed the driving part of the licensing test on the first try. In the District of Columbia, approximately 18 to 20 percent fail the written test on first trial and 41 percent to 45 percent fail the driving test on first trial (26); these include graduates of training courses, both public and commercial. If licensing examinations do in fact measure elements which are essential to safe driving (and the tests are widely regarded as much too easy!) these data and the high accident rates of the young would indicate that people do not automatically pick up all they need to know and need to do simply by living in this culture.

It seems of prime importance to find out what are the critical items of knowledge, perception, and skill, and how to impart them most effectively and inexpensively. The notion that if the present school system does not help enough to warrant its cost, and if the costs of improvement seem exorbitant, then it should be either excluded from help by safety dollars or dropped from the high school curriculum, may really be self-defeating. How much is good driver preparation worth and how good is good? Is it reasonable to leave driver preparation to individual choice, so long as the applicant passes the license examination? Do or can the examinations do the job required? Can they be relied upon? Since individual accident involvement rate is not highly stable over a period of time, tests cannot predict such involvement very well (37, 38). The answers must be developed by way of applied science rather than opinion.

IV. The Unknown Value of Present Driver Education Programs

The effectiveness of driver education in the public schools as a means to reduce highway

accidents and injuries to the young has been questioned since its inception in 1933. Today, nearly 14,000 high schools are teaching nearly 2 million students per year (45) and approximately 2,200 commercial schools train about 1-3/4 million persons of all ages per year (74,101). Many millions of dollars of both private money and tax money are spent for one form or another of driving instruction. Federal funds to aid driver education for safety reasons are now about \$8 million per year. After 37 years of public high school experience and over 60 years of commercial school experience, there is still no body of data or series of studies from which it can be concluded that current programs do or do not contribute to highway safety (40, 42, 43, 72, 86, 89).

Over the years, many analyses have been made which compared accident and violation records of graduates of driver education courses with drivers who did not have such courses (23, 89). Generally, such comparisons showed the driver education graduates to have better records. This fact impressed the insurance industry to the extent that for many years they have been offering reductions in premiums to drivers under 25 years of age who have had formal driver education courses. But the conclusion that the superiority of the records of the driver education graduates is due to the course experience itself is an unsound one, because none of such analyses began with groups which can be regarded as equivalent with respect to the people themselves or their post-training driving experience. People who volunteer for driver education are different as a group from those who do not, and in ways that may affect subsequent driving records (5, 88). School districts which offer driver education differ in many respects from school districts which do not offer driver education; again, the inputs are not comparable. Students of commercial schools would be expected to differ from students of public school courses. Such comparisons are, then, not meaningful with respect to the possible effect of driver education on sub-

sequent driving records in terms of accidents or violations.

It should be noted that as a business policy, it is justifiable for an insurance company to offer a reduction in premium to the group which had driver education if having had driver education serves to identify for the insurance company a group with a lesser risk. However, the insurance companies have never ascertained whether driver education is the cause of a better accident rate. If driver education merely serves to identify preferred risks, then the policy of the insurance industry will be self-defeating in the long run. This is so because in an increasing number of States today, driver education is becoming a requirement for obtaining a license at 16, and most males and many females avail themselves of the opportunity. Under such a system, the insurance industry policy will cease to be based upon a system which identifies the group with the lesser risk--if the course has no effect.

It should also be noted in passing that driver education is not the only presumed countermeasure that has been in operation for several decades without scientific evidence as to its effectiveness (56). A similar situation exists with respect to driver licensing, traffic law enforcement by highway patrols, all of the efforts of the traffic courts, much traffic engineering practice, and much highway design practice (56, 102). It seems that public school driver education has been challenged from the early days for several reasons. It is expensive, time-consuming, and, more important, has often been regarded by educators as an inappropriate subject to be taught in the public schools on the basis that it is not an academic subject. But that point of view has been considerably modified as the standards for driver education in the high schools have been improved, in terms of better preparation of teachers, better curricula, better equipment, and recognition by many universities that the preparation of high school driver education instructors is a legitimate and proper enterprise for universities. Also, the objectives of the courses in high school have been broadened to include not only preparation for driving, but an

understanding of traffic safety in all its aspects--to produce good "traffic citizenship." The name of such courses has been changed to "Driver and Traffic Safety Education."

But even today, driver and traffic safety education is rarely considered on the same intellectual or academic level as history, French, algebra, chemistry, or other traditional subjects. Shopwork, home economics, sewing, football, baseball, etc., have in the past been regarded as directly relevant to preparation for life, and therefore properly taught in public schools with the use of taxpayer's funds. Driver education has had a more difficult history in this regard. But the common-sense basis that formal training by professionally prepared instructors should be more effective than informal instruction by parents, friends, relatives, etc., coupled with the fact that so-called hardheaded businessmen were offering reduced premiums to those who take driver education, served to promote interest in the field and to urge boards of education to include driver education in the high school curriculum. Many parents urged the schools to initiate courses. Automobile manufacturers, through their dealers, have made available, on a minimum cost basis, new vehicles specially equipped (by the dealers, usually) to be used in the behind-the-wheel phase of driver training. Presumably, this serves the dual motivation of helping to promote safety and expanding the use--thus, the market--of motor cars. Still, as in many other areas of safety measures, there are no data on which one may judge the effectiveness of current programs of driver education as an accident countermeasure.

Although safety is the goal of Federal expenditures in this area--following the mandate in the Highway Safety Act of 1966--the effectiveness of these expenditures is not known. If it were known whether formal driver education actually reduces accident losses, or, if it does not, what changes in programs would reduce losses and how much, the support of such programs by Federal funds would be considerably clarified, and the allocation of Federal funds could be made more efficient.

While it may prove entirely impossible to conduct the definitive experiment (because the social situation does not permit random assignment of people), it does seem that fruitful approaches do exist:

1. It may be feasible to locate schools where it is possible to replicate the kind of study carried out by Conger, Miller, and Rainey in 1966 (17). These investigators took advantage of the existing situation in the Denver Public Schools. They were able to identify one group who wished to take driver education (including behind-the-wheel training) and did take it; a second group who wished to take driver education but could not, for reasons such as conflicts with other course work; and a third group who did not wish to take driver education and did not take it. This kind of situation provides the possibility of a rather good approximation to the control of two variables which are exceedingly difficult to control without actual random assignment--namely, the motivation of the student (and the associated personality and biographical factors) and secondly, the quality and quantity of driving exposure after completion of the course. This kind of research is relatively inexpensive, and if it were possible to replicate such a study in a dozen places around the country, it might well be possible to integrate the outcome into fairly firm conclusions. Of course, it would be necessary to pay considerable attention to the quality of the instruction and instructors, the nature of the program, local enforcement policy, accident reporting, record-keeping, etc. But such an approach does offer considerable promise. If the original Conger, Miller, and Rainey study had had several hundred cases in each of the three groups, instead of only 40 cases each, and were replicated in several parts of the country, it would be possible to place much greater reliance on their outcomes. As it is, their finding of a 60 percent and 75 percent difference in average number of responsible accidents in 4 years in favor of the driver education group remains an outcome from a very small study, not a sufficient basis for national policy determination.

2. A second approach which could be very useful would be proper scientific comparisons of high school driver education programs with commercial school training programs. It would be possible to assign students at random into the two programs if funds were available to pay for the commercial training. By so doing, it would be possible to vary specific components of the programs and to test their relative effectiveness. Again, this would not need to be highly expensive research--and no one need complain that he was denied formal training in order to perform an experiment. This could also be done within the public school domain and within the commercial school domain, but with less flexibility and possibly greater contamination of results.

3. Another evaluative research approach that might be reconsidered (although it was considered in one of the National Highway Safety Bureau's* contract reports (28)), is that of random assignment of school districts to different types of driver education and to no driver education. The opportunity to do this remains only while a sizable number of schools do not yet offer driver education. This is probably very expensive research and cumbersome in that the accident reporting and recordkeeping may vary so much from area to area that this could becloud the effects we are trying to measure. However, this is an approach that seems well worth exploring in light of the very great need for scientific evaluation.

4. Since the cost of driver education is a salient issue, intensive studies might well be undertaken to find means to reduce the cost. Simulators have been advanced as one such means and they are in very common use. Another approach that could be explored might be called a "diagnostic" approach. That is, not all students need the same treatment in order to be prepared for the driving task. Very likely, at least 25 percent of the high school students

could achieve the information component of current driver education courses with very little classroom work, by means of programmed texts, teaching machines, or simply by studying books and taking multiple choice tests on the contents. The attitudinal aspects of driver education would be expected to be more difficult to achieve this way, but diagnostic attitude tests given before beginning of the class might focus more sharply on the individual needs of students as a basis for appropriate handling. Among other things, it may well be that boys and girls are more effectively handled in separate groups because of their different needs and the different sources of their driving information and skills. It is commonly believed that the attitudes of boys and girls toward risk-taking in driving are widely different. All of this applies similarly to the behind-the-wheel training, and this leads directly to another possibility.

5. To some degree, parents have always been involved, be it however haphazardly or accidentally, in the preparation of their children for driving. The State of Connecticut permits the substitution of training by parents (or other responsible adults who have been licensed for 5 years) for public school or commercial school training, if the adult is willing to sign a statement that he has given a course of instruction to the applicant (18). It would seem fruitful to explore effective means by which parents can be involved all during the driver education experience, but most particularly in providing supervised behind-the-wheel experience, since that is the most expensive part of driver preparation. Not all parents can or should do this, but a great many, with proper professional guidance from the schools, could greatly supplement and support the school experience. No one who is at all informed on the subject considers that the current "30 and 6" course (30 hours in class, 6 hours behind the wheel) is sufficient preparation for driving in modern traffic. After completion of the formal course, either high school or commercial, a new young driver needs additional supervised experience for many months (92). With guidance from the professional instructors,

*The name of the National Highway Safety Bureau (NHSB) was changed to the National Highway Traffic Safety Administration (NHTSA) by the Federal Aid Highway Act of 1970, effective December 31, 1970.

parents might be helped to make this probationary period most effective. It might very well be that the immediate post-course driving experience is much more critical to a subsequent good record than the course itself. The course provides only minimum entry skills and perhaps that is all one should expect from "30 and 6." It may be that from a cost/benefit point of view, much greater effort should be exerted during the first 1 to 3 years of one's licensed driving to make sure that he is developing into a good driver. Perhaps driver improvement programs should focus much more intensively on the new driver than they currently do to assure that the novice builds good driving habits. Probationary licenses are used in some States with this in mind.

V. Activities of the National Highway Traffic Safety Administration in the Field of Driver Education

The Highway Safety Act of 1966 provides in section 402(b)(1): "The Secretary shall not approve any State highway safety program under this section which does not... (E) provide for comprehensive training programs for driver education in the school systems or for a significant expansion and improvement of such a program already in existence to be administered by appropriate school officials under the supervision of the Governor as set forth in subparagraph (A) of this paragraph; (2) the training of qualified school instructors and their certification; (3) appropriate regulations of other driver training schools including licensing of the schools and certification of their instructors; (4) adult driver training programs and programs for the retraining of selected drivers; and (5) adequate research, development, and procurement of practice driving facilities, simulators, and other similar teaching aids for both school and other driver training use."

To implement this Section of the Act, NHTSA issued Highway Safety Program Standard 4.4.4, Driver Education, and Highway Safety Program Manual, Vol. 4, Driver Education, to assist the

States in meeting the requirements of the Standard.

Over several years, considerable controversy has developed concerning driver education among three classes of parties—the public school driver educator group, the commercial school driver educators, and researchers. Few, if any, other issues in highway safety have been so characterized by the interpretation of data to support preconceived notions, of interest groups and others, as in the case of driver education. It should be re-emphasized that there are currently no data upon which one might confidently decide whether driver education, as currently practiced in public high schools or in commercial schools, results in better driving records than would be the case if such students were trained informally by parents, relatives, friends, etc. The National Highway Safety Bureau (now NHTSA) recognizing this essential fact, and facing the mandate from Congress in the Highway Safety Act of 1966, let four identical contracts (28, 29, 30, 58) for the purpose of developing means by which State driver education programs could be evaluated; a fifth contract (43) was let to synthesize and integrate the outcomes from these four contracts and to make specific recommendations for action. In addition, two contracts (86) were let for the conduct of two symposia—one regarding public school driving education programs and the other regarding commercial driver education programs. The recommendations that emerged from these contracts were in essential agreement that in order to develop instruments and means by which to evaluate formal driver education, NHTSA should first develop a satisfactory and detailed description of the driving task (43); then, on that basis, training curricula should be developed specifically for that description of the driving task, and then the effectiveness of such a curriculum, conducted by properly trained educators, should be scientifically evaluated. NHTSA has since let a contract for the development of the description of the driving task, which is now completed (68), and has also let a contract to determine the

components of the task which are optimally teachable by way of simulation methods. It is envisaged that it will be several years before the sought-for answers regarding effectiveness and cost/benefit ratios are forthcoming. The need to determine the safety effectiveness of driver education, however, is pressing. NHTSB (NHTSA) has spent considerable money on the nine research contracts mentioned—over \$400,000. In addition, nearly \$28 million has been spent through 1970, under the Highway Safety Act of 1966, on State programs to improve or expand driver education activities. The effectiveness of this funding in terms of safety is unknown. Furthermore, effectiveness of other means of reducing fatalities, such as vehicle crash injury reduction, is becoming known.

The prospect of successful development of air cushion crash restraints has prompted some people in the field to place that development at a very high priority and to de-emphasize research and development in the driver education or re-education area. The payoff from development of passive restraints, such as the air cushion and other types of padding, is expected to be high; moreover, it is easier to evaluate payoff in such cases than in the case of driver education. It is to be emphasized that it is generally simpler to evaluate effectiveness of engineering devices for crash protection than it is to evaluate countermeasures to accidents by way of influencing human behavior. The reason for this is that research on crash prevention through human behavior must deal with far more variables than does research on crash protection through mechanical devices.

The satisfactory testing of the value of driver education, or any other means of influencing driving behavior, requires a condition which is difficult to achieve in practice. Prospective drivers must be assigned *at random* into driver education programs and into informal preparation programs in order to meet basic requirements for proper scientific comparison of subsequent driving records. Only such random assignment beforehand assures the comparability of the groups on all relevant factors, including

the quantity and quality of subsequent driving exposure of the two groups. In this instance, however, this kind of random assignment is exceedingly difficult to achieve, because if driver education is believed to be a good thing, both students and parents of the students are unwilling to permit their exclusion from driver education programs merely for purposes of research. The legal requirements for driver education for licensing at certain ages in the States also pose very real problems. However, there still exists the very great need to determine whether and to what extent current driver education programs contribute to safety and at what costs.

VI. Effectiveness of Driver Improvement Programs

The situation is somewhat better with respect to driver improvement or driver re-education programs—also mandated in the Highway Safety Act of 1966, quoted above in section 402(b)(1)(E)(4). There have been a few well-done studies which show that properly developed letters, interviews, administrative actions, and educational or counselling programs can have a favorable effect on driving behavior in terms of reduced violations and accidents (8, 14, 19, 40, 46, 50, 51, 60, 78, 105). In these studies, reductions in violations ranging from 21 percent to 73 percent, and reductions in accidents ranging from about 15 percent to 69 percent were shown. How long the effects last is not known; but diminishing effects may be expected to appear after 1, 2, or 3 years after the treatment, depending upon the particular treatment, age, individual characteristics, local conditions, etc. None of these programs was specifically developed for young drivers; but some of the results showed differential effectiveness with different age groups.

VII. Activities of the National Highway Traffic Safety Administration in Driver Improvement

Highway Safety Program Standard 4.4.5, Driver Licensing, includes a requirement for

... a driver improvement program to identify problem drivers for record review and other appropriate actions designed to reduce the frequency of their involvement in traffic accidents or violations." There is no provision for efforts specifically directed at the young driver and his problems. With the cooperation of the U.S. Coast Guard (USCG), NHTSA has contracted with the American University to conduct an experimental study on the effectiveness of certain driver improvement efforts on USCG recruits. The USCG situation provides an unusual opportunity to conduct such an experiment. The enlistees are under USCG control for a four-year enlistment, and the USCG currently provides driver improvement programs for its recruits. Further, they keep very good records on the driving experience of their people throughout the world. At least 2 or 3 years will probably be required before even preliminary results from this study are forthcoming, and the data should be rather sound. However, the applicability of the findings to other programs or situations and to drivers who are not represented by USCG enlistees will have to be considered with care. Fortunately, the subjects of the study are included within the age range that is of special concern—the youngest recruits are 17.

VIII. The Central Role of Driver Licensing

A greatly improved system of examination for licensing is likely to be prerequisite to the development of improved preparation of drivers, since much of the instruction, and much of the students' motivation, is centered on passing the licensing examinations. Currently, driver licensing systems fall far short of making their full potential contribution to highway safety, in the view of many people who are competent to judge. Most of the written examinations verify only a fraction of the necessary knowledge; the driving test normally omits highway speeds, heavy traffic, nighttime driving, or other difficult conditions. The orientation of most licensing agencies is to screen applicants in a

"go-no-go" fashion, rather than to help them to achieve maximum preparation for driving.

NHTSA is aware of some of these shortcomings. They have contracted for the development of a pool of items to be used in the written licensing examinations. They have also contracted for development of license examinations as proxy indicators of driver education effectiveness. Clearly, the requirements for licensing are critical to the kind of preparation for driving which will be provided both now and in the future, whether by commercial schools or by public schools. There are presently no efforts in the licensing area or the driver improvement area which are specifically oriented to the special problems of the beginning young driver, to help him through the first few years that are apparently required to develop his competence, judgment, and "traffic maturity."

IX. The Need for Integrated Efforts Focused on the Young Driver

There is great need for integration of the ways in which this society nurtures, controls, rewards, and punishes its drivers. The school programs, both public and commercial, might profitably be integrated with the enforcement-surveillance systems, the court systems, the driver improvement systems, the public education systems, and others. Some workers in the field report that the different agencies characteristically communicate very little with each other, and often work at cross-purposes without knowing it. Federal influence in this area might be very helpful. It seems especially important that coordinated efforts be directed to the new young drivers, especially males, to help them achieve the needed experience, skill, and maturity of judgment in traffic that will minimize the trouble they currently generate.

Several of the NHTSA activities do have implications for the safety of the 15 to 24 age group and their impact on the safety of others. Certainly, the efforts of NHTSA in driver education do; also, but to a lesser extent, the driver improvement part of the licensing standard, and

the licensing standard itself. However, the Alcohol Safety Action Program, which is the largest effort oriented to the driver, is focused primarily on the problem drinker, the habitual alcohol abuser, or the outright alcoholic. It is not likely that many people in the 15 to 24 age group are in these categories. But one-third of the drivers in fatal accidents are in this age group, and many of them are heavily involved with alcohol at the time of death. In the Illinois study, one-third of the driver fatalities aged 15 to 20 had measurable alcohol, and more than 57 percent of those had .10 percent and higher BAL (53). In the Minnesota study (4), over 60 percent of the driver fatalities aged 16 to 24 had alcohol in their systems; over 79 percent of them had .10 percent and higher BAL. The NHTSA Action Program has not been primarily focused on such people, but approaches to the youth-and-alcohol problem are now under development. However, this is still a small portion of their program, less than a one-man effort, so far as can be ascertained.

X. Conclusions

1. Drivers between the ages of 15 and 24 have a disproportionately high accident and fatality rate. This is true whether we use the population death rate, mileage accident rate, or yearly accident rate. In terms of fatalities, the excess loss in this age group, beyond that expected in all age groups above 15, has reached about 7,400 per year. This excess loss is therefore the second largest loss, next to alcohol abuse, in highway accidents associated directly with behavior of the driver. A 60 percent excess involvement of young drivers in accidents implies a large excess loss inflicted upon persons in other age groups, but the extent of this latter loss is not yet known.

2. Driving and riding with other young drivers constitute the greatest hazard to survival which American youth must pass successfully to reach adulthood. Everyone must pass through this period of life. It is a period of stress, experimentation, and turbulence for a great many. While youth are becoming experienced

drivers, a number are experimenting with alcohol and drugs as well. The changes—physiological, personal, social, economic—taking place in this period of life are probably more extensive than in any other period.

3. Existing methods of administering driver education, driver licensing, and driver improvement programs appear to recognize only one intermediate step (learners or restricted licenses) within the stages of probable progress of young drivers as they move through a 10-year period of development. It is probable that the variable combinations of knowledge, driving skill, and gradual development of responsible attitudes and mature judgment require several more progressive steps.

4. The programs of NHTSA have not sufficiently focused on the needs of the beginning young driver; while many of their programs do have implications for this age group, they are not specially tailored for them and their needs. The Alcohol Safety Action Program in particular, with its emphasis on the long term problem drinker, may not have sufficient content which applies to the youthful alcohol-fatality problem.

5. There are several points at which special emphasis or special programs might be applied: initial preparation of drivers; examination for initial licensing; driver improvement programs, especially in the first few years of the driver's experience; surveillance by police, motor vehicle departments, and the courts; parental supervision and monitoring of the new young driver; school and college monitoring of young drivers; industrial off-the-job safety programs; vehicle inspection—perhaps the cars young people drive ought to be inspected more frequently; and contacts with the health agencies with respect to emotional problems and the drug and alcohol scene.

6. Greatly improved licensing examinations appear critical to improvement of initial preparation of drivers. This means improvement and extension of the information tests, and improvement and extension of the driving performance tests.

7. Since achievement of "maturity" of driving behavior in terms of an accident rate that is not disproportionate seems to require several years of driving experience, an increased period of supervision or monitoring of the behavior of newly licensed young drivers, especially the males, appears eminently necessary. Such supervision and monitoring appears necessary not only on the basis of the present high losses to this group in accidents, but also as a means of reducing losses to other parts of the population. It should be noted that with the reduction of the voting age to 18 years, the apparent period of need for such supervision would extend into the years when persons are considered qualified to vote and thus to influence highway safety programs. Thus there is increased need for early education with respect to highway safety programs in the broadest sense.

8. The safety value of current programs of driver education, both in public schools and in commercial schools, is entirely unknown. Moreover, it may be quite impossible to conduct the definitive experiment because of the infeasibility of assigning subjects at random. However, there are some promising approaches to an approximation of the definitive experiment which might be explored.

XI. Recommendations

The Safety Board recommends that:

1. The National Highway Traffic Safety Administration re-examine its highway safety program efforts with a view to focusing certain programs more sharply on the 15 to 24 year-old group of drivers as a means of reducing excess losses in this group. This would pertain especially to driver licensing, driver education, driver improvement, alcohol safety action programs, and vehicle inspection. A much more thorough set of examinations for initial licensing of young drivers appears highly desirable. A diagnostic approach to driver preparation, driver licensing, and driver improvement programs designed primarily for the new young driver appears highly justified by the disproportionate involvement and fatality rate of this age group.
2. The National Highway Traffic Safety Administration develop new and/or supplemental efforts in their alcohol safety action programs specifically designed for the young drinking driver, beyond those now contemplated or in use.
3. The National Highway Traffic Safety Administration explore means by which newly licensed young drivers can be provided with effective supervised driving practice for extended periods of time.
4. In addition to current efforts of National Highway Traffic Safety Administration to determine the safety value of driver education in the public schools and in the commercial schools, additional approaches such as some of those noted in this report, be explored:
 - a. Possible replications of the Conger, Miller, and Rainey study in which the driving records of graduates of the course were compared with the records of drivers who wished to take driver education but, for a variety of reasons, could not, and with a third group who did not wish to and did not take driver education.
 - b. Assignment of school districts, at random, to provide driver education and not to provide driver education, and subsequent comparison of the driving records of the two groups. The opportunity for this disappears as more and more districts undertake driver education programs.
 - c. Assignment of students, at random into public driver education courses and into commercial driver training courses, and comparison of the driving records of the two groups; this is to be done to evaluate relative effectiveness of various components of the two systems.

- d. The possible advantage in terms of cost and/or effectiveness of a diagnostic approach to driver education, i.e., a determination before entry into the course of individual students' needs in terms of information, attitudinal change, driving practice, or counseling. It does not follow that all students need the same treatment to achieve responsible and effective driving performance, since they do not bring the same capabilities and characteristics to the program.
- e. Diagnostic approaches to driver improvement programs and to develop differential treatments especially designed to meet the needs of the new young driver.
- f. As an aid to an understanding of the total social costs of high involvement of young drivers in fatal accidents, NHTSA conduct studies with a view to determining the excess losses suffered by other age groups as a result of the accident involvement rates of youthful drivers.
5. National Highway Traffic Safety Administration should explore means by which current examination procedures for initial license applicants, especially for the 15 to 24 age group, can be greatly improved. Such improvement should follow in two directions: a) increased comprehensiveness of both the knowledge examination and the performance test, and b) structuring of the tests to serve the purpose of diagnosing the applicant's areas of insufficiency so that additional training, study, counseling, practice, or other measures might be recommended. Periodic re-examination of new young drivers during the first few years of their experience might be profitably considered.
6. The National Highway Traffic Safety Administration consider expanding the National Highway Traffic Safety Program Standard on Driver Licensing to provide for a 2-year period of probationary licensing for drivers under 21, during which time they would be expected to demonstrate the achievement of competence and maturity in driving. Such provisional licensing would facilitate suspension or revocation for cause and placement of mildly errant drivers into improvement programs before poor behavior and attitudes become habitual.
7. The National Highway Traffic Safety Administration seek means to promote the coordination of the efforts of State agencies involved in safety programs affecting the young driver: public schools, police, courts, public health agencies, communications media, adult education programs, motor vehicle departments, and others.
8. The Youth Organizations United Toward Highway Safety (YOUTHHS), appointed as an Advisory Committee to NHTSA by the Secretary of Transportation, consider possible programs which will develop an appreciation on the part of individual youthful drivers of the major role which their driving behavior exerts in determining whether they will pass successfully through this high-risk period in life. The need for appreciation of this risk should be directed strongly to young male drivers, and should be coupled to the sense of increased public responsibility which ought to derive from possession of the right to vote.

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ JOHN H. REED
Chairman

/s/ OSCAR M. LAUREL
Member

/s/ FRANCIS H. McADAMS
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