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A STUDY TO DETERMINE THE FEASIBILITY OF PERFORMING
AN EVALUATION OF HIGH SCHOOL DRIVER EDUCATION
IN THE STATE OF MINNESOTA

Final Report

Submitted to:

Traffic Safety Education Office
Minnesota Department of Education

by

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INTRODUCTION

The State of Minnesota Department of Education has expressed an interest in developing specific guidelines for program development and evaluation. The program described in this report has been designed to answer the following questions and to provide specific information about which resources within the state can be best utilized to achieve the goal. The two questions are:

1. Have the Minnesota Department of Education efforts in Driver Education resulted in better prepared vehicle drivers and have these efforts resulted in a reduction of motor vehicle crashes on the part of the students impacted by the program?

AND

2. What long range plans and programs should the Department of Education consider in the planning of future Driver Education Programs and the evaluation of same?

A major part of the effort of the Minnesota Department of Education has been directed toward developing demonstration programs in the high schools associated with the TASC Unit (Traffic and Safety Center Unit) demonstration centers. Therefore the first phase of this study (Phase A) was directed toward developing a program for comparing these "treatment" schools (high schools) with other schools which are similar with respect to variables known to effect safe driving performance. The second phase of the study (Phase B) consisted of tasks associated with curriculum development and evaluation activities as the developing state plan reaches out to additional school districts. The complete development of this second plan should continue to be conducted in consultation with the Driver Education section of the Minnesota Department of Education.

Two plans are recommended and detailed in the following sections. They are:

Phase A. A detailed plan for implementing a one year program to evaluate the driver education program in the task unit demonstration schools, as compared to other schools including (but not limited to) recommended measurement instruments, data collection procedures, sampling plan, and data analysis techniques.

Phase B. A recommended long range driver education program development and evaluation plan including a description of tasks to be performed, and a timetable of events.

PHASE A. EVALUATION OF DRIVER EDUCATION

I. Introduction and Summary

In May, 1973, The University of Michigan Highway Safety Research Institute received a contract from the State of Minnesota Department of Education to develop and recommend an experimental design for evaluation of Driver Education programs operating in school districts throughout the State of Minnesota. The HSRI study was concerned principally with two questions:

(1) Can official driver records maintained by the State of Minnesota be used to evaluate the effectiveness of Driver Education programs?

(2) How effective are the Minnesota Driver Education programs associated with the Traffic and Safety Center (TASC) program as compared to the Driver Education programs in Minnesota high schools not associated with the TASC program?

This presents the results of the HSRI study of those two questions. In sum, the answer to the first question is negative; for reasons discussed in Part II of this report, official driver records cannot be effectively used to evaluate Minnesota Driver Education programs or any other known Driver Education program. The answer to the second question is positive; the three general types of Driver Education programs now conducted in Minnesota can be effectively and economically evaluated by use of the design recommended in Part III of this report.

II. Use of Driver Records for Evaluating Driver Education Programs

On an intuitive basis, it is easy to assume that official driver records offer a ready means of evaluating the effectiveness

of Driver Education programs in general or a given Driver Education program in particular. In this approach to evaluation, the driving records of graduates of high school Driver Education programs would be matched against the records of drivers who had not participated in Driver Education programs. Such a comparison cannot produce valid and reliable results, for several reasons.

First, official driver records do not accurately reflect driving skills or driving behavior. The keeping of a driving record is one means by which the state attempts to monitor the driving performance of the motoring public. Entries on a driver record are made only after the driver has been involved in a reported accident and/or has been found guilty of a traffic violation. Accident reporting practices and ticket-issuing practices vary widely from one police jurisdiction to another. They also vary widely within jurisdictions, over time, because of manpower fluctuations, work load requirements, political pressures, budgetary changes, selective enforcement program, and so forth. Studies have confirmed that accidents as well as traffic violations are underreported (though the extent of this underreporting has not been quantified), and that personality factors involved in interactions between police officers and involved drivers (or between involved drivers) often affect whether or not an accident or traffic violation is reported. Also, state law defines which accidents are to be reported and which are not. Thus it is impossible to reconstruct the actual accident and violation experience of a given population. It is possible to reconstruct the officially recorded experience of a population of drivers but it is badly biased for the above mentioned reasons. Also no clear cut indication of culpability is indicated on the driver record.

An entry is made on a driver record only after guilt has been established following the issuance of a citation for a traffic violation. When a police officer witnesses a violation, he may take one of three courses of action depending

upon his training, personal bias, work assignment, perception of the situation and the relative seriousness of the perceived violation. He may choose to ignore the violation, issue a warning, or issue a citation. If he chooses the former two, no record is kept. If he issues a citation, it then must be adjudicated. If the citation is dismissed (for a variety of reasons including reasons of not guilty or legal technicalities) no record is kept, even though a violation of safe driving practice may have actually occurred. Also, many changes are reduced to a lesser offense and no record of the original offense is kept. Only abstracts of those cases found guilty may be forwarded to the record keeper for inclusion on the driving record. If the court is lax or for some other reason, even some of these cases may not find their way onto the official driving record. Thus many sources of bias exist in the chain of events between the observation of a violation and the subsequent entry on an official record.

Of equal importance is the fact that not every violation is witnessed and hence never even has a chance of being recorded on the driving record. There simply are not enough police to watch every driver all the time.

Also, no entry is made for safe operation. Therefore, administratively, the absence of entries on the record is commonly construed to mean that the driver is a safe vehicle operator. It may simply mean that he is a smart driver who is a violator, but doesn't get caught. Many so-called safe drivers have indeed been involved in crashes and committed violations which have not been officially recorded (for a variety of reasons not under the control of the record keeping authority. Of those recorded violations, which were actually violations of safe driving and which were mere technical violations resulting in no unsafe operation?

Furthermore, safe driving has not been adequately defined and hence the identification of unsafe acts and their contribution to "unsafe driving" cannot be stated.

Other factors affect driving records as a data source. Selective enforcement by the police causes an emphasis of enforcement activity either on traffic or certain aspects of traffic or on other societal problems such as breaking and entering, etc. Thus, the enforcement practices also vary from community to community.

The attitudes of society toward self enforcement change over time, resulting in periods of low incidence of traffic violations and accidents and periods of high incidence. The economic and social climates also change and influence the violation-accident rate. While the changes are not to be construed as good or bad, no system of monitoring them exists.

Also the record keeping system changes over time both in the method by which the records are kept, the specific information included or excluded on the record, and the accessibility of the record. Thus needed information may be absent from the record or otherwise unavailable.

In summary, the traffic record for an individual is a compilation of only those violations and accidents which happened to be reported and survive the pitfalls of the path to the record keeper. Any attempt to use these records must recognize that the driving record probably does not reflect the actual capability and/or performance of the driver.

Any analysis attempting to use driving records must control for the sources of bias heretofore mentioned (and many others not mentioned). Unfortunately some of the sources of bias cannot be controlled and any analysis or attempt to prove the value of a system based solely on driving records is doomed to failure from the outset.

A second reason why driver records cannot be used to evaluate Driver Education programs is that an adequately designed study requires comparison of two carefully matched sets of drivers: graduates of Driver Education programs, and non-graduates who resemble the graduates in all important respects other than they are not graduates of a Driver Education program. That second group of drivers--the control

group--would be extremely difficult to establish, since there is no possibility of establishing a control group or a group which has not had the benefit of the high school driver education. Such an evaluation is a logical extension of the evaluation program described later in this paper. The reader should recognize, however, that all drivers have been exposed to some form of Driver Education--i.e., self taught, instruction by parents or friends, commercial schools, and the like. Thus, the question becomes not one of driver education better or worse BUT which type of driver education (formal or informal, etc.) produces the safest or best drivers, or whatever. Driver Education for young people via the formal route is the only means for the majority of Minnesota teenagers of becoming a licensed operator. There is no provision in the law for establishing an alternative treatment group (control group) and hence the possibility of making comparisons does not exist. Second, data must be collected to provide a means of comparing the various treatment groups if such groups could be identified. Without going into detail, suffice it to say that the variables necessary to establish and monitor safe driving are elusive, defy definition, ill defined, and difficult if not impossible to sample. While a data collection program could be established it would be prohibitively expensive and of tenuous validity and reliability. An attractive alternative then is to use state collected accident and violation data. Unfortunately, this is not a viable alternative as has already been explained. Therefore, without a radical change in state law and practice and large quantities of resources, an evaluation of Driver Education using a non-high school driver education group is impossible.

III. A Field Evaluation of Driver Education Programs

Driver Education programs operating in Minnesota school districts are of three types: (A) TASC-affiliated programs offering modern instruction, trained instructors, a driving simulator, a driving range, and a course duration exceeding

the minimum State requirements; (B) Non-TASC-affiliated programs offering improved classroom instruction, a driving range or driving simulator, and a course duration exceeding the minimum State requirements; and (C) Non-TASC-affiliated programs offering a traditional 30 and 6 course, with or without a driving simulator or driving range, and a course duration that may exceed, meet, or not meet the minimum State requirements.

Only a few school districts offer Type-A programs; several other school districts offer Type-B programs; all other school districts in Minnesota offer Type-C programs.

The relative effectiveness of the three types of programs can be evaluated by randomly selecting otherwise comparable students from school districts offering the three types of programs, administering three standard tests to them--a knowledge test, a range test, and a road test--and then analyzing the test results for significant differences between the three types of programs.

A. Test Instruments

1. Knowledge Test

This should be a paper-and-pencil, multiple-choice, parallel-form test of 75 to 100 items covering all aspects of safe, efficient, legal driving. The test form attached (Appendix A) is suitable. It is a prototype test designed and used in connection with evaluation of the Ann Arbor (Michigan) School District Driver Education Program. A different or expanded Knowledge Test could easily be constructed by consulting the Handbook for Driving Knowledge Testing,* a report available from the National Highway Traffic Safety Administration. This report contains not only the protocols for test development but a pool of several

*W. T. Pollock and T. L. McDole, Handbook for Driving Knowledge Testing. Ann Arbor, Michigan. The University of Michigan, Highway Safety Research Institute. Prepared under Contract FH-11-7616, January 1974.

hundred candidate multiple-choice test items for which item performance statistics have been developed. A separate, but comparable test form (to be used in a post test) should be developed and pre-tested.

2. Range Skills Test

The specific contents of the Range Skills test employed in the study are not critical. What is critical to the success of the study is that the same test instrument be consistently administered and scored. The test should consist of several driving range activities--straight-line driving, parallel parking, offset alley, serpentine course, etc. The test instrument should employ a checkoff or demerit scoring system, so that a total single score is generated for each test subject.

3. Traffic Test

Only test subjects who perform safely on the Range Skills test should be given the Traffic Test. The Traffic Test should consist of a road test of approximately one-half hour in duration, covering a variety of common driving activities: putting the car into motion, residential streets and intersections (both open and stop-sign-controlled), urban and city driving including traffic signalized intersections, multiple lane streets and city type congestion, rural highways and expressways. Different types of road surfaces are desirable as well as a variety of traffic situations. Again, the specific contents of the Traffic Test are not as critical as is the consistency with which the tests are administered and scored. The Traffic Test, like the Range Skills Test, should possess a checkoff or demerit scoring system, so that a total correct score is generated for each test subject.

NOTE: For both the pre- and post-test portions of the skill and road tests, successful passage of the skill test is a prerequisite to participation in the road test. If for any reason at any time in either the skill or road test it becomes evident either through observation on the part of the examiner

or explication on the part of the participant that the test should not be continued, it should be terminated and notations made on the score card.

Suitable scoring techniques must be developed for each test. Ideally the knowledge test should be multiple choice with the use of answer sheets to provide for quick scoring of the responses and the summation of the total number correct for each student. The skill test should employ a checkoff system or demerit system whereby a total score can be generated for each student. Likewise the road test should use a check-off or demerit type system similar to the skill test form so that a total score can be generated for each student. Care must be taken so that a total score can be determined for each test. The road and skill tests should not be open-ended in the number of errors possible, but instead each should have a standard score device indicating points of scoring and the degree of the error for each point such that each component of the exercise can be graded and a total score summed for the participant.

Each test form must be thoroughly pre-tested to eliminate problems and each scoring system similarly proven. Of great importance is the fact that the same testing and scoring procedure must be employed each time the testing is administered. While the knowledge testing is fairly objective, great care must be taken with the skill and road tests. All tests should have written instructions and all administrators of the testing and judges used for scoring must be trained to the same standards. Inter-rater variability is a potential source of error and must be carefully controlled and monitored.

B. The Sampling Design

The designation and construction of the sample requires the gathering of information concerning the population and the establishment of control variables to assure uniformity and consistency of the sample. The ultimate goal of the sample construction process is to identify the school districts

conforming to the definitions of the three types of treatments (A, B, and C) described earlier and to rank the districts within the three groups according to selected student population characteristic variables and selected community type variables and to select the subjects for testing from the selected school districts.

1. Selection of School Districts and Schools

To achieve the goal of selecting school districts, three surveys must be conducted prior to the selection of the sample. Once completed, these surveys will permit the matching of school districts and the random selection of school districts from which to draw the required samples of students.

The three surveys are: (1) A survey of high schools offering driver education by school district to determine the type and quality of the driver education offering; (2) A survey of the school districts to determine matching variables; (3) A survey of the communities containing the school districts to determine community characteristics relevant to the driving environment.

Content of Survey I -- Type of driver education offered: Sufficient information must be collected from each high school offering Driver Education about its Driver Education program, to permit identification and classification of the program into one of the three treatment types (A--4 phase TASC treatment schools; B--3 phase improved Driver Education offerings; C--2 phase traditional programs). Key elements of this survey would be: the type of program offered (2, 3, or 4 phase) -- preparation and qualification of the instructors (basic certification only, advanced courses, etc.), time of offering and length of Driver Education course, etc. These items are an attempt to quantify the quality of the course offering so the schools may be matched with and placed in the appropriate treatment type.

Content of Survey II -- Survey of school districts:
 Each school district should be surveyed to determine the following: Personal and State Income Tax return data by school district; per pupil expenditure by school district; state reimbursement for Driver Education by school district; population of the school; etc. These items are an attempt to determine the characteristics of the school district on the basis of size and financial status.

Content of Survey III -- Survey of Community:
 The surrounding community which contains the school district should also be surveyed to determine the following: size of the community in which the school district or school is located; type of community by socio-economic classes; variables available from the 1970 census tabulated by school district;* ratio of licensed drivers to population for the community (if available); tax base or ratio equalized evaluation); degree of urbanization (urban-rural); etc. These items are an attempt to determine the characteristics of the community on the basis of socio-economic status and population.

A table should be compiled which will list the results of the three surveys in the following manner: For each of the three geographic regions associated with the Unit Centers divide the population of school districts first by type of treatment offered. Give careful consideration to the results of survey I and categorize the schools by treatment type. The TASC Unit associated school district should be the only school district in treatment A. If other schools in the geographic region are offering a 4-phase program comparable to the TASC Unit Program they should be eliminated from the sample. If not, give careful consideration before including them in treatment B. All school districts offering treatment B should be placed in treatment B and the like with treatment C

*Minnesota State Planning Agency, Minnesota Analysis Planning System, Minnesota Socio-Economic Characteristics, Fourth Count 1970 Census, 3 Volumes, April 1972.

schools. Second, look at the results of surveys II and III for the TASC Unit schools in treatment A. Identify those three (perhaps more) treatment B schools matching the treatment A school and several treatment C schools. Once this selection process is completed, all that remains is to randomly select 1 school from treatment B and 1 from treatment C. These then become the schools which will be included in the sample.

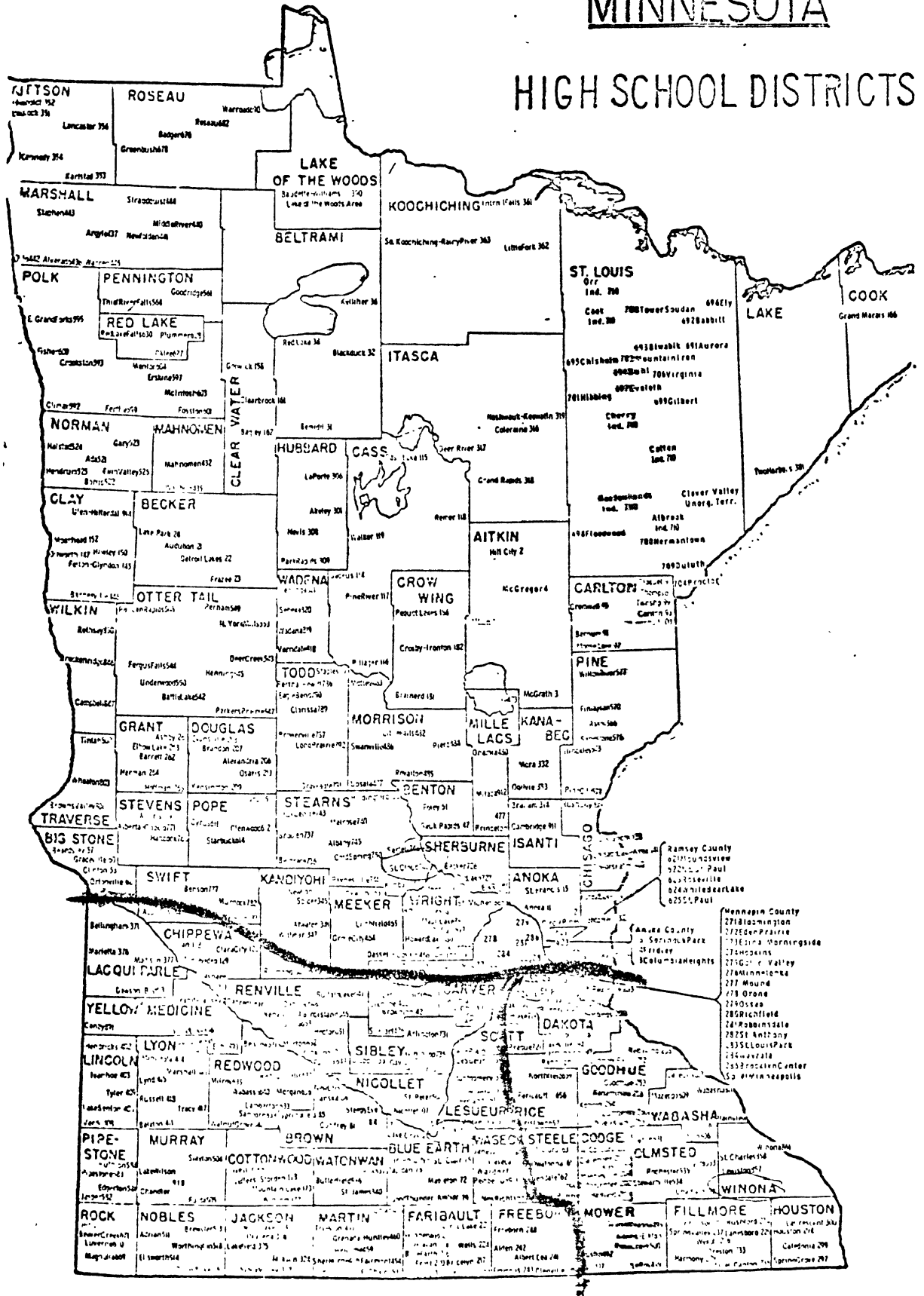
A few words of caution are necessary. The selection process must be completely random once schools within a given treatment have been identified as comparable. As many variables as practical should be used to generate comparable schools. However, don't go overboard as you may generate so much variability as to not be able to match schools.

The sample selection process would appear as shown on the next page.

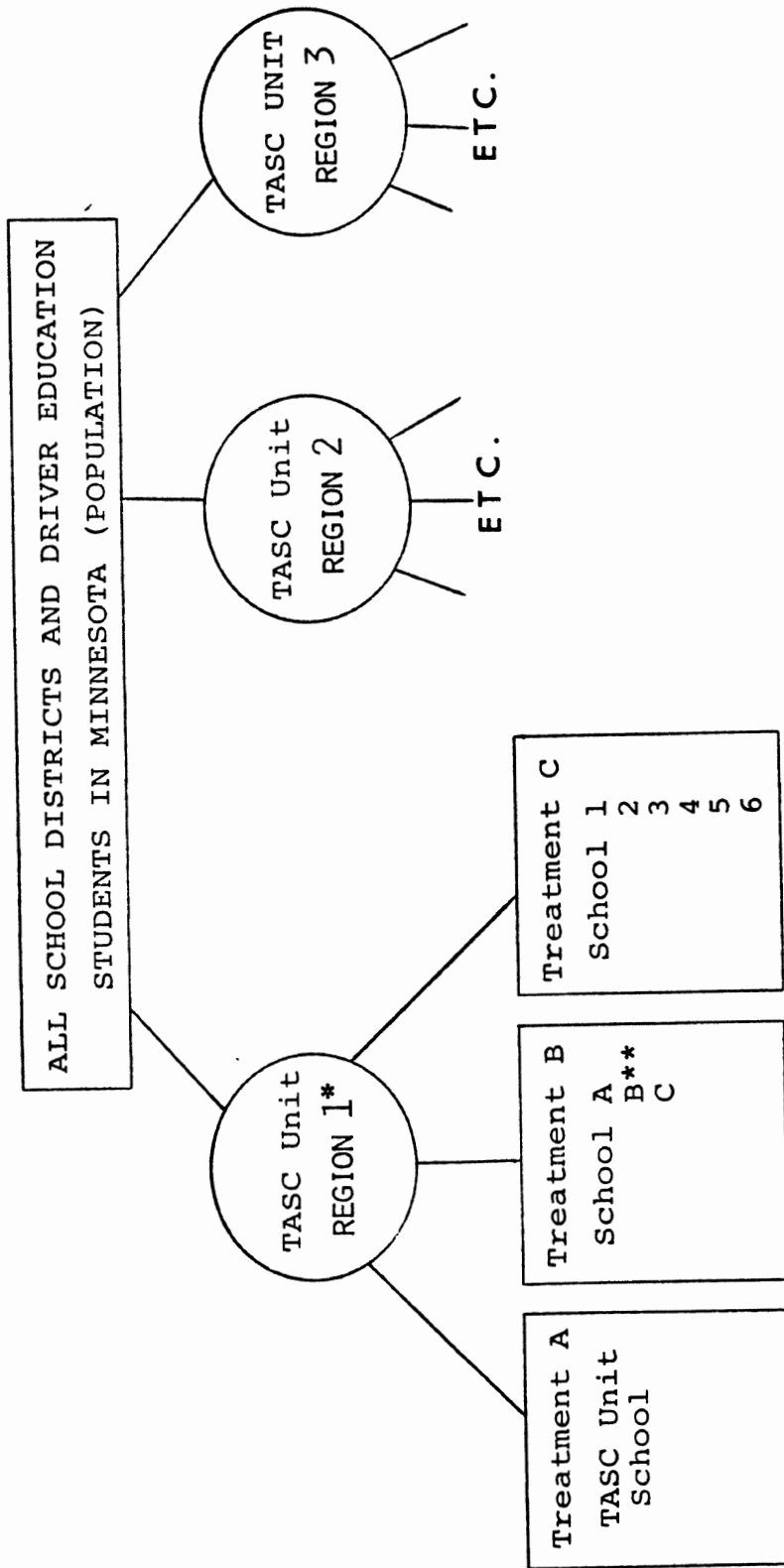
This selection process will result in 3 treatment type schools (districts) in each geographic region for a total of 9 units from which to select students. It should be noted that probably the selection procedure will result in school districts which are urban in nature since the small number of treatment A school districts controls the selection of other school districts. This, although perhaps introducing a bias, may well result in a more rigorous evaluation since the other treatment schools may well have the potential to offer a program equal to the TASC unit school programs.

Once the various treatment schools have been selected, the selection of students from each of these 9 school districts can begin. The word school district will be used here and it will be assumed that all students in a district receive the benefit of the same type of a program, individual teacher differences excepted. If two schools in a district offer a different type of program, then the school district must be split in the aforementioned selection procedure and then students selected only from the school(s) in the district which meets the selection criteria.

MINNESOTA HIGH SCHOOL DISTRICTS



— Indicates TASC Center Region Boundaries



*See region map, page 12.

**selected by random process.

2. Selection of Test Subjects

To satisfy the requirements of the analysis plan, 200 students must be selected from each of the 9 schools. Each student enrolled in Driver Education must be given an equal chance of being selected. Thus through the use of a completely random selection process in each school, students must be selected from among all the students enrolled in Driver Education such that a balanced sample exists with respect to factors such as age, sex, and grade level of the subjects. The sample should be stratified on these factors (and possibly other factors of importance) to achieve a balanced sample across the treatment groups and geographic regions. Care must be taken not to introduce a selection bias into the sample thus selected. It would be improper for the school authorities to designate students to be included in the sample.

Each student thus selected will be given the knowledge test in a pre-post driver education testing program. Due to the high cost involved in the skill and road tests a special selection procedure will be employed for determining the students to be tested in these other phases (unless unlimited resources are available). A minimum of 50 students from each of 9 schools are required to satisfy the design criteria for evaluation of the skill and road tests (all 200 are desired except for economic reasons stated above). From the sample of 200 students per school, randomly select 50 students to take either the pre-post skill and road tests. This special sample of students must be representative of the parent sample and hence must be stratified and balanced in the same manner as the parent sample. All students in the special sample must take both the road and skill tests.

For each student in the sample, the following information should be acquired and retained: name; address; age; sex; grade; responses to questions quantifying driver/automobile experience such as number of times driven car, estimation of miles, type of driving experience; an I.Q. or achievement test score; an attitude survey (i.e. Mann Attitude Survey).

3. Administration of Tests

a. Knowledge Test

The knowledge pre-test and post-test can be administered to the 200 test subjects by local instructors at each of the nine schools. Clear written instructions on how to administer and score the tests should accompany the test instruments.

b. Range Skills Test

The random sample of subjects (see previous section for the definition of these students) who have taken the knowledge pre-test should be given the range skills pre-test.

For the pre-test portion of the skill test, all subjects should possess the minimum skills necessary to operate a motor vehicle (operate defined here as start, stop and steer). To establish this threshold, all subjects should receive 1 hour of simulator instruction (or equivalent) in the actual (or simulated) procedures for: 1) starting the engine; 2) putting the car into motion; 3) driving the car forward and backward; 4) stopping the car; 5) making right and left turns. Once this minimal level of skill has been imparted to them regardless of past driving experience, between 24 and 72 hours should elapse before the actual skill test begins. Thus all subjects will possess the minimal skills for operating a vehicle (the degree of skill imparted and the timelapse should be uniform for all subjects). During the skill exercise pre-test, careful observations of all subjects is necessary to assure they do not get in over their head and endanger life and/or property.

c. Traffic Test

All test subjects who perform safely enough on the range skills pre-test should be given the traffic pre-test. As with the range skills testing, ideally all testing should be done at the same location. It would be best if all subjects from a given region could be tested in a neutral location. This could most easily be accomplished by picking a neutral

city or location and bussing the students to that location. While knowledge testing is somewhat independent of a location bias, skill and road testing are not. The ideal scheme would be to have a random mixture of students from the 3 school districts representing treatments A, B, and C, bussed to the neutral testing site and tested en masse under the same conditions by the same raters. (If the testing cannot be completed in one day, random samples from each treatment should be tested on each day. It would be improper to test all of the treatment A students on one day, all treatment B students on another, etc.) This greatly reduces the problems of inter-rater and different location bias which can readily effect any treatment result. While these considerations may seem cumbersome and expensive, they are among the most important of the study. Such a plan requires that only 3 comparable road tests and 3 comparable skill test areas be set up. An alternative would be to have the raters travel to each school. However, this would mean 9 comparable road tests and 9 comparable skill tests would have to be established and verified as to their uniformity. While it can be done, it is most difficult to assure uniformity of testing conditions. A third alternative--which is wholly intolerable is to have raters in each of the locations set up their own tests and perform their own rating. Such a scheme introduces so much variability that the results are of questionable value.

The exact content of each test (skill and road) is somewhat less critical. However, each test administration must be as like the last as possible. Also the context must have face validity, i.e. purport to measure general driving knowledge and skill.

d. Data Collection--General

The data collection activities are to be conducted in three phases: 1) pre-test of the test instruments--knowledge test, skill test, road test; 2) administration of the survey instruments; 3) administration of the test instruments to the subjects in pre-post testing.

Once the test instruments have been developed, they need to be pre-tested on students who will go through a Driver Education program. Ideally the test should be administered during the semester prior to the actual data collection. A few classes of students (100 students is enough) should be given the knowledge test at the beginning of the course and then tested again at the end of the class using an alternative test form. This will verify that the tests are indeed measuring a change in knowledge. If new knowledge tests are developed specifically for this program, it should go without saying that a full scale test development activity needs to precede even this trial testing exercise.

Likewise the skill and road tests need to be pre-tested. The same classes of students can be used for these tests and in fact the whole testing pre-test exercise should resemble the full scale testing program. Any problem detected in this exercise should be corrected and the test readministered.

Concurrently survey instruments should be administered, and other data to be used for matching the schools should be collected.

The actual data collection activities should be administered as nearly as practicable in time and sequence with the following considerations: 1) all pre-testing should be done at the beginning of the semester; 2) all post testing should be done at the end of the semester; 3) the test administration and scoring (rating) staff should be kept as small as possible, should be employed both for the pre- and post-test, and be trained to the same level of proficiency; 4) as nearly as possible identical conditions and surroundings should be present in all test administrations; 5) all score sheets and data forms as well as the recording of scores should be uniform and performed in the same manner; 6) all score, subject information such as age, sex, etc. as described earlier, and other information should be retained in a secure place until the analysis has been completed.

C. Analysis of Data

Once the data collection has been completed, all data forms should be checked for accuracy and completeness, scored (or, if they have already been scored, rechecked), and reduced to a form suitable for computer analysis.

The analysis should be a standard analysis of variance, with multiple-comparison analyses of the differences between the three types of programs. This should be supplemented by an analysis of covariance--using pre-test scores as a covariate--with post-test scores as the dependent criterion variable. Finally, an analysis which includes environmental and demographic variables as independent variables should be performed to determine the sensitivity of test scores to these variables.

Nine unique sets of scores for Driver Education programs should be compared: TASC-Region 1 programs of Type A, B, and C; TASC-Region 2 programs of Type A, B, and C; and TASC-Region 3 programs of Type A, B, and C. These nine sets define a two-way analysis of variance. The regions are control variables and the program types are the variables of interest. The basic questions to be answered are whether students learn more in the Type-A than in the Type-B and Type-C programs, whether they learn more in the Type-B than in the Type-C programs, and whether the differences are significant.

The results of the knowledge tests administered for each program should be computer-analyzed using a two-way analysis of variance capable of handling unequal numbers of observations in the individual cells and capable of computing row means. After the analysis of variance is performed, a TUKEY test should be used to perform multiple comparison tests of the statistical significance of differences between the knowledge test scores of the three types of programs.

The analysis of covariance can use the following multiple regression model:

$$Y_2 = b_0 + b_1 Y_1 + \sum_{i=1}^6 a_i X_i + E$$

where:

Y_2 is Knowledge post-test score

Y_1 is Knowledge pre-test score

$X_1 = 1$ for B program in region 1
0 otherwise

$X_2 = 1$ for A program in region 1
0 otherwise

$X_3 = 1$ for B program in region 2
0 otherwise

$X_4 = 1$ for A program in region 2
0 otherwise

$X_5 = 1$ for B program in region 3
0 otherwise

$X_6 = 1$ for A program in region 3
0 otherwise

$E =$ random error

Values of the Y's and X's are obtained for each student and the standard multiple regression program is used to obtain the estimated regression coefficients b's and a's. The interpretation of these coefficients is as follows:

$b_1 =$ A measure of the relationship between pre- and post-test scores. It is used to control for differences in student knowledge which were identified by the pre-test.

$a_1, a_3, \text{ \& } a_5 =$ A measure of the difference in knowledge between the C programs (control group) and B programs in regions 1, 2, and 3, respectively.

$a_2, a_4, \text{ \& } a_6 =$ A measure of the difference in Knowledge Test scores between the C and A programs in regions 1, 2, and 3, respectively.

Appropriate tests of statistical hypotheses can be made using the output from the multiple regression program.

The final analysis, which includes environmental variables, can be easily performed by adding variables to the regression

model specified above. Various combinations of these individual variables can be used in an exploratory analysis.

In addition to the above, demographic variables for the subjects (age, sex, etc.) should be analyzed and compared to (1) define the sample (and hence the population), and (2) compare the group of subjects in the sample across the treatment group and geographic strata to test for uniformity in the subjects.

The analysis should be reported in such a manner as to answer the following:

- (1) Verify that the various treatment groups across the geographic strata are equal.
- (2) Verify that all subject groups at the time of the pre-test are equal.
- (3) Verify that no differences exist within the same program types across geographic strata.
- (4) Verify that learning did take place within the treatment groups.
- (5) Verify that the main question--is there a significant difference in effectiveness of the programs--is answered.

D. Recommended Sequence and Timetable

	TIME IN MONTHS																	
<u>Task</u>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Conduct Surveys:*																		
Survey I																		
Survey II																		
Survey III																		
Develop Measuring Instruments																		
Select Schools																		
Pre-Test Measuring Instruments																		
Data Collection																		
Data Analysis																		
Reports																		

- *Survey I--Survey of schools offering driver education.
 Survey II--Survey of school districts--matching variables.
 Survey III--Survey of community--matching variables.

E. Interpretation of Results

Although it is expected that the results of the study will likely show that Type-A (TASC-Unit-affiliated) Driver Education programs are more effective than Type-B programs, and that Type-B programs are more effective than Type-C programs, the results should be interpreted in terms of whether the higher costs of the Type-A and Type-B programs are justified by the extent to which those programs are more effective than Type-A programs.

The study results would provide the Minnesota Department of Education with a means of evaluating what Driver Education students know when they enter the programs and what they know after having completed them. Thus, apart from establishing the relative merits of the three types of programs, the study results could well identify content areas which might be eliminated because all entering students already possess the knowledge or skills in question. In general, the study results would be a useful element in planning an effective K-12 safety education program.

PHASE B. LONG RANGE DEVELOPMENT AND EVALUATION PLAN

It would seem logical that the content of Driver Education should be based on a definition of the driving task and the ability and knowledge of the students.

Several attempts have been made at defining the driving task. However, to this date no task analysis exists upon which to base either the content of a driving course or a measuring device to determine if in fact a driver is a safe driver.

Likewise, no systematic evaluation of the knowledge and skills possessed by beginning drivers has been undertaken. (None exists for licensed drivers either).

It is proposed therefore that the State of Minnesota undertake a long range evaluation program to measure the driving skills and knowledge possessed by students ready to take Driver Education and those who have completed Driver Education and become licensed drivers.

Such a study would provide the Minnesota Department of Education with a statement of the specific skills and knowledge possessed by the prospective Driver Education student and with the skills possessed by licensed drivers. The difference between the two skill levels then would then dictate the content of the course, or provide content area considerations to be used in planning the curriculum and would also indicate which content areas would be redundant (already known by the students).

Such a program could be patterned after the Minnesota Education Assessment Programs* which is used to measure student achievement in a number of academic areas.

By using the Knowledge Test Item Pool** developed by HSRI (based on the HumRRO Driver Education Task Analysis) and a

*Division of Planning and Development, Minnesota Department of Education, Minnesota Educational Assessment: Pilot Phase Results, February 1973.

**W. T. Pollock and T. L. McDole, Handbook for Driving Knowledge Testing. Ann Arbor, Michigan. The University of Michigan, Highway Safety Research Institute. Prepared under Contract FH-11-7616, January 1974.

number of other skill and performance measures an assessment could be made of the performance and knowledge abilities of students at several grade levels (i.e., 6, 8, 10, 12, for example).

The result would be two-fold: (1) it would tell what knowledge and skills are possessed by beginning Driver Education students and (2) would indicate which knowledge and skills are acquired by a majority of the students and hence when such concepts are best taught to the student. The latter point would help in planning a K-12 safety knowledge education program and eliminate duplication of what the student has previously learned by what he is expected to learn in Driver Education.

carlmac

A Test of Driving Knowledge

Instructions:

This booklet contains a series of questions designed to help us find out how much you know about driving.

Using a PENCIL, fill out the top 2 lines on your answer sheet by printing your Name, Today's Date, Your Age, Sex, Date of Birth, School, City, Class (1st, 2nd, 3rd hour, etc.) and the name of your Instructor. DO NOT write anything in the space for the identification number.

Consider each question by itself. Read the question carefully and then try to answer it the best you can. Please answer EVERY question. Select the ONE best answer and record it in the appropriate space opposite the question number. Mark your answer with a heavy black mark between the dashed lines. See the example below.

	a	b	c	d
1	:::::	<input checked="" type="checkbox"/>	:::::	:::::

If you change your mind, erase the mark completely before marking the new choice.

DO NOT make any marks in this booklet.

When answering these questions you should assume that the road and weather conditions are good unless otherwise stated in the question.

Now turn to the next page and begin with question 1 making sure that you place the answer to question 1 next to the "1" on your answer sheet.

10. This traffic signal means:

- A. Slow down and continue with caution through the intersection.
- B. Speed up and continue through the intersection before the light changes to red.
- C. Stop before entering the intersection if you can safely do so.
- D. Stop immediately; do not continue through the intersection.



YELLOW (STEADY)

11. This sign means:

- A. Slow down to 35 mph and prepare to enter a curve.
- B. Exit ahead, exit speed 35 mph.
- C. Construction area, slow down to 35 mph and use the right lane only.
- D. Vehicles turning right must reduce speed to 35 mph.



12. It is illegal to:

- A. Drive a motor vehicle registered in another state.
- B. Keep your registration in your vehicle.
- C. Drive or permit someone else to drive a non-registered vehicle.
- D. Give your registration to another when he is using your vehicle.

13. If you see a sign warning of poor road conditions ahead:

- A. Slow down before you get to the problem area.
- B. Brake quickly and stop.
- C. Pull off the road and check the area on foot.
- D. Move toward the center of the road and continue at the same speed.

14. When approaching a railroad crossing that does not have a signal on it:

- A. Stop and look both ways before crossing.
- B. Continue across at normal speed.
- C. Blow the horn while driving over the tracks.
- D. Slow down and look both ways.

15. Under normal conditions the top speed limit for driving in a business district is:

- A. 15 mph.
- B. 20 mph.
- C. 25 mph.
- D. 30 mph.

16. After moving into a new lane you should drive near the:

- A. Left side of the lane
- B. Center of the lane.
- C. Right side of the lane.
- D. Shoulder or median.

17. You must turn your headlights on:

- A. After 7 p.m. and keep them on until 7 a.m.
- B. At night when the road does not have any street lights.
- C. 1/2 hour after sunset and during other times when visibility is bad.
- D. When the sun or bright lights create a glare.

18. For turning, you should signal:

- A. Just before the turn so you will not cause confusion.
- B. After you begin to slow down.
- C. Only if there are vehicles behind you.
- D. At least 100 feet before the intersection.

19. Passing results in:

- A. Many fatal accidents per year.
- B. Many accidents but few deaths per year.
- C. Relatively few serious accidents per year.
- D. Relatively few problems of any type.

Continue to next page. . .

20. You should drive in the right lane of a 6-lane highway when:
- A. Driving slower than the traffic in the other lanes.
 - B. You are preparing to exit on the left.
 - C. When you see traffic entering the highway from the right.
 - D. You want to pass other vehicles on the highway.

22. If you are towing a trailer and want to pass another vehicle you should not:
- A. Check to see if there is room to pass.
 - B. Make a wider swing around the vehicle than usual.
 - C. Check to see that you will not block traffic behind you.
 - D. Turn sharply when you are changing lanes.

21. An order or direction given by a police officer directing traffic:
- A. May be disregarded if you are in a hurry.
 - B. Must be obeyed.
 - C. May be ignored in an emergency.
 - D. Should not be obeyed if it is in conflict with a traffic signal.

23. When passing a vehicle going in the opposite direction you must:
- A. Decrease your speed by at least 10 mph.
 - B. Blow your horn.
 - C. Stay to the right.
 - D. Drive onto the shoulder to provide more room.

24. You should expect this sign on a:

- A. Bridge or in a tunnel.
- B. Country road or highway.
- C. Traffic circle.
- D. Highway entrance or exit.



25. If you cannot avoid driving through a sand or snow drift in the road you should:
- A. Speed up before entering it.
 - B. Drive in a zig-zag pattern through it.
 - C. Shift to a higher gear before entering it.
 - D. Try to keep your vehicle in motion.

26. You should not drive over a fire hose on the road:
- A. Under any circumstances.
 - B. If it is being used.
 - C. Unless instructed to by a fire department official.
 - D. Unless traffic is heavy in both directions.

27. To help a seriously injured person after an accident you should:
- A. Try to reset any broken bones and then call for help.
 - B. Rush him to the hospital.
 - C. Cover him and try to control any bleeding.
 - D. Move him to a warm place.

28. If you often have trouble seeing things when driving you should:
- A. Get more rest before driving.
 - B. Go to an eye doctor.
 - C. Not drive alone.
 - D. Squint your eyes when driving.

29. When entering a traffic circle you should always:
- A. Stop before entering the circle.
 - B. Go to the right when entering the circle.
 - C. Speed up to go faster than the other traffic.
 - D. Drive to the center of the circle.

30. When entering a freeway from an entrance with an acceleration lane, you should:
- A. Stop to check for traffic at the end of the entrance.
 - B. Enter the freeway at top speed and slow down to the speed limit afterward.
 - C. Use the acceleration lane to get up to the speed of the freeway traffic.
 - D. Use the shoulder to gain speed before you enter.

31. This sign means:

- A. Watch for cross traffic ahead.
- B. Stop sign or signal ahead.
- C. No through traffic; prepare to turn.
- D. Prepare to change routes.



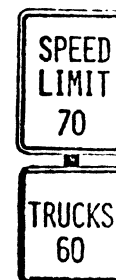
32. If a speed limit is not posted before a curve:
- A. Continue at the same speed.
 - B. Assume that it is better to take this curve at a higher speed.
 - C. Slow down to 35 to 40 mph.
 - D. Judge how sharp the curve is and change your speed accordingly.

33. When backing up you should:
- A. Allow less distance to stop than if going forward.
 - B. Pump the gas pedal to gain speed.
 - C. Avoid making quick steering changes.
 - D. Speed up slightly when turning.

34. When you see this sign you should:
- A. Avoid blowing your horn, quiet zone.
 - B. Reduce speed and watch for persons stepping from between parked cars.
 - C. Avoid driving in this area unless you are attending church services.
 - D. Not park in this area.



35. When you see this sign you should:
- A. Drive between 70 mph and 60 mph if you are driving a truck.
 - B. Not drive slower than 60 mph unless you are driving a truck.
 - C. Not drive faster than 70 mph if you are driving a car.
 - D. Not drive faster than 70 mph during the day and 60 mph at night.



36. Windshield wipers in good working condition are:
- A. Required equipment on all motor vehicles.
 - B. Required only on commercial motor vehicles.
 - C. Required equipment on only American-made vehicles.
 - D. Not required, but strongly suggested.
38. If your license or registration has been suspended or your insurance has been canceled:
- A. Continue to drive until you receive a second notice from the Department.
 - B. You may drive, but there must always be someone in the vehicle with you.
 - C. You should still use your license as a form of identification.
 - D. Your license or registration must be sent back to the Department immediately.

37. After passing an oncoming vehicle that had its bright lights on you should:
- A. Continue at a slower speed for a short time.
 - B. Continue at your normal speed.
 - C. Speed up slightly.
 - D. Turn on your inside lights.

40. When driving you should stay at least:
- A. 1/2 of a second behind the vehicle in front of you.
 - B. 3/4 of a second behind the vehicle in front of you.
 - C. 1 second behind the vehicle in front of you.
 - D. 2 seconds behind the vehicle in front of you.

39. When driving through fog at night, you should use your:
- A. High beam headlights.
 - B. Parking lights.
 - C. Low beam headlights.
 - D. 4-way flashers.
41. In making a left turn, you should not:
- A. Pull halfway into the intersection and edge into cross traffic.
 - B. Signal before you arrive at the intersection.
 - C. Slow down to a stop if traffic is heavy.
 - D. Stay in one lane while turning.

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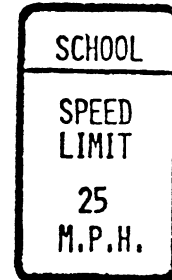
42. This sign found on top of another vehicle is used where it is necessary to:

- A. Lead vehicles through a construction area.
- B. Guide vehicles during civil defense emergencies.
- C. Warn people that the driver is a learner.
- D. Restrict the area to classified personnel.



43. This sign means:

- A. School buses must not exceed this speed limit.
- B. Any vehicles transporting children to school must not exceed this speed limit.
- C. This speed limit should be observed only when children are seen walking.
- D. Vehicles must not exceed this speed limit.



44. When passing another vehicle you can tell how fast it is going by:

- A. Looking at your speedometer.
- B. Looking at the side of the road.
- C. Seeing how fast you are getting closer to the other vehicle.
- D. Checking your speedometer and the speed with which you are approaching the other vehicle.

45. It is illegal to:

- A. Forge or alter a certificate of title with intent to commit fraud.
- B. Unknowingly borrow a registration card which has been altered.
- C. Borrow someone else's vehicle with his consent and become involved in an accident.
- D. Forget to take the title for your vehicle when driving.

46. If you are taking medicine for a cold you should:

- A. Know the effects of the medicine before you drive.
- B. Not drive with anyone else in the vehicle.
- C. Not drive at night or just after taking the medicine.
- D. Only drive if it is an emergency.

47. When there is oncoming traffic you should:

- A. Move closer to the center line.
- B. Move as far to the right as possible.
- C. Slow down until it has passed.
- D. Pass at your own risk.

48. If a vehicle approaches you quickly from the right while you are crossing an intersection:

- A. Stop in the path of the vehicle.
- B. Put your vehicle in reverse and back up.
- C. Speed up to get out of the way.
- D. Blow the horn and continue at the same speed.

49. If you know that you will soon be making a turn you should:

- A. Look well ahead to locate the turning point.
- B. Blow the horn several hundred feet before the turn.
- C. Flash your bright lights to warn other traffic.
- D. Speed up so as to avoid making other vehicles wait.

50. In an emergency stop you should not:

- A. Grasp the steering wheel firmly.
- B. Apply brakes as soon as possible.
- C. Turn off the engine.
- D. Signal the vehicles behind you.

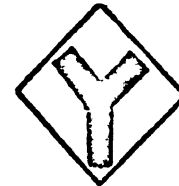
51. It is legal to:

- A. Lend your driver's license to someone else.
- B. Refuse to turn over your license to the Department.
- C. Lend your registration to someone using your vehicle.
- D. Use a false name when applying for a license.

52. When about to pass you should generally:
- A. Move up very close to the lead vehicle, then change lanes.
 - B. Drop back and change lanes far behind the lead vehicle.
 - C. Maintain usual following distance until you change lanes.
 - D. Move up close to the lead vehicle and drop back to warn him you are about to pass.

54. Before going down a long, steep hill:
- A. Shift into neutral.
 - B. Turn on your headlights or blow your horn.
 - C. Tighten your seat belt and sit well back on the seat.
 - D. Test your brakes and shift into a lower gear.

56. This sign means:
- A. Prepare to merge with traffic ahead.
 - B. Slow down, side road ahead.
 - C. Prepare to detour.
 - D. Slow down and prepare to turn right or left.



57. If your tires are badly worn you should:
- A. Replace them.
 - B. Rotate them.
 - C. Let out some air.
 - D. Put in new inner tubes.

59. When passing another vehicle you should:
- A. Return to the right lane as soon as you clear its front bumper.
 - B. Drive as close beside the vehicle as possible.
 - C. Not go over the speed limit unless necessary.
 - D. Flash your brake lights several times before turning to the right lane.

61. If you see that your exit is on the left side of the road:
- A. Move smoothly into the left lane well before the exit.
 - B. Move into the left lane and increase your speed to passing speed.
 - C. Stay in the middle lane and move over when next to your exit.
 - D. Stay in the right lane until you are going slow enough to exit.

53. If you pass pedestrians near the road at night you should:
- A. Turn off your headlights if there are lights on the street.
 - B. Use your high beam headlights if there are no oncoming vehicles.
 - C. Only use your parking lights.
 - D. Keep your headlights on low beam.

55. If the rear of your vehicle is skidding to the left you should:
- A. Move the steering wheel back and forth in a zig-zag pattern.
 - B. Turn the top of your steering wheel to the left.
 - C. Hold your steering wheel from moving until out of the skid.
 - D. Turn the top of your steering wheel to the right.

58. When possible, pedestrians walking along the road should walk:
- A. On the left side facing traffic.
 - B. On the right side with traffic.
 - C. On the edge of the road rather than on the shoulder.
 - D. On the side with the least traffic.

60. In most situations bicycle riders:
- A. Have the right-of-way over all other vehicles.
 - B. May not travel on a heavily traveled road.
 - C. Are subject to the same rules as motor vehicles.
 - D. Must ride against the flow of traffic so they can see and be seen.

62. When approaching a traffic accident or fire you should:
- A. Stop and offer your help to the police.
 - B. Turn on your emergency flashers before you drive by.
 - C. Drive closer than usual to the vehicle in front of you.
 - D. Slow down and watch for people near the scene.

Continue to next page. . .

63. If you come to a sand or snow drift on the road it is best to:
- A. Speed up and drive through it.
 - B. Drive around it if possible.
 - C. Decrease your speed and go through it.
 - D. Shift to a lower gear and drive through it.

65. To avoid spinning the tires on a slippery surface you should:
- A. Alternately use the brake and gas.
 - B. Increase speed slowly.
 - C. Shift from drive to neutral.
 - D. Start in second gear with fast but steady power.

67. Before making a turn you should:
- A. Use hand signals first and then mechanical signals.
 - B. Look to see if other vehicles will be in your way.
 - C. Stop before the turn to inspect the area.
 - D. Move slightly to the left when turning right and slightly to the right when turning left.

64. When driving on a slippery road you should:

- A. Hit your brakes harder to stop.
- B. Not make quick turns.
- C. Change speeds often.
- D. Slow down and stop at every intersection.

66. The driver of an emergency vehicle may:

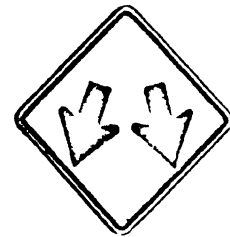
- A. Ignore certain traffic laws when responding to an alarm.
- B. Take the right-of-way when returning from an emergency.
- C. Endanger the lives of pedestrians to reach his destination.
- D. Violate traffic signals any time his vehicle is on the road.

68. If you are on a freeway entrance and notice that there is no traffic on the freeway:

- A. Stop before entering the freeway.
- B. Slow down before entering the freeway.
- C. Continue smoothly onto the freeway.
- D. Drive several miles above the legal limit before entering the freeway.

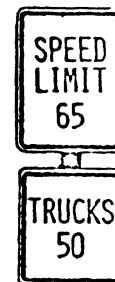
69. This sign means:

- A. Divided road ahead, keep right.
- B. Obstruction ahead, move to the right or left.
- C. Road ends ahead, detour.
- D. Prepare to merge with the traffic ahead.



70. When you see this sign you should:

- A. Drive between 50 mph and 65 mph if you are driving a truck.
- B. Not drive slower than 65 mph unless you are driving a truck.
- C. Not drive faster than 50 mph if you are driving a truck.
- D. Not drive faster than 65 mph during the day and 50 mph at night.



71. When clearing the windshield of frost or ice in extremely cold weather you should avoid using:

- A. Your windshield washer even with anti-freeze.
- B. The heater.
- C. The defroster.
- D. A plastic or rubber scraper on the windshield.

72. The most important reason for passing a truck traveling at 45 miles per hour in a 55 miles per hour zone is:

- A. To improve your ability to see.
- B. To advance your position in traffic.
- C. To reduce your travel time.
- D. To avoid exhaust fumes.

73. To turn on the right turn signal, you:

- A. Press the lever down.
- B. Push the lever in.
- C. Pull the lever out.
- D. Lift the lever up.

74. If, after leaving the road, it is necessary to return to the road without stopping:

- A. Shift to neutral and keep your foot on the brake.
- B. Speed up to get back on the road quickly.
- C. Gradually steer back towards the road.
- D. Hold the steering wheel loosely.

75. If you are backing to the right out of a driveway, you should:
- A. Check only the traffic coming from the left.
 - B. Start forward quickly once you are in the traffic lane.
 - C. Cause traffic to stop by slowly backing out of the driveway.
 - D. Back into the lane nearest the curb.

76. A vehicle generally does not have to be registered in this State if it is:
- A. Regularly used for the commercial transportation of property.
 - B. Used for personal transportation by a non-resident.
 - C. Frequently used for business within this State.
 - D. Used for transporting persons for a fee.

77. You are most likely to see this sign:
- A. In a restricted area.
 - B. On a bridge or tunnel.
 - C. In a parking lot or service area.
 - D. On a country road.



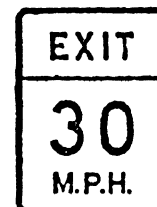
78. Minimum speed limits are:
- A. 15 mph lower than the maximum posted speed limits.
 - B. Not legal and need not be observed.
 - C. The slowest you should drive except when necessary for safety.
 - D. Speed limits between the daytime and nighttime legal speed.

79. If you damage the highway when illegally operating someone else's vehicle with the owner's permission:
- A. You and the owner are both held responsible.
 - B. The highway department is held responsible.
 - C. The owner is the only one held responsible.
 - D. You are the only one held responsible.

80. Having 1 or 2 drinks before driving:
- A. Improves your driving ability.
 - B. Has little or no effect on your driving ability.
 - C. Will affect your reactions and judgment.
 - D. Is illegal.

81. If you are about to drive away from the curb, you should:
- A. Sound your horn and go ahead.
 - B. Signal and pull into the street.
 - C. Signal, yield right-of-way and pull into the street.
 - D. Signal, wait for the first vehicle to pass and pull into the street.

82. This sign means you should:
- A. Slow down to 30 mph on this exit.
 - B. Go no faster than 30 mph before leaving the main road.
 - C. Reduce your speed to 30 mph even if you are not going to exit.
 - D. Expect to go 30 mph after exiting.



83. When turning left at an intersection:
- A. You have the right-of-way over oncoming traffic.
 - B. You should blow your horn and proceed with caution.
 - C. Check cross traffic from both directions.
 - D. Pull halfway into the intersection and edge into cross traffic.

84. Every motor vehicle must be equipped with:
- A. A muffler.
 - B. 4-ply tires.
 - C. A rear window defroster.
 - D. A trunk light.

END OF TEST * * read below

Go back and answer any question you may have skipped over.

Check your answer sheet to make sure all your answers are clearly marked and that any erasures are completely done.