PERCEPTUAL SKILLS IN THE GROUP-LIKE STRUCTURE OF DRIVER EDUCATION: A RATIONALE AND STUDY

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Submitted to the Faculty of the Graduate College
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in partial fulfillment of the requirements
for the Degree of
DOCTOR OF EDUCATION
July, 1971

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PREFACE

The National Highway Safety Bureau presently has several contracts with research firms which include private organizations and colleges. These agencies are working diligently on various aspects of the driving task. The objective of the National Highway Traffic Safety Administration is to devise a way or ways to measure the effectiveness of driver and traffic safety education in high schools all over the nation.

Because of this action many educators in the field of traffic safety have been spurred on to find better methods, techniques and aids in teaching this course, not because they are afraid the value will be disproven but because they have an acute desire to improve something they already feel is one of the most necessary courses in the high school curriculum.

The feeling that a social psychology rationale offered much for possible improvement led to the design of this study. The questions asked by the study are an attempt to find a better way to teach students how to drive.

I would like to take this opportunity to express gratitude to Dr. Richard P. Jungers who chaired my doctoral committee. His direction and assistance led to the completion of this study. My committee, Dr. Harry Heath, Dr. Gene Post and Dr. Robert Brown, gave me invaluable counsel for which I am grateful. I am also indebted to the driver and traffic safety education teaching staff in Oklahoma City for their interest and consulting assistance in administering the tests and to

Mr. Bill Accola and others of the Oklahoma State University Computer Center for processing the data. I would also like to express appreciation to Mrs. Mary Young and Mrs. Sandra Wyrick for their tenacity while typing the early manuscripts and to Mrs. Mildred Lee for her excellence of the final copy.

Most of all, I would like to extend my most heartfelt thanks to my wife Cliffa, for her encouragement and the expropriation of time at home with my daughter Kim and son Bradley. This study could not have been completed without their understanding.

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CHAPTER I

INTRODUCTION

Statement of the Problem

Currently, there are two viewpoints as to what the objectives of driver education should be. At a National Driver Education and Training Symposium in December, 1968, Dr. William Tarrants, the first Director of the National Highway Safety Bureau,[1] expressed the view that accident reduction should be its goal.

> The Bureau is obviously not opposed to driver education, but it does have a mandate to see that all highway safety program elements, including driver education, contribute to the reduction of death, injury, and property damage on the highways. (33, p. 24)

To many educators, the objectives should be "good traffic citizenship" as defined by Tossell in a recent article in Safety magazine.

> Traffic citizenship combines the concepts of 'traffic' and 'citizenship' to describe the dynamics of good citizenship under circumstances in which the individual is either a component of highway traffic, such as the driver of a vehicle, or dependent upon traffic movement for daily services. (35, p. 24)

Driver education has many critics, including educators, who maintain it is a frill, non-academic and worthless insofar as preventing accidents on our highways or teaching "good traffic citizenship" are concerned. However, in spite of this criticism, The National Highway

[1] The name has been changed to National Highway Traffic Safety Administration.

Safety Act of 1966 gave the high schools of this nation support against such criticism when it created the National Highway Safety Bureau, which has as one of its purposes, "To insure that every eligible high school student has the opportunity to enroll in a course of instruction designed to train him to drive skillfully and as safely as possible under all traffic and roadway conditions." (14, p. 7) This act, with all its implications, should create more interest in the field of driver education. The result could be improvement of the content, teaching techniques, teacher preparation and, most important of all, the product of the course.

As will be pointed out in the review of the literature, there is evidence that, under certain conditions, simulation of driving situations may hold the key to decreasing the highway accident toll. However, little attention has been given to the use of simulation in the group-like structure which occurs when the student participates in this learning experience. This problem is evident today because no answers to certain basic questions have been found. Among these questions are: "Why does simulation work?" and, "Does the group-like structure which occurs in the learning-to-drive situation have implications for the instructor who teaches the novice driver?" No rationale exists to provide the instructor who uses simulation with a reason for the positive results he achieves when they do come about.

Statement of Purpose

Methods and techniques of most courses in the school curriculum will undergo change, and improvement usually results. Driver education is no exception. The process of change for driver education has been to include simulation. This improvement in many cases has been without due regard for the importance of the physical setting of the simulator room or other methods, aids and techniques which can be used by the simulation instructor to enhance learning.

Thus the problem of the study is identified in the absence of both research supporting specific aspects of simulation instruction and a theoretical foundation to explain the success of using simulation. Using the "group" as defined by social psychologists as the focal point, the study was developed to serve a threefold purpose. First, a rationale for utilization of simulation was developed from social psychological concepts related to social-stimulus situations. Second, an attempt was made to determine if a driver education course using simulation could produce an increase in driver judgement and visual perception. Third, specific methods and techniques within the group application of simulation during the driver education course were investigated to determine their effects upon driver judgement and visual perception.

Since simulation is being used to enable the same teaching staff to teach increasing numbers of students (32, p. 1), it is appropriate to determine those techniques which can make simulation more effective. Likewise, since instruction in simulation is done in a group-like situation, the social-stimulus effect of the group is of major importance to the instructor. The one-to-one ratio typically used, in fact or by implication, by driver education instructors needs to be reviewed in light of the conditions under which learning is taking place. Even during the one-to-one ratio of in-car instruction, the back-seat peers are an important part of the interaction.

Rationale

Before establishing a rationale for this research, a description of the physical setting of the simulator room characteristics will be undertaken to better explain the simulation situation. The simulation room contains features not found in the ordinary classroom. The latter part of this section will be devoted to ideas formulated and inferred from the review of the social psychology and driver education literature and forms a basis for the rationale.

The simulators discussed in this study are manufactured for classroom use by Link (Good Driver Trainer) and Raytheon (Drivotrainer). Both incorporate similar technology and have essentially the same general characteristics. Usually, a simulation installation consists of a number of individual simulator cars (6 to 16 in number), a screen (wide angle), a set of films, a 16mm projector, and the control console. The console records errors and permits the instructor to manipulate the equipment, films and student responses in a manner which will help the student learn to drive, i.e., produce the desired behavior. Stimuli from which the students perform are supplied by the simulator car, the instructor, and the film. The latter produces both audio and visual stimuli from the projection on the screen. Another stimulus which is being proposed by this study and described in the review of the literature, the social stimulus situation, is created by the general atmosphere caused by all things present in the room.

The students in driver education are at least high school sophomores or fifteen and one-half years old. This age and the goal they are attempting to reach, places them in a category where they are susceptible to the group characteristics described below. Sherif and other social psychologists use these terms and others in the study of group behavior.

In simulation of driving, the following characteristics are present:

1. Togetherness situation.[2]

2. Ego-involvement.

3. Stimuli.[3]

4. Differential perception which results from the togetherness situation and ego-involvement.

5. Dependence upon certain stimuli and anchorages.

6. A relatively stable frame of reference. (26, pp. 1-767)

Within this frame of reference a student's visual perception should be at its peak. Sherif says about visual perception,

> The properties of an object . . . are determined not only by the fixed characteristics of the parts of the stimulation in isolation, but to a considerable extent by its position and relationship to other objects . . . and the general background against which it stands out. (27, pp. 78-79)

Simulation appears to be useful in two categories.

1. Development of manipulative skills, habits, and acquaintance with basic traffic patterns.

2. Practice and experience in the driving task, meeting hazardous traffic conditions, giving the student a chance to develop skills, habits, attitudes, and judgments necessary to meet such situations without endangering life or property. (19, pp. 104-108)

This study is concerned with the latter. "The total driving task includes: recognition of hazards, decision-making and performance.

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[2]The interaction which takes place in a togetherness situation produces some of the same products as would interaction in a bonafide group.

[3]Stimuli come from the screen (film), the instructor, the simulator car, other people in the room and forces outside the room.

Recognition includes seeing and realistically interpreting the driving scene." (6, p. 9) In order to do these and realize the greatest potential from simulation, the driver must possess not only sufficient knowledge, emotional stability, proper attitudes and skill, but he also must be able to see the film in the proper frame of reference. Simulation also should be used by the instructor under conditions which capitalize on the togetherness situation and other items discussed in previous paragraphs. If the rationale as proposed is valid, increased development of recognition of driving hazards and decision making can be the product of its application through various methods and techniques.

A student must be able to watch the wide angle screen without extraneous objects (including other students in the classroom) conflicting with his line of vision. As much darkness as possible may prevent the student from anchoring upon anything other than the screen. It must be noted here that the togetherness situation (the other eleven students) actually enhances the student's ability to perform at a high level. Allport in his studies of "alone" and "togetherness" situations has demonstrated this. (2, pp. 265-266) An additional conclusion can be reached by this same line of thinking. The simulation classroom must be a pleasant surrounding so the student can receive maximum benefit from the frame of reference of the "man-made" stimulus situation of simulation.

Total perception at any given time depends upon a number of factors, as we have noted. This includes previous experience or familiarity with the types of situations being encountered, or frame of reference. Improvement of a student's ability to detect driving hazards--which is only a small part of the student's perception--can be accomplished by introducing the individual to a variety of experiences through simulation, which is a social stimulus situation. The student becomes an "active" learner mentally by the competition of the togetherness situation and the effects of the differential behavior caused by the togetherness and ego-involvement. He also is an active physical learner in that he must properly manipulate his simulator car.

The student's increased ability to detect driving hazards can add much to his perception of the driving task and his accomplishment of that task. It will enable him to understand that it is always better to prevent a situation where an accident could happen rather than just prevent the accident from happening after the situation has developed.

The task of the simulation instructor is not only to teach students to detect driving hazards, but to help them learn to perceive the whole driving task, to identify, predict, decide and execute. It seems reasonable that this can be accomplished by concentrating upon the strong points of simulation and using the framework which has been presented.

The numerous variables which are present in driving can be controlled and held constant to a greater degree in the simulation classroom than on the road. The social stimulus situation boundaries have been decreased tremendously with only a slight reduction in tasks which face the driver out on the street.

Judgmental and perceptual skills should increase during the driver education due to the social stimulus situation described. The amount of increased judgment and perception also should vary according to certain changes in the physical setting of the room.

Definition of Terms

Social stimulus situation refers to an external stimulus which produces behavior. In this study, the simulation classroom is the setting for the social stimulus situation.

Perception refers to the sum total of the social stimulus situation.

"Visual perception refers to the identification of stimuli that are recorded through the eye." (20, p. 4)

Simulation refers to an instructor interacting with an installation of 12 simulator cars, control console and films.

Dark simulation room is a term used to describe the simulation room where the only illumination is from the equipment as it is operating.

Light simulation room is a room with portable lighting on stands in the back of the room. Lighting level is set at three on General Electric foot candle meter.

Skill drill exercises are exercises designed to increase students' manipulative skills in driving an automobile.

Limitations

The outcome of this study is limited to the driving characteristics measured by the Columbia Driver Judgment Test and the McPherson Perception of Traffic Hazards Test. The results of the tests do not measure actual ability of the driver to react in an emergency, but may indicate a trend or characteristic which will be useful to the driver education instructor.

The subjects are, by nature of the enrollment procedures employed by the school, self-selected. Those students desiring to enroll in driver education during the summer of 1970 in a large school system were used for this study. No effort was made to control for sex or I. Q. differences.

Finally, generalizations drawn from the findings should be limited to the population sampled, or applied cautiously to driver and traffic safety education classes which are similar to the sample of this study.

Summary

Chapter One states the problem and provides a statement of purpose. The problem materializes as an absence of a rationale which would explain why simulation in driver education works to improve a student's driving, and an absence of an explanation of the effects of the group-like structure which occurs in simulation. The purpose of this study is threefold: (a) A rationale is given to explain positive results in simulation. This was developed, using social psychology concepts. (b) The study was designed to see if increased driver judgment and visual perception is a product of the driver education course as it was taught in the school system used for the study. (c) Certain methods and techniques and their interaction were studied to see if they had the effect of increasing driver judgment and visual perception.

The study rationale is given, based upon influences of driver education and social psychology literature. Terms were defined and limitations of the sample described.

CHAPTER II

REVIEW OF SELECTED LITERATURE

Introduction

This chapter is concerned with a review of literature which describes the use of simulation in driver education, a definition of perception as a social-stimulus situation and the relationship of perception to driving. The review will then turn to literature which directly concerns this study, visual perception and simulation in driver education.

The Use of Simulation in Driver Education

The literature includes many suggestions for improved driver education. This in itself implies the need for improvement. Aaron says, ". . . the teacher of driver and traffic safety education is the key to improving high school driver education programs, . . ." (1, p. 83) This places some burden for improvement upon the teacher preparation programs. Anderson says improvement must come about through both content and method. (3, p. 17) Wisconsin is attempting improvement with a new curriculum guide. (13, pp. 16-19) Kaywood suggests a "new approach" to improve driver education (17, pp. 16-17), while Dr. Norman Key suggests certain innovations which are ". . . recommended for use. Among these are: (1) team teaching, (2) programmed material,

(3) television teaching, and (4) four-phased program." (18, p. 6) Most of these refer to better methods and techniques.

The position that improvement is needed in driver education was substantiated by a commentary of the National Commission on Safety Education and later was endorsed by the American Driver and Traffic Safety Education Association at its annual meeting in August, 1968. In its commentary, the Commission states, "What is needed now in driver education is a concentration on curriculum content and teaching methods."[4]

Simulation has been used since 1953 by various high schools to reach more students without an increase in teaching staff. (32, p. 1) Klamm indicates it also has been used in driver education in an effort to improve quality of content and methods. He feels that

> The simulator offers the teacher the natural bridge between the classroom and the dual control car. Simulation offers an unprecedented opportunity for the teacher to work on standardization of procedures and checking the student's learning process by having him drive duplicate driving experiences chosen for the specific experiences they offer the learning driver. Such training can be accomplished in complete safety to the teacher and the student, and realistic amounts of traffic conflict can be introduced early in the sessions to help the student realize what his role in traffic will be. (19, p. 105)

Bernoff in his study of the teaching of driver education using the Aetna Drivotrainer (simulator) found, "The Drivotrainer is a device which can be used successfully to train students as adequately, or possible better, than they are being trained by conventional means." (4, p. 9)

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[4]This commentary was distributed to the conferees attending the national conference of the American Driver and Traffic Safety Education Association but was not published.

Several other studies have been completed to determine the value of simulation. In the summarization of three studies supervised by Bernoff, Zaun and Lanke, Stack points out that "The Drivotrainer definitely offers a given staff the opportunity to train approximately thirty per cent more students in a year than can be trained by conventional means. This could result in tremendous saving." (30, p. 13) In the conclusions of his study, Bishop makes this statement: "More students (quantity) learn more about driving (quality) with less expense (cost) to the school district." (6, p. 15)

One of the key elements in simulation is the set of films which is used. Merrill and McAshan attempted to find a method of predicting learning from a given film, and used a behavioral and factual analysis technique. They found they could predict learning from films with better than chance results by using a panel of experts. Further, they found that the audience viewing the film did learn, and attitudes toward key concepts did change, after a period of six weeks under conditions described as the "sleeper effect."[5] (22, pp. 272-273) Fletcher showed in his study that single concept, 8mm loop films can be used effectively to teach selected skills and thus save demonstration time in the car. He reported:

> Naive students who were substantially equal at the start of the study learned technical information regarding selected driving skills equally well under these teaching methods: film demonstration, live demonstration and a combination of film and live demonstration. (9, p. 53)

These statements indicate simulation in driver education has possible benefits to the young driver. It gives him better instruction

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[5]No improvement was found after the subject viewed the film until six weeks had elapsed.

through improved learning methods and techniques. Schools also benefit by being able to reach more students in less time without loss of quality.

Simulation as a Social Stimulus Situation

Learning to drive is a social stimulus situation and is goal-directed behavior. A social stimulus situation is an external stimulus, the skin being the limit of the externality which produces behavior. A stimulus situation becomes internal only as a result of external effects which have become almost a part of the person. Broadly interpreted, "society" and "culture" are used to denote the classification of social stimulus situations. (26, pp. 11-14) To be more explicit, however, Sherif gives the following classification of social stimulus situations:

I. Other people
   1. Other individuals as stimuli
   2. Groups as stimulus situations
      2a. Intragroup relations
      2b. Intergroup relations
   3. Collective interaction situations

II. Cultural products
   4. Material culture
   5. Nonmaterial culture (26, p. 14)

The definition of a "group" as defined by Sherif does not exactly fit the so-called "group" of simulation students in this study. Therefore, it is essential to determine the qualities of a group this assemblage of students have. A group is defined as

> . . . a social unit which consists of a number of individuals who stand in (more or less) definite status and role relationships to one another and which possesses a set of values or norms of its own regulating the behavior of individual members, at least in matters of consequence to the group. (26, p. 144)

Twelve students who come together to learn to drive do not necessarily meet the requirements of this definition and, therefore, should not be classified as a group. On a continuum from "group" to "alone," the collection of students in simulation is somewhere in the middle. This is called "togetherness" for the following reasons: First, there is only a beginning of status and role relationships (time must elapse and interaction take place before these develop). Second, the students have a set of values and norms concerning driving because interaction with students in this age group has established these norms; therefore, some cohesion exists. Third, there is more than one student in the room; therefore, it is not an "alone" situation.

Even though technically speaking, there is no real group, an assumption can be made that some of the influences and reasoning used for determining group behavior (perception) will hold true for the simulation togetherness group. Hare states, "Individuals and groups form and conform to norms to achieve goals." (12, p. 21) Learning to drive is goal-directed behavior. However, the direction does not come entirely from the group. Some comes from society, peers, the school situation and the instructors.

Perception, its definition and discussion, in itself is a complicated task. Sherif notes, "Perception conceived as a case illustrative of experience in general, is a result of the organization of external and internal stimulating factors that come into functional relationship at a given time." (27, p. 32)[6]

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[6]The definition was derived by Sherif from Chapters 4 and 5 of W. Kohler, Gestalt Psychology.

It is important at this point to consider several factors. First, it must be realized that perception is not merely an intellectual and psychological event. All perception must take place within its appropriate frame of reference. Frame of reference is defined by Sherif as ". . . a system of functional relations among factors operative at a given time which determine psychological structuring and hence behavior." (26, p. 80) Both internal and external factors are operative at a given time. The internal factors are such things as the person's motives, attitudes, emotions, past experiences and physical qualities. The external stimulation factors include objects, persons, groups and events which influence the individual.

Ego-involvement plays an important role in perception. Each person has a concept of "I" which is a part of the internal factors which make up his frame of reference. Ego is defined by Sherif as

> . . . a development formation (a 'subsystem') in the psychological make-up of the individual consisting of interrelated attitudes which are acquired in relation to his own body, to objects, family, person, groups, social values, and institutions /sic/ and which define and regulate this relatedness to them in concrete situation. (26, p. 581)

Ego develops as a process and is governed by the satisfaction of momentary needs. As a young child meets external resistance, he gradually adapts himself to reality. This process enables the child to distinguish himself from external things. Much of the ego is formed as a result of socially prescribed norms. Sherif illustrates this in the following statements.

> In the household, in school, in business, in the office, in the meeting and even in a love situation, we stand in more or less definitely socially prescribed relationships to other individuals and to the whole situation. To a large extent our status, what we are in this situation, and how _we_ shall _feel_ and _act_, are prescribed by social values. (27, p. 166)

A person is ego-involved when one or more ego attitudes are factors in determining experience and behavior. Internal factors within the frame of reference make ego attitudes operative at a given time because of their relevance to ongoing psychological activity or external stimulus factors. (26, p. 402)

The effects of our "nation on wheels" has placed great burdens upon individuals, especially teenagers, in our society. As technology increases the complexness of our society increases and more demands are made upon the people within the society. Social values demand that teenagers learn to drive, and in their interaction with their peers and society, they become ego-involved. The student's activities are directed by this social value. He is expected to pursue this goal and usually will, even though he may or may not be aware of these expectations. These expectations produce differential effects on his experience and behavior. Sherif defines differential effects as ". . . changes in perception, discrimination, emotions, thinking, 'personality' features, and action which result from becoming a functioning part or member of social interaction." (26, p. 156) Differential effects are also caused by the student's interaction in the togetherness situation from immediate stimulus situations. When the student becomes involved, he is no longer neutral. His heightened selectivity caused by the ego-involvement increases the effectiveness of his perception, also causing differential effects. Sherif further illustrates with his statement,

> . . . the <u>consistency</u> revealed in ego-involved behavior is the outcome of his heightened selectivity and sensitized psychological processes concentrating on the relevant aspect of the stimulus field or ongoing psychological activity. (26, p. 583)

Ego is not a fixed entity, but varies depending on relationships of social classes and a person's role in society.

At this point we can say that ego is a motivational force in learning to drive an automobile. In the setting previously mentioned in the simulator room, we have a given frame of reference, ego-involved students, and anchorages supplied by the image shown on the screen to make up the social stimulus situation. The social stimulus situation can be a multitude of things. Broadly classified, a social stimulus situation can be produced by (a) other people or (b) culture. The student who uses the simulator is influenced by both. Other people, his classmates, the culture, his parents and society in general produce the social stimulus situation. Vinacke points out, "It is considered a truism by virtually all psychologists that a person's behavior is guided by his perception of the world in which he lives." (36, pp. 298-299) A student's behavior in simulation appears to be guided by his perception brought about by the physical setting in the simulation room.

In summary, a review of social psychology literature reveals that students who participate in simulation while fulfilling requirements for a driver education class are in a togetherness situation. An assemblage of students in a togetherness situation are influenced by some of the same forces which influence group behavior. Those forces, which are related to perception, have been shown by social psychologists to increase learning capabilities of the students involved.

Visual Perception and Simulation

Visual-perception studies have been completed by McPherson (21), Robinson (25) and Dorner (7) to see whether instruction in driving simulators improves a student's visual perception abilities. Nothing was added to the films for these studies.

McPherson used groups arranged according to I.Q. The varying ranges of I.Q. studied were from the educationally mentally handicapped (55-79 I.Q.) to above average (120-133 I.Q.). His study indicated that ". . . subjects receiving instruction in the driving simulators were significantly more perceptive of traffic hazards than a comparable group who did not receive treatment in driving simulators." (21, p. 49) Robinson studied "normal" students. One group received a conventional traffic simulator program, and the other viewed the same program in a regular classroom setting. His results indicated that the simulator car is not really necessary to teach visual perception. (25, pp. 43-44) Dorner used "active" versus "passive" teaching in the simulator laboratory. In the "passive" method the instructor showed only the programmed films which come with the simulators. In the "active" method, the teacher pointed out cues in potentially hazardous situations. He found that those students taught by the "active" instructional method were more perceptive to hazards than those taught by the "passive" instructional method. (7, pp. 19-24)

The studies just discussed are related to the measurement of visual perception abilities and existing programmed simulator films. The studies which follow are related to attempts to use additional techniques to increase visual perception.

A "package" of 35mm slides was designed by the Traffic and Safety instructional staff at Illinois State University, which consisted of three sections. One series contained three- to nine-digit numbers; the second, slides of uniform traffic signs; and the third, a series of local traffic scenes. The slides of digits and traffic signs were flashed on the screen for one-half second by means of a tachistoscope in an effort to increase perceptual skills of the subjects. The number of stimuli was increased as the student progressed through the series by increasing the number of digits and/or progressing from "easy-to-read" signs which contained only one word to "harder-to-read" signs which contained more words. In this manner, the student's ability to see and interpret should increase.

Streeter used sixty-one students and concluded that the "package" administered ". . . in a classroom setting will increase the students' visual perception." (31, p. 25) Other investigators used a similar "package" and studied the effect of the "package" on different sample populations.

Gardner worked with the educationally mentally handicapped and reported no significant difference between the groups which were given the "package" technique and those in the control group which did not receive this technique. (10, p. 36) He also reported that his sample was small and he had two subjects who were socially maladjusted and should not have been permitted to participate in the study. (10, p. 33) Johnson studied the effects of visual presentations in a segregated school in the South with disadvantaged youths. His results were ". . . positive and appropriate for disadvantaged youths." (13, p. 31) Thomas followed a similar plan in his study of students in a small rural school. Two groups were used: a regular driver education class and a class with a special section for building the student's recognition level. Again, positive results with the group which received the training program were reported. (34, p. 23) Welch found significant difference existed between an experimental group and a control group when a comparison was made by using a pretest and a post test. He tested the subjects of his study after the classroom session and again after the laboratory phases, which included simulation and on-street driving. In his conclusions, he states,

> . . . when followed by laboratory instruction consisting of 'active' simulator instruction and on-street experience, visual training appears to enhance the value of the simulator and on-street experience in terms of perceptual development as measured by the McPherson Perception of Traffic Hazards Test. (31, p. 24)

Hales found that students who receive either range or simulation during their experiences in driver education, in addition to the visual presentation, markedly improved their visual perceptual abilities. (11, p. 35)

A more extensive research project was reported earlier by Spicer. Visual perception was studied in relation to the three human variables of driver attitude, frustration response and problem solving. In reporting his findings, Spicer indicated that only visual perception seemed to bear any consistent relationship to driving and traffic accidents. (29, pp. 3-30)

A new technique called FLASH film developed by Klapmeier and Kuluvar has been used by high schools in forty states of the U.S.A. and in six foreign countries. This technique employs a regular 35mm filmstrip projector with a tachistoscopic lens attached. Driving situations are flashed on the screen for a short time and must be interpreted by students. The author indicates, "The 'flash' time realistically simulates the actual driving experience and decision making." (23, pp. 38-40)

Visual perception studies were completed to see if the programmed films which are a part of the simulation system improved a student's visual perception. Three studies were cited which indicate that increased visual perception is a product of the simulator film series. Following these studies, others were completed which used a "package" of 35mm slides designed to increase visual perception. This "package" was used in addition to the programmed films. Results indicated that these slides used in this manner did increase visual perception.

This chapter has reviewed three areas of literature related to this study. First, the literature helped to establish simulation in driver education as a meaningful experience and beneficial to the student who is learning to drive. Simulation also assists schools to increase quantity and quality of instruction. The second portion contained social psychology literature which is pertinent to simulation being a social stimulus situation as proposed by the rationale of this study. Conditions which are present in the simulation room while instruction is taking place is reviewed and relationships to group situations pointed out. The final section of this chapter summarized studies which used a "package" of 35mm slides to increase a student's perception. The "package" was used in addition to the programmed films which are used with the simulator cars.

CHAPTER III

METHODOLOGY AND RESEARCH DESIGN

Introduction

This chapter will describe the procedure for the study, sampling techniques used and state how the data were collected. The instruments, Columbia Driver Judgment Test and McPherson Perception of Traffic Hazards Test, are described. The statistical analyses used, including tests for homogeneity, also are described.

Procedure for the Study

Permission to conduct the study in selected Oklahoma City Schools was requested and granted by the Director of Safety Education. Permission was requested from the Director of the Driver Education Section, Oklahoma State Department of Education. This request was necessary because of slight alteration in the schedule of the standard driver education course. Permission was granted.

Before the first day of class, the equipment for the lighting control was obtained. Lighting stands with reflectors were borrowed from the Oklahoma State University Audiovisual Center, Graphic Arts Center and the Oklahoma City public schools audiovisual department. Lighting controls were supplied on a loan basis by the Oklahoma State University drama department.

The normal summer school routine was maintained as students were scheduled for a three hour session each day: three days in the classroom, one day in the simulators and one day driving per week. The study was designed with this schedule in mind. The students were rotated through this schedule so as to be in the classroom every other day. Steps were taken by the classroom instructor to keep continuity in the classroom. Students were required to keep a notebook and a brief review of the previous day's material was given by the instructor.

The pretest was administered the first day in the classroom. Test booklets, answer sheets, projectors, test narration tapes, slides and written instructions were provided for the instructor at each school. Results were scored by the investigator.

During the four-week period, the skill-drill techniques, the perception presentation and lighting treatments were administered by each instructor, according to a schedule outlined by the investigator. The techniques for administering the perception exercises were similar to those described in the review of literature, with the basic difference being the shorter perception exercises used for this study. A taped narration was used with an audible tone to indicate to the instructor when to change the hazard scene to a blank scene long enough to let the student record his response on his answer sheet. Individual differences among the teachers while administering the various treatments did occur, but were controlled to some degree by written instructions and by recording the majority of the presentations on tape.

The post tests were administered on the final day of the course. Procedures similar to those of the pretest were used.

Sampling

The sample population was drawn from Capitol Hill High School, Grant High School, John Marshall High School and Northwest Classen High School in Oklahoma City, Oklahoma. Enrollment in these schools is 1,764, 1,906, 2,177 and 2,439, respectively. Two schools are located in the south and two in the north part of this city of 366,481 population. Another criterion for selecting these particular schools was equipment. Each has a 12-place simulator installation which fits the design of the study.

The summer school session was chosen because it is only four weeks long, which would tend to lessen the number of variables related to the student's family life. The choice did cause some difficulty in scheduling, leading to an attrition rate higher than normal. Each of the four schools had two sections of sixty students which would be a total of 480. The number of students who actually completed the proper treatments and testing scheduled for their group decreased to 336 because of absenteeism and the tightness of the schedule.

Students who participated were those desiring to take driver education in the school system during the summer 1970. No enrollment fee was charged, although a ten dollar deposit was used by the school system at pre-enrollment time to assure that the student who enrolled actually attended class. This is a common practice by the school district and did not deter low-income students from enrolling, according to the director of the program, because the money was returned.

Randomization was achieved by random grouping and random assignment to the treatments. Assignment sheets were numbered from one to fifteen, then shuffled. Names of the students were affixed at random to these sheets. In this manner, randomization was achieved as to the day of the week a student would be in simulation. However, there was difficulty due to the closeness of the schedule in randomly selecting the day of the week the treatments would be administered to the various groups. Groups at all four schools received the same treatment on the same day.

Instructors were assigned by the Director of Safety Education to their respective teaching areas independently of this study and according to their abilities and experience. Several visits were made by the investigator to each of the schools while the data were being collected to insure that the procedure was followed and treatments administered. The skill drills were administered by the simulation instructor at each school. Each instructor was prepared to administer the drills by an orientation session before summer school started. The subjects were given both the orientation to the perception presentation and the perception presentation by the instructor via audio-taped narrations prepared by the investigator.

Data Collection

Data were collected during the month of June, 1970. The pretests were given at the beginning of the summer school semester and the post tests were given at the end of the semester.

Ordinarily the students in this large system take many tests and are relatively accustomed to the introduction of new tests, techniques and methods. For this reason the pretest, post test and the treatments were done with very little indication to the student of the actual reason for the slight differences in the program.

In an effort to determine the effect of a portion of the rationale, the simulator room for groups A and C was not as dark as the room for the other groups. The exact level was set by using a General Electric footcandle light meter placed in the center of the screen in each of the simulator rooms and adjusting the lighting control so there would be basically the same amount of light at each simulator installation. This level was set so each student could see everything that went on in the room, but still see the projected picture. Control of the lighting at each school was achieved by using auto transformers to raise and lower the level of light produced by bulbs with large reflectors located on portable lighting stands. The method used was an alternate plan to control the frame of reference of each student. The original plan called for a device which would restrict the student's vision to the screen and the control panel of the simulator car where most of the visual stimuli would originate. Technical difficulties in supplying a device of this nature, to the number of students used in this study, negated its use.

Each group received thirty clock-hours in the classroom instruction, three clock-hours in actual behind-the-wheel driving and twelve clock-hours of instruction in the simulators. A summary of group treatments is given in Table I. Groups A, B and E were given a thirty minute orientation session and a thirty minute perception presentation designed to increase visual perception. Content of these presentations can be found in Appendix A. Groups C, D and E participated in skill-drill exercises in an effort to make the skills automatic for the student to use whenever the proper situation demanded such action, i.e., to develop habits. Content of these exercises can be found in

Appendix B. It should be noted that group E received both types of treatment to determine the effects of skill drills and the perception presentations on the simulator student.

TABLE I

A SUMMARY OF GROUP TREATMENTS

Function	Groups				
	A	B	C	D	E
Instruction	All groups received 30 clock-hours classroom, 3 clock-hours behind-the-wheel and 12 clock-hours simulation.				
Treatments	Light Room Perception Exercises	Dark Room Perception Exercises	Light Room Skill-Drill Technique	Dark Room Skill-Drill Technique	Dark Room Skill-Drill Technique and Perception Exercises
Testing	The Columbia Driver Judgment and McPherson Perception of Traffic Hazards pretest and post test were administered to all groups.				

The behind-the-wheel instructors, indirectly involved in the study, were experienced. The classroom and simulation instructors were experienced and hold Standard Certificates in Driver and Traffic Safety Education. Individual differences existed in some methods and techniques used by the instructors, but differences were at a minimum due to several attempts which were made to standardize instruction. Monthly meetings of the instructors and student skill check sheets, which were developed by these instructors, had a stabilizing effect upon instruction. After the data were obtained, the name of the student and the pretest and post-test scores were coded and punched on IBM cards at the Oklahoma State University Computer Center. The personnel at the Center designed the programs for the Wilcoxon and Kruskal-Wallis tests and the IBM 360 Model 65 Computer was used to calculate the values derived from the formulas.

Instrumentation

The measuring instruments employed in this study were the Columbia Driver Judgment Test and the McPherson Perception of Traffic Hazards Test. The tests were administered as a pretest and post test at the beginning and end of the course. Form A of the Columbia Driver Judgment Test was used for the pretest and Form B was used for the post test. The McPherson Perception of Traffic Hazards Test has only one form and was used in both pretest and post test. There was, however, a four-week time lapse between the pretest and post test.

Columbia Driver Judgment Test

The Columbia Driver Judgment Test was developed using descriptions of driving behaviors. These were collected and analyzed by the critical incident technique. Incidents described as "good" or "bad" driving behavior were collected from 1,057 professionals representing ten different specialties concerned with traffic safety. In all, 2,111 incidents were received, from which 3,089 critical driver behaviors were abstracted. One-hundred-eighty multiple-choice questions were developed from the descriptions of behavior after they were classified into "good" or "bad" behaviors and assigned randomly to four forms. They were administered to 185 "good" and 431 "bad" drivers and internal consistency checked. One-hundred-sixty questions remained. Using cross validation statistics, 40 questions having similar mean difficulty and internal consistency were incorporated as Form A and Form B of the Columbia Driver Judgment Test. An objective type test with accompanying answer sheet was used by the student to record his responses by placing an X in the appropriate space(s) on this paper-pencil multiple-choice test.

Below are statements of reliability and validity as reported by the Manual of Administration of the Columbia Driver Judgment Test.

> Reliability. Split-half reliability coefficients, based on alternate items, were calculated for each form of the test. In one study, reliability estimates for Form A were computed from performance of fifty-one 'good' and eighty-eight 'bad' drivers. The result was a corrected split-half reliability coefficient of .89. Form B was administered to forty-three 'good' and ninety-four 'bad' drivers, with a resultant split-half reliability of .87.
>
> Validity. Establishing the validity of the CDJT was made more difficult by the lack of adequate criterion measures. Existing behavior measures of driving, such as accident and violation records, have theoretical deficiencies and low reliabilities (Barmack, 1962; Goldstein, 1961; Thorndike, 1951); so do behind-the-wheel performance tests, which, in addition, tap a different area of driver behavior--implementation of decisions rather than decision making itself.
>
> Consequently the validity of the CDJT rests primarily on the method of its development--defining driver behavior as a score on a test scientifically derived from the systematic analysis of expert's objective descriptions of 'good' and 'bad' driving. As a further check, however, twenty authorities from a variety of fields relating to traffic safety were given the CDJT. Ten took Form A and ten Form B. For all items, the average interjudge agreement on answers

was 94 per cent. The lowest degree of agreement for any single answer was 80 per cent. These results suggest that the content validity of the test is of a high order.

In another attempt to assess validity, the CDJT and tests concerned with psychological attributes logically related to driving behavior--anxiety, fantasy, authoritarianism, and social conformity--were given to 182 behaviorally classified 'bad' drivers. (The 'good' driver sample was judged too homogeneous on pertinent variables to be used in this study.) The results indicated that comparatively high degrees of anxiety, fantasy, and authoritarianism are associated with low scores on the CDJT. These findings generally agree with those reported in the literature which suggest that a high level of presence of such personality characteristics negatively influences an individual's driving ability. (8, pp. 3-4)

The McPherson Perception of Traffic Hazards Test

The McPherson Perception of Traffic Hazards Test is a visual test with a paper-pencil answer sheet. A slide of traffic hazard(s) is flashed on the screen for five seconds, the student marks his answer sheet with an X in the appropriate box as the possible choices are read twice from a tape recorder. A "beep" from the tape controls the time each slide appears on the screen in order to assure each slide is shown five seconds. The number of possible responses, including detractors, was limited to five or less to insure minimum memory span between the visual presentation and the taped oral responses from which the students were to choose. The vocabulary used in giving the test was controlled in an attempt to keep the words understandable for most I.Q. classifications. A copy of the test script and answer sheet is in Appendix C.

Reliability. A pilot study was conducted by McPherson to determine the discrimination of questions contained in the Perception of Traffic Hazards Test. With this information, the questions were arranged from least difficult to most difficult. Another group was used as reported by Lazarewicz in his study to obtain data and the product-moment co-efficient of correlation was employed to determine statistical reliability. The test results revealed a reliability level of .985. (20, p. 25)

Validity. Statistical validity has not been established for the McPherson Perception of Traffic Hazards Test. However, the test appears to have content validity and is supported by its method of development which is described below.

The McPherson Perception of Traffic Hazards Test was developed at Illinois State University. The test was constructed from selected slides of the Shell Oil Company series entitled "Perception of Driving Hazards." Traffic scenes from this series were carefully chosen and cut out of the film-strip series and placed in 35mm slide frames. The slides depict typical situations in various driving environments including expressway, highway, residential and business. For each slide, hazards, potential hazards and information necessary for safe driving were identified by the instructional staff at Illinois State University's Traffic Safety Education Section. Pseudo-hazards were included in the test to prevent guessing and to determine if the student was reading the traffic picture in a false manner.

Various hazards present various degrees of danger; therefore, the identified hazards were assigned positive numerical values, depending on the severity of the hazards. The pseudo-hazards were given negative numerical values[7] to establish a discrete nature for the distractor.

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[7]Negative values of minus two and three were used, depending upon the degree of relevance to each scene.

A subject's raw score on the test is the difference between his identification of actual traffic hazards and the pseudo-hazards. (21, pp. 44-46)

Hypotheses

The hypotheses which were tested are stated below. The direction stated on Hypothesis One is supported by studies which appear in the review of literature. Hypotheses Two, Three, Four and Five state direction also. The support for direction on these hypotheses is based upon the social psychology rationale as presented in Chapter One and subsequent supporting literature.

> H.1. The post-test scores on the Columbia Driver Judgment Test and the McPherson Perception of Traffic Hazards Test will be greater than the pretest scores of the Columbia Driver Judgment Test and the McPherson Perception of Traffic Hazards Test.
>
> H.2. The post-test scores of group E (dark room, combination of perception exercises and skill-drill techniques), as measured by the two tests, will be significantly higher than the scores of any other group.
>
> H.3. The post-test scores of group B (dark room and perception presentation), as measured by the two tests, will be significantly higher than the scores of groups A, C and D.
>
> H.4. The post-test scores of group A (light room and perception presentation), as measured by the two tests, will be significantly higher than the scores of groups C and D.
>
> H.5. The post-test scores of group D (dark room and skill-drill techniques), as measured by the two tests, will be significantly higher than group C.

Statistical Procedures

Data characteristics for the five groups on the Columbia Driver Judgment Test and the McPherson Perception of Traffic Hazards Test were determined by the F test. Popham indicates the F test can be used to see if the groups come from the same population. (24, pp. 137-138)

Tests for homogeneity were run at the .05 level of significance and are summarized in Chapter Four, Tables II, III, IV and V. The null hypothesis of no significant difference was used to see if differences did exist among the groups which took the Columbia and McPherson pre-test and post tests.

Two statistical procedures were used to test the hypotheses of this investigation. Both are non-parametric in nature and were chosen for three basic reasons. First, the groups which were used for statistical comparison were unequal in number; second, the variances between the groups for two of the four groups as shown by the F test were heterogeneous as shown by Tables II, III, IV and V in Chapter Four. Third, it was assumed the data resulting from administering the Columbia Driver Judgment Test and the McPherson Perception of Traffic Hazards Test were ordinal in nature.

Hypothesis One was tested by using the Wilcoxon matched-pairs signed-ranks test. This test was chosen in view of the following statement by Popham:

> The Wilcoxon test uses not only the 'direction' of the differences between pairs (when two measures for the same individual are taken these are considered to represent a 'pair', but also the relative 'magnitude' of differences. (24, p. 279)

According to Siegel, there are two tests available for k independent samples of ordinal data, the Extension of the Median Test and the Kruskal-Wallis one-way analysis of variance. However, he states of the Kruskal-Wallis one-way analysis of variance, "When data are such that either test might be used, the Kruskal-Wallis test will be found to be more efficient because it uses more of the information in the observations." (28, p. 193) He also states, "The Kruskal-Wallis test seems to be the most efficient of the non-parametric tests for k independent samples." (28, p. 194) Therefore, the Kruskal-Wallis was chosen on the basis of Siegel's statements and the nature of the data collected to test the four remaining hypotheses.

Summary

This chapter outlined the methodology and research design. The procedure included a pretest and post test and various treatments administered within the regular summer school schedule of a school system. The sampling, from four high schools in a large city, consisted of 336 students who desired to take driver education during the summer of 1970. Randomness was achieved by random grouping and assignment to treatments. Data were collected during June, 1970. Pertinent information about the instruments used, Columbia Driver Judgment Test and the McPherson Perception of Traffic Hazards Test, including validity and reliability, were described. Hypothesis One was stated to indicate driver judgment and perceptual skills will increase during the course. Hypotheses Two, Three, Four and Five were stated to indicate differences will exist in the various treatments by predicting degrees of improvement in driver judgment and perception. Two non-parametric procedures were employed in this study, the Wilcoxon matched-pairs signed-ranks test and the Kruskal-Wallis one-way analysis of variance. These are described and reasons for using these particular procedures stated.

CHAPTER IV

ANALYSIS OF DATA

Introduction

Data were gathered for this study by administering a pretest and post test using two instruments, the Columbia Driver Judgment Test and the McPherson Perception of Traffic Hazards Test. This chapter contains the summaries of results and tables of the tests for homogeneity. The hypotheses are restated and results of the statistical computations for these hypotheses are given. Statistical computations were made by using the Wilcoxon matched-pairs signed-ranks test to determine if the null hypothesis should be rejected for Hypothesis One. The Kruskal-Wallis one-way analysis of variance was used for Hypotheses Two, Three, Four and Five. Rejection of null forms of the hypotheses and homogeneity checks, indirectly accepting their alternate forms when such inferences were supported by computations, was used in adherence to common practice.

Results of Tests for Homogeneity

Homogeneity on the two pretests (Columbia and McPherson) and the post tests (Columbia and McPherson) was checked by using an F ratio to see if extreme variances existed. The .05 level of confidence was used to accept or reject the null hypothesis in determining homogeneity of the groups.

The F value obtained for the Columbia pretest was 1.813. The critical F value (50, 70 df) at the .05 level of confidence is 1.53. On the basis of this computation, the variances among the groups on the Columbia pretest were considered to be heterogeneous, or significantly different. Data related to this test are summarized in Table II below.

TABLE II

A SUMMARY OF CHARACTERISTICS OF GROUPS ON THE COLUMBIA DRIVER JUDGMENT PRETEST

Group	n	$\bar{X}$	s^2	s	F	p
A	71	29.070	25.107	5.010		
B	60	28.900	21.823	4.671		
C	76	29.315	15.426	3.927	F=1.813*	$<.05$
D	71	28.169	27.971	5.288		
E	58	28.913	26.906	5.187		

*Critical F .05 (50,70) = 1.53

The F value for the Columbia post test is 1.748. The critical F value (50,70 df) at the .05 level of confidence is 1.53. On the basis of this computation, the variances among the groups on the Columbia post test were considered to be heterogeneous, or significantly different. Data related to this test are summarized in Table III below.

TABLE III

A SUMMARY OF CHARACTERISTICS OF GROUPS ON THE COLUMBIA DRIVER JUDGMENT POST TEST

Group	n	$\bar{X}$	s^2	s	F	p
A	71	29.816	16.459	4.056		
B	60	29.366	20.532	4.531		
C	76	29.421	25.033	5.003	F=1.748*	$<.05$
D	71	29.380	28.779	5.366		
E	58	30.000	24.551	4.954		

*Critical F .05 (50,70) = 1.53

The F value for the McPherson pretest is 1.401. The critical F value (50,70 df) at the .05 level of confidence is 1.53. On the basis of this computation, the variances among the groups on the McPherson pretest were considered to be homogeneous or not significantly different. Data related to this test are summarized in Table IV below.

TABLE IV

A SUMMARY OF CHARACTERISTICS OF GROUPS ON THE MCPHERSON PERCEPTION OF TRAFFIC HAZARDS PRETEST

Group	n	$\bar{X}$	s^2	s	F	p
A	71	33.000	97.154	9.856		
B	60	32.666	108.622	10.422		
C	76	33.171	77.483	8.802	F=1.401*	> .05
D	71	31.239	103.590	10.177		
E	58	33.000	83.137	9.117		

*Critical F .05 (50,70) = 1.53

The F value for the McPherson post test is 1.255. The critical F value (50,60 df) at the .05 level of confidence is 1.56. On the basis of this computation, the variances among the groups on the McPherson post test were considered to be homogeneous or not significantly different. Data related to this test are summarized in Table V below.

TABLE V

A SUMMARY OF CHARACTERISTICS OF GROUPS ON THE MCPHERSON PERCEPTION OF TRAFFIC HAZARDS POST TEST

Group	n	$\bar{X}$	s^2	s	F	p
A	71	42.577	53.229	7.295		
B	60	41.000	52.133	7.220		
C	76	40.592	61.794	7.860	F=1.255*	>.05
D	71	38.985	65.450	8.090		
E	58	39.051	57.635	7.591		

*Critical F .05 (50,60) = 1.56

Testing the Hypotheses

> H.1. The post test scores on the Columbia Driver Judgment Test and the McPherson Perception of Traffic Hazards Test will be greater than the pretest scores of the Columbia Driver Judgment Test and the McPherson Perception of Traffic Hazards Test.

The Wilcoxon matched-pairs signed-ranks test yielded a z value of -3.829 for the comparison of the pretest and post-test scores of the Columbia Driver Judgment Test. This z value for a one-tailed test is significant beyond the .00007 level of confidence. Evaluation of the computer results produced the observation that the significance is in a positive direction.

The results of the comparison of the McPherson Perception of Traffic Hazards pretest and post-test scores yielded a z value of -12.282, which is significant beyond the .00003 level of confidence for a one-tailed test. Evaluation of the computer results produced the observation that the significance is in a positive direction.

On the bases cited above, the null hypothesis of no significant difference is rejected. The observation of more positive scores than negative scores also supports the direction as stated by the hypothesis.

An analysis of the data for the remaining four hypotheses stated below was made by using the Kruskal-Wallis one-way analysis of variance to see if differences among the groups did exist. The calculated H value for the Columbia pretest was 1.297. The calculated H value for the Columbia post test was 1.598. The calculated H value for the McPherson pretest was 2.07. The calculated H value for the McPherson post test was 9.115. This last value is the only one which approached significance. Comparison of the computed H values with Table C values (28, p. 249) revealed that none exceeds the critical value of 9.49.

On the basis of these calculations, it is concluded that no significant differences existed between any of the groups. Therefore, the null hypothesis for Hypotheses Two, Three, Four and Five is not rejected. Data related to this test are summarized in Tables V, VI, VII and VIII.

> H.2. The scores of group E (dark room, combination of perception exercises and skill-drill techniques), as measured by the two tests, will be significantly higher than the scores of any other group.
>
> H.3. The scores of group B (dark room and perception presentation), as measured by the two tests, will be significantly higher than the scores of groups A, C and D.
>
> H.4. The scores of group A (light room and perception presentation), as measured by the two tests, will be significantly higher than the scores of groups C and D.
>
> H.5. The scores of group D (dark room and skill-drill techniques), as measured by the two tests, will be significantly higher than group C.

TABLE VI

KRUSKAL-WALLIS ONE-WAY ANALYSIS OF VARIANCE
COLUMBIA DRIVER JUDGMENT
PRETEST

Group	n	Average Rank	
A	71	173.28	
B	60	164.34	
C	76	172.59	H = 1.297*
D	71	158.73	
E	58	173.54	

*Critical H .05 = 9.49

TABLE VII

KRUSKAL-WALLIS ONE-WAY ANALYSIS OF VARIANCE
COLUMBIA DRIVER JUDGMENT
POST TEST

Group	n	Average Rank	
A	71	168.36	
B	60	160.52	
C	76	166.76	H = 1.598*
D	71	166.23	
E	58	181.99	

*Critical H .05 = 9.49

TABLE VIII

KRUSKAL-WALLIS ONE-WAY ANALYSIS OF VARIANCE
MCPHERSON PERCEPTION OF TRAFFIC
HAZARDS PRETEST

Group	n	Average Rank	
A	71	173.21	
B	60	172.72	
C	76	172.01	H = 2.07*
D	71	153.68	
E	58	171.91	

*Critical H .05 = 9.49

TABLE IX

KRUSKAL-WALLIS ONE-WAY ANALYSIS OF VARIANCE
MCPHERSON PERCEPTION OF TRAFFIC
HAZARDS POST TEST

Group	n	Average Rank	
A	71	194.04	
B	60	176.01	
C	76	167.01	H = 9.115*
D	71	152.79	
E	58	150.66	

*Critical H .05 = 9.49

Summary

This chapter has presented the findings of the study. The significance level of .05 was used to determine homogeneity and to accept or reject the hypotheses stated in the null form for all five hypotheses. The tests for homogeneity indicated that two of the groups were non-homogeneous. Heterogeneity, ordinal data and unequal numbers in the groups were used as criteria to select the Wilcoxon signed-ranks matched-pairs test for the first hypothesis and the Kruskal-Wallis one-way analysis of variance for the remaining four. The results showed a significant difference between the pretest and post-test scores in the proper direction. The various treatments used in this study did not result in a significant statistical difference among the groups examined.

CHAPTER V

SUMMARY AND CONCLUSIONS

Introduction

The National Highway Safety Act of 1966 brought a spotlight of great intensity to bear upon high school driver education as a course in the curriculum. This course, because of its mention in the Act, makes it a part of the nation's over-all plan for safer transportation. Thus, driver education eventually must prove that it contributes to reducing the number of lives lost to traffic accidents. It is hoped that this study will become one of the many bricks in the wall which must be built to insure that driver and traffic safety education in high schools does make its contribution to reducing highway accidents.

The purpose of this chapter is to present a summary of the study. This includes the findings, conclusions drawn from the results of the study and recommendations for additional research in visual perception as it relates to driving a vehicle.

Summary of Procedures

The central purpose of this study, unlike other studies of this nature, was to develop a rationale for simulation in driver education based upon social psychology concepts. Heretofore, there has been no comprehensive rationale which would explain to the instructor why simulation seems to work. The second purpose was to determine if driver judgment and perceptual skills would be increased during driver education which included classroom, behind-the-wheel and simulation. Finally, an effort was made to determine if short skill-drill exercises, short perception presentations, room lighting and the interaction of these treatments would have an effect upon the drivers' judgmental and perceptual skills.

The rationale was developed using social psychology as a basis. Simulation in driver education occurs in a social-stimulus situation. The social-stimulus situation is caused by the student's ego-involvement, differential perception and frame of reference. These are group-like characteristics caused by the several students in the room, in this case twelve. These characteristics interact to enhance the learning situation. Expectations and pressures of other individuals cause the student to become "susceptible" in the learning situation. The rationale supports increased judgment and visual perception by the end of the driver education course when simulators are used. It also supports a variation in judgmental and perceptual skills as the social-stimulus situation varies when the room is lightened, darkened or differential treatment administered.

A sample of 336 students from four high schools in a metropolitan area was used. The students were given the _Columbia Driver Judgment Test_ and the _McPherson Perception of Traffic Hazards Test_ in a pretest, post-test situation. The groups were subjected to various treatments between the pretest and the post test.

Summary of Results

In order to check homogeneity of variances of the five groups, the F test of extreme variances was used with the pretest and the post-test scores. Two pretest and post-test scores were found to be heterogeneous. Heterogeneity, unequal numbers in the groups and ordinal data were characteristics considered in choosing the type of statistical analysis used to test the hypotheses. Non-parametric statistical analyses were used to compare groups which received the various treatments to see if the scores on the post test were significantly higher.

The Wilcoxon matched-pairs signed-ranks test was used to test Hypothesis One. It was determined by this analysis that the driver and traffic safety students as taught during the summer of 1970 in Oklahoma City did increase their driver judgment as measured by the Columbia Driver Judgment Test and their perceptual skills as measured by the McPherson Perception of Traffic Hazards Test.

The four remaining hypotheses were tested to see if differences did actually exist in the scores of the subjects. If differences did exist, other statistical procedures would be used to determine where those differences were and which groups, if any, actually excelled on the scores of the two instruments. The Kruskal-Wallis one-way analysis of variance was used and a determination was made on the basis of this test that there were no significant differences among the groups.

> H.1. The post-test scores on the Columbia Driver Judgment Test and the McPherson Perception of Traffic Hazards Test will be greater than the pretest scores of the Columbia Driver Judgment Test and the McPherson Perception of Traffic Hazards Test.

> H.2. The post-test scores of group E (dark room, combination of perception exercises and skill-drill techniques), as measured by the two tests, will be

significantly higher than the scores of any other group.

H.3. The post-test scores of group B (dark room and perception presentation), as measured by the two tests, will be significantly higher than the scores of groups A, C and D.

H.4. The post-test scores of group A (light room and perception presentation), as measured by the two tests, will be significantly higher than the scores of groups C and D.

H.5. The post-test scores of group D (dark room and skill-drill techniques), as measured by the two tests, will be significantly higher than group C.

Conclusions

Rejection of the null for Hypothesis One supports the conclusion that the driver and traffic safety education course as taught in Oklahoma City during the summer of 1970 did increase a student's driver judgment and visual perception as measured by the Columbia Driver Judgment and McPherson Perception of Traffic Hazards tests, respectively.[8]

Failure to reject the null for Hypotheses Two, Three, Four and Five did not support the rationale as proposed. There were no significant differences as a result of the various treatments administered for traffic judgment or perceptual skills.

Another conclusion is implied in the paragraphs above. Literature reviewed for this study implies perceptual skills can be taught in driver and traffic safety education. However, the results of this study, with its shortened perception exercises, implies that it would take more than two thirty-minute segments of perception exercises,

[8]The course consisted of thirty clock-hours of classroom, twelve clock-hours of simulation and three clock-hours of behind-the-wheel instruction.

skill drills, lighting used as a device to regulate anchorages (frame of reference) and their interaction to create improvement above that already being achieved in driver education using simulation. This conclusion also is supported by the calculation of the H value for the McPherson post test approaching significance.

Recommendations

One value of research is to generate new ideas for other investigations. The final segment of this study suggests ideas and possible avenues of approach.

It is recommended that the first part of the study be repeated with some change in design. A control group which would not have the benefit of simulation would give a basis for estimating how much perception and judgment is increased when simulation in driver and traffic safety education is used. Longer perceptual sessions would be needed, as implied by the results of this study.

Although the rationale as proposed is not supported by this study it is possible that the design was not adequate to produce results which would support or reject it. The difficulty encountered in closing out all external stimuli for the simulation student could account for no differences existing. Even with the simulator room very dark, the student could still see other students around him, observe their actions, anchor on things in the room and otherwise distort his frame of reference. Thus, a second recommendation would be a study which could be designed to eliminate the possibility of the simulation student anchoring upon any stimulus except the screen, the controls and instruments of his car. A device could be designed to permit the student to see only the screen and the instrument panel of his simulator car. This device would cut down on anchorages and tend to amplify the stimulus of the screen and the simulator car. This amplification would be in addition to the already present social-stimulus situation. Later, designs for simulators in driver education could be improved if this reasoning is supported.

A reduction of the number of students and instructors involved also would be in order. Variables related to the number of instructors and number of schools used in the study could be drastically cut by following this recommendation.

The McPherson Perception of Traffic Hazards Test has been very useful in this and other studies. A similar test which would use the same approach but employ motion could prove to be even more useful. The final recommendation of this study is that such a test using motion film clips be constructed, and that its reliability and validity be established for similar studies. A test of this nature would present a better "real world" situation and might prove to be a very effective tool for research in traffic safety.

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APPENDIX A

PERCEPTION EXERCISES

Script for Orientation to Perception Presentation*

I. Regulatory Signs
Show transparency 13 (a pointer may be used to point to correct sign as definition is given)

When regulatory signs are used to direct traffic on the roadway, the driver does not have an option; he must do as the signs indicate.

Stop sign. The driver must stop at a designated location at all times.

Yield sign. The driver must yield to other traffic that is approaching from right or left. In such cases this sign has the same meaning as the stop sign.

No U-Turn signs. Traffic must proceed ahead and not turn.

Arrows indicate the direction of travel. In this case, straight ahead or left.

Slower traffic keep right is used primarily on roadways outside municipalities. When driving below the maximum legal speed, keep right.

Speed 40 MPH is the maximum legal speed allowed on the roadway under legal conditions. Traffic volume, road surface, driver condition, and weather conditions may require even lower speeds for safe driving.

The One-Way Arrow shows that the driver must drive in the direction the arrow is pointing.

The Keep Right arrow indicates direction. There is no option allowed here. The driver must stay on the side in the direction of the arrow.

The Do Not Pass sign is used on curves and where sight distances are decreased. It means to remain in your lane of travel until you are beyond the "markings," which you will see later.

Each sign has a different shape because shapes can usually be seen for a greater distance than the legend on the sign.

---

*Transparencies 13-22 of "Into the Driver's Seat."

The shapes of the signs on this transparency are octagonal, triangular, rectangular with the longer dimension horizontal, and rectangular with the greater dimension vertical.

Color combinations are also used to distinguish signs. For example, stop signs are white on red and reflectorized.

One-Way signs are black and white combinations.

Other signs are black on yellow.

Signs are usually located in the areas where they must be observed.

II. Warning Signs
Show transparency 14.

The design of and legend on warning signs are usually very clearly shown.

The shapes, legends and color combinations shown on this transparency are identical to what you see along the roadway.

Warning signs, when installed by a traffic engineer, are installed according to engineering standards. That is, they are placed far enough in advance of the condition for the driver to make the necessary adjustment in driving to cope with the situation safely.

These signs are placed to the right of the roadway. In high speed areas, at least three signs may be used at different distances from the conditions they relate to.

III. Guide Signs
Show transparency 15.

<u>Guide Signs</u> are used to direct a motorist along established routes; to inform him of intersecting routes; to direct him to his destination; to identify rivers, parks and forests.

The three major groups of guide signs are:

A. Route markers and auxiliary markers; Highway numbers, inter-state, U. S. route markers, Highway junctions and directional.

B. Destination and Distance Signs: names of cities, towns and villages.

Standards limit the number of names of cities to not more than two to a sign.

C. Information signs: Rest places, parking areas, public telephones, first aid stations, and services areas.

IV. Sign Locations
Show transparency 16.

A diamond shaped or warning sign with the legend "Merging Traffic" is located according to engineering standards in advance of the point where the traffic merges.

The regulatory yield sign indicates to the driver that he must stop if traffic is so close as to constitute a hazard.

The railroad crossing warning sign is placed to permit the driver to stop if a train is approaching.

V. Purpose of Markings
Show transparency 17.

Markings have a definite and important function to perform in controlling traffic.

They serve as a supplementary function to other regulations and warnings such as traffic signs and signals.

In some instances they give direction to the driver solely on their merit.

Markings are used for channelizing traffic by discouraging lane changing, separating turn lanes, special use lanes such as passing on a hill and for marking ramps and exits.

A dividing line separates the direction of legal flow of traffic. It is sometimes referred to as a center line, but is not always located in the center of the roadway.

Lane lines designate the travel area for a vehicle. A lane may be marked or unmarked.

Crosswalk lines are painted on streets to provide a degree of protection for the pedestrians. They are placed where there is a conflict between vehicular and pedestrian traffic. Crosswalk lines are sometimes placed at locations other than at intersections.

Two lines are necessary for a crosswalk.

a. The lines are solid white in all areas, urban and rural.

b. According to the uniform traffic code, the pedestrian must walk in the right half of the crosswalk.

Turn markings are painted on the pavement to indicate the direction of the movement of traffic.

Show transparency 18.

Pavement edge markings help reduce the damage caused to the pavement edge, makes driving more comfortable, and helps to reduce accidents.

No passing is designated by a solid line in the lane in which no passing is permitted.

Solid white lines, used as a dividing line on state and county roadways would be quite expensive, therefore, dash lines are used.

Show transparency 19.

The position of the snake line, stop line, and other lines previously discussed are shown on this transparency.

VI. Overhead Signals

Overhead signals exert profound influences on traffic flow when properly located and operated.

They provide for orderly movement of traffic, permit increased capacity, reduce certain types of accidents, and with proper spacing and timing, provide for a continuous flow of traffic. They can also be used at intervals to interrupt heavy flow of traffic for minor traffic.

Show transparency 20. (Use as single transparency)

Some overhead lights indicate to the driver the lane in which he should or should not drive.

These overhead lights may be so constructed as to permit more traffic flow in one direction than the other at one time of the day and then reversed in the opposite direction at another time of the day. This expedites the flow of traffic and takes care of peak periods.

Show transparency 21. (Use as single transparency)

Arrows are used to warn and to tell drivers to take specific actions. When the arrows light up they can tell a driver to: turn left only, turn right only, go straight or a combination of these.

On two-lane streets, signals are usually located at the corner on a pedestal support. On multiple lane streets, an overhead signal is usually placed above each lane of traffic.

Show transparency 22. (Use as single transparency)

Standard colors of signal lights are red, amber and green.

The "Uniform Traffic Control" Manual suggests that standard location of the colors should be, red on top, amber in the center, and green on the bottom position.

Green means proceed after checking traffic, red means to stop at all times, and the amber light serves to permit vehicles and pedestrians caught in the intersection on the color change to clear the intersection. If a horizontal mounting is used, the red will be at the left, the yellow next, and the green at the right.

Sometimes a pedestrian control signal is used to provide safety for pedestrians where there is a conflict between vehicular traffic and pedestrians. These should be observed at all times.

We have given you information in the last few minutes which we hope will enable you to interpret the various driving situations which you will encounter while driving.

Perception Presentation

(Opening Remarks)

In this presentation we will be discussing driver perception. By this we mean, how well the driver sees and interprets the information in each traffic scene.

The perceptual task for a driver can generally be divided into three subtasks: search, identification and prediction. The performance of these subtasks tell the driver where and when to look, what to look for and what meaning it has for him. They should ask these questions: Is there anything present that influences driving? This would be classified as search. (2) What is it? This is identification. And (3), what can be expected to occur? We would classify this as prediction.

Timely and accurate performance of the subtasks provide an opportunity for the driver who has developed his ability to quickly interpret each driving situation, predict the accident potential and determine the driving manuevers that will make it possible for him to continue on his route safely. Accurate prediction enables a driver to take alternative action, select the safest one and execute the manuever. This is known as the control task. The control task consists of decision making and execution. Decision means deciding what to do and execution is the driver's response which controls the vehicle. For example, when a driver is approaching a traffic signal or traffic sign, he must decide whether to stop, where to stop, how hard to press the brake and then he must use the appropriate control action. Search may be defined here as the observational procedure used to determine the presence or absence of critical conditions and the changing driving scene. Vision is the key to search. The three components of search are: focus of attention, search rate and search pattern. By focus of attention, we mean where and what the driver sees as he meets an ever changing environment. The driver's focus may need to change with the speed, visibility, road topography and roadway signs, signals, markings, traffic volume, and density of traffic. Search rate considers how frequently the driver searches his environment. Time sampling is the problem here. What part of the driver's time should be spent in looking at the various elements of his environment, such as present location of his own vehicle, the roadway ahead, behind, and to each side, and also the instruments in his vehicle? The search pattern is concerned with how efficiently the driver samples his environment. Does he see and interpret all of the traffic information in his changing traffic environment that he should? In view of this information, all of us will agree that the driver is a processor of traffic information. And that he must give full attention to this task, if he is to be an accident free driver. In the next portion of the presentation we will show you a number of traffic scenes. As you view these scenes you will get some idea of how well you process the traffic information before you.

These scenes are like the ones you would see as you drive along a roadway in your automobile. These scenes were photographed in such a way that you would be viewing them as if you were actually seated behind the steering wheel of an automobile. You will be given an opportunity to view each of these scenes for a period of four seconds. As soon as the scene has disappeared from the screen, you will write your answers on the answer sheet you have before you. You will see three series of traffic scenes. Series I consists of eight traffic scenes and in each scene you should see and interpret either three traffic signs, three traffic signals, roadway markings, or a combination of some of these. In Series II you will have more traffic information to process in the same amount of time as in Series II--four seconds. Series II will have ten different scenes. In each scene, there will be four or five traffic signs, traffic signals, road markings, or a combination of some of these that you should see and interpret correctly. Again you are to place the information asked for on the answer sheet. In Series III, there will be still more traffic information to process than you had to process in Series I or II. The time allowed for processing the information in Series III will be four seconds, the same as you were allowed in Series I and II. This is the way our driving is. Sometimes there is much more information that relates to our driving than at other times. And we have the same amount of time to accurately see and use this information. In Series III you will have much more information to see at some locations along the roadway than at other locations. And if you process it correctly, you are considered to be an accident free driver. In Series III, ten traffic scenes will be projected on the screen. Each scene will have from five to eight traffic signs, traffic signals, road markings or a combination of some of these. You will view each scene for four seconds and then record the answers on the answer sheet that you have. The procedure that we will follow in doing this is as follows:

(1) On each command, eyes on the screen, each of you will focus your attention on the center of the screen. You must give your undivided attention to the screen. As soon as the scene disappears, you may

answer the question on the answer sheet. You will have thirty seconds to answer these questions. When the command is given again, you must cease writing and focus on the center of the screen. And as soon as the scene disappears, you will write your answers to the questions on the sheet you have before you. Now are there any questions?

We will now take one trial run. Eyes on screen. (Pause 4 seconds) Write the answers to what you saw on your answer sheet. Answer these questions. (1) . . .

A series of 35mm slides were used at this point with the worksheet which follows.

Student Worksheet for Visual Perception Exercises

Series I

Situation 1

______________a. What type of sign was seen?
______________b. What color combination was on the sign?
______________c. What was the location of the sign from our car?

Situation 2

______________a. What type of sign was seen?
______________b. What color combination was seen?
______________c. Draw sign and show the markings and legend on the sign.

Situation 3

______________a. What type of sign was seen?
______________b. What shape of sign was seen?
______________c. What color combination did you see?

Situation 4

______________a. What type of sign was seen?
______________b. What was the shape of the sign?
______________c. What information was on the sign?

Situation 5

______________a. How many signs were seen?
______________b. Was the legend the same on each sign?
______________c. What type of signs were seen?

Situation 6

______________a. What was the legend on the sign?
______________b. What type of sign was seen?
______________c. What message was given to the driver?

Situation 7

______________a. What type of sign was seen?
______________b. What shape of sign was seen?
______________c. What message was on the sign?

Situation 8

______________a. What type of signs were seen?
______________b. How many signs were seen?
______________c. How many directions of travel were given on the signs?

Series II

Situation 1

______________a. How many signal lights were seen?
______________b. What colors were seen?
______________c. How many green signals were seen?
______________d. What signal was directly in front of our car?

Situation 2

______________a. What symbol did you see?
______________b. How many cars did you see on the street besides yours?
______________c. Was there any hazard to our car?
______________d. Who must yield in a situation of this kind?

Situation 3

______________a. What was the direction of travel on the street?
______________b. How many lanes in each direction?
______________c. How many dividing lines were seen?
______________d. How many lane lines did you see?

Situation 4

______________a. What type of signs were seen?
______________b. What were the highway numbers?
______________c. What direction were the arrows pointing?
______________d. Which highway was leading to south bound traffic?
______________e. Where was the "KEEP RIGHT" sign from our car?

Situation 5

______________a. How many overhead lights were seen?
______________b. How many pedestal lights were seen?
______________c. How many red signals did you see?
______________d. What hazard to our car was seen?

Situation 6

______________a. What markings were seen?
______________b. How many colors of markings were seen?
______________c. Give description of markings?
______________d. What potential hazard was seen on the right?

Situation 7

______________a. How many signs were seen?
______________b. What was the speed limit?
______________c. How many shapes of signs were seen?
______________d. What marking was seen?

Situation 8

______________a. What markings were seen?
______________b. What color markings were seen?
______________c. Which car could not legally pass in this area?
______________d. How many lanes of traffic are allowed on this roadway?

Situation 9

______________a. How many different markings were seen?
______________b. What is the purpose of the dash line?
______________c. Was passing permitted in this area?
______________d. How many cars were seen going in the opposite direction to ours?

Situation 10

______________a. How many signal lights were seen?
______________b. What color was the signal light above our lane of traffic?
______________c. What kind of street are we on?
______________d. How many cars did you see to our left?

<u>Series III</u>

Situation 1

______________a. How many different markings were seen?
______________b. What markings were seen?
______________c. How many other vehicles were seen?
______________d. Which direction were the other vehicles traveling?
______________e. What was the contour of the roadway?

Situation 2

______________a. How many signals were seen?
______________b. How many colors were seen?
______________c. What colors were seen?
______________d. How many arrows were seen?
______________e. How many lighted crosses were seen?
______________f. Where was the solid green signal light?
______________g. How many lanes of traffic are permitted in the direction we are going?

Situation 3

______________a. What color sign was seen?
______________b. Where was the sign located from our car?
______________c. What information did you read on the sign?
______________d. What potential hazard was noted on the right?
______________e. How did you identify the hazard on the right?
______________f. What markings were seen?
______________g. What lane is our car in?

Situation 4

______________a. How many signs were seen?
______________b. How many highway numbers were given on the overhead signs?
______________c. What highway signs were seen?
______________d. What markings were seen?
______________e. How many signs were there with right turn arrows?
______________f. How many lanes of traffic turned right?
______________g. Which direction did Highway 40 go?

Situation 5

______ a. What markings were seen?
______ b. What guide sign was seen?
______ c. Which direction was arrow pointing on guide sign?
______ d. What direction of travel did the arrow in our lane indicate?
______ e. What direction of travel was indicated in lane 1?

Situation 6

______ a. How many overhead signs were seen?
______ b. What highway number was seen?
______ c. How many lanes of traffic could go right?
______ d. What kind of lane line did you see on the right?
______ e. What regulatory sign did you see on the right of the roadway?
______ f. What regulatory sign did you see for traffic going left?
______ g. Would you go left or right to get downtown?

Situation 7

______ a. What lane are we in?
______ b. What number highway was on the sign?
______ c. What markings were seen?
______ d. Which direction are we going?
______ e. What was the contour of the roadway?
______ f. Did the sign say keep left or right?
______ g. Which direction does the curve go?

Situation 8

______ a. What markings were seen?
______ b. What was the purpose of center lane?
______ c. What highway marking did you see over the top of the truck?
______ d. Which lane is our car in?
______ e. What kind of signs did you see?
______ f. How many lanes of traffic were allowed on this street?

Situation 9

______ a. How many overhead signal lights were seen?
______ b. How many red signal lights were seen?
______ c. What lane is our car in?
______ d. How many lanes of traffic could turn left simultaneously?
______ e. What markings did you see?
______ f. What message do the markings have for us?
______ g. What two signs were seen?
______ h. What legend was on the regulatory sign?

Situation 10

______________a. What four highway signs were seen?
______________b. Which direction does Highway 66 go?
______________c. Which direction does Highway 74 go?
______________d. What kind of signs did you see?
______________e. What color signal lights were seen?
______________f. How many lanes of traffic could travel in the same direction as we are going?
______________g. What markings were seen?

SCORE - Series I______________

SCORE - Series II_____________

SCORE - Series III____________

APPENDIX B

SIMULATION FILM AND SKILL DRILL SCHEDULE

Week	Film	Skill Drill Exercises
1	Orientation (You and the Drivotrainer System)	Steering exercises.
	Driving an Automatic Shift Car	Shifting w/o looking.
	Blending in Traffic	Intersection procedures a. Checking L. R. L. b. Proper use of acceleration. Lane change procedure.
2	Backing Safely	Looking over proper shoulder and steering properly.
	Angle Parking - Turning Maneuvers	
	Special Driving Techniques	Acceleration and braking control.
	Traffic Strategy	
3	Parallel Parking	Review of backing and steering.
	Shifting Skill	Shifting drills.
	Driving a Standard Shift Car	Review of shifting.
	Driving Emergencies	Drill - getting off of the acceleration easy (after blow out). Instruction - hit car before film and check reaction of students (drill).
	Highway Driving	
4	Perfect Passing	Review of lane change procedures.
	Good Driving in Bad Weather	
	Expressway Excellence	
	Road Check	

APPENDIX C

MCPHERSON PERCEPTION OF TRAFFIC HAZARDS TEST

McPherson Perception of Traffic
Hazards Test Script

Start Recorder

This is a test to measure Visual Perception. Slides will be shown on the screen for a period of 5 seconds, after which a series of responses will be given via this tape recorder. If a response item is in the slide, mark an "X" in the appropriate blank on the answer sheet. If the item is not in the slide, leave the corresponding space on the answer sheet blank. A penalty will be imposed for guessing.

In this test an on-coming car means any car which is approaching in the opposing lane or lanes.

An approaching car is any car which is approaching the roadway from the side.

The median is the grassy strip between divided highways.

Show Example Slide One

As an example, this slide shows:
A. Light colored on-coming car
B. Snow, limiting lane
C. Car from right
D. On-coming car nearing curve
E. Shadowed condition on curve and hill
F. Car behind silo

It does not show:
G. Person on right or
H. Car approaching from left

Please mark an "X" in blanks A, B, C, D, E, and F in the Number I example on your answer sheet.

Please be ready to mark the "X" in the correct space or spaces on the next slide.

*
Show Example Slide Two
(5 Seconds)
*

*An asterisk designates slide change.

Blank Slide

You saw:
A. Convertible on right
B. Beginning of one way street
C. Station wagon on left
D. Oncoming truck entering your lane
E. Blue and white car entering street from right

Reverse to Slide Two

If you marked A, C, and D, you are correct. Notice the white convertible on the right, the station wagon on the left, and the blue and white car entering the street from the right.

No slide will be shown twice and each response will be read only two times.

Your instructor will now answer any questions you might have about the test.

<u>Stop recorder and answer questions if any</u>.

(Advance projector to blank slide after Example Two)

Start Recorder
*
TEST FRAME I (5 seconds)
*
Blank Frame

Highway--8--Highways and Byways
A. Men Standing by Tractor
B. Truck Parked on Left
C. Oncoming Car on Curve

*
TEST FRAME 2 (5 seconds)
*
Blank Frame

City Business Area--9--Urban Suburban
A. Bike on the Right
B. Movie Theatre
C. Car with Wheels Turned out in Parking Space
D. Broken Glass on Street
E. Car on Left Over Center Line

*
TEST FRAME 3 (5 seconds)
*
Blank Frame

Expressway--6--Highways and Byways
A. Car Ready to Pull on to Road
B. Oncoming Car Is Passing
C. Sign--Curve Ahead

*
TEST FRAME 4 (5 seconds)
*

Blank Frame

Expressways--14--Limited Access
A. Two Cars on Left Changing Lanes to the Right
B. Three Cars in Left Lane
C. Animal by Road on Left
D. Exit on Right

*
TEST FRAME 5 (5 seconds)
*
Blank Frame

Residential--22--Urban Suburban
A. Stop and Go Light--Green
B. Car Crossing in Front of Truck
C. Children on Right
D. Man in Street

*
TEST FRAME 6 (5 seconds)
*
Blank Frame

Business Area--7--Urban and Suburban
A. Car Leaving Parking Place
B. Boy Riding Bike in Right Lane
C. Light Colored Car with Brake Light on in Parking Place
D. Car Changing Lanes

*
TEST FRAME 7 (5 seconds)
*
Blank Frame

Expressway--10--Limited Access
A. Car Off the Road on the Left Side
B. Oncoming Car Crossing Median (Grassy Area)

*
TEST FRAME 8 (5 seconds)
*
Blank Frame

Residential--28--Urban Suburban
A. Taxi to the Left
B. Man at Right Curb
C. Man in Street Beyond Cross Street
D. Stop Sign Ahead

*
TEST FRAME 9 (5 seconds)
*
Blank Frame

City Business Area--25--Urban Suburban
A. Car in Left Lane
B. Fire Truck
C. Stop and Go Light--Green

*
TEST FRAME 10 (5 seconds)
*
Blank Frame

Expressway--11--Limited Access
A. Car on Left Moving Into Your Lane
B. Exit Sign
C. Car on Right Moving Into Your Lane

*
TEST FRAME 11 (5 seconds)

*
Blank Frame

Residential--1--Urban Suburban
A. Bike on Right
B. Oncoming Car
C. Bike on Left
D. Car Entering Street From Driveway on Right

*
TEST FRAME 12 (5 seconds)
*
Blank Frame

Highway--Highways and Byways
A. Car Leaving Driveway by White House
B. Water on Road
C. Oncoming Car in Passing Position

*
TEST FRAME 13 (5 seconds)
*
Blank Frame

City--Business Area
A. Baby Carriage on the Right
B. Car Leaving Parking Place
C. Stop and Go Light--Green
D. Hood Up on Car in Street

*
TEST FRAME 14 (5 seconds)
*
Blank Frame

Expressway--17--Limited Access
A. Two Cars on Left Changing Lanes
B. Deer in Median (Grass Area)
C. Truck in Right Lane
D. Three Cars in Left Lane
E. Hitchhiker on Right

*
TEST FRAME 15 (5 seconds)
*
Blank Frame

Highway--7--Highways and Byways
A. Car Approaching on Right
B. Oncoming Car
C. Mud on Road
D. Soft Shoulder

TRAFFIC AND SAFETY EDUCATION
Illinois State University

MCPHERSON PERCEPTION TEST

I. Example Slide: A. X , B. X , C. X , D. X , E. X , F. X , G.___, H.___

II. Sample Question: A.___, B.___, C.___, D.___, E.___

****

III. Begin Test

1. A.___, B.___, C.___
2. A.___, B.___, C.___, D.___, E.___
3. A.___, B.___, C.___
4. A.___, B.___, C.___, D.___
5. A.___, B.___, C.___, D.___
6. A.___, B.___, C.___, D.___
7. A.___, B.___
8. A.___, B.___, C.___, D.___
9. A.___, B.___, C.___
10. A.___, B.___, C.___
11. A.___, B.___, C.___, D.___
12. A.___, B.___, C.___
13. A.___, B.___, C.___, D.___
14. A.___, B.___, C.___, D.___, E.___
15. A.___, B.___, C.___, D.___

For Scoring Only

	1	2	3	-2	-3
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

VITA

Delbert Raymond Karnes

Candidate for the Degree of

Doctor of Education

Thesis: PERCEPTUAL SKILLS IN THE GROUP-LIKE STRUCTURE OF DRIVER EDUCATION: A RATIONALE AND STUDY

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