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Driver Education at the Crossroads

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DRIVER EDUCATION AT THE CROSSROADS

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Preface

Driver education as known and experienced by a generation of novice drivers is disappearing. Whereas close to 80 percent of eligible high school students participated in school courses in the 1960s and 1970s, far less than half do in the 1990s and currently, and the proportion continues to decline. While the reasons are many, chief among them is a tightened economy that has squeezed many deserving subjects out of the curriculum. Evidence as to a cost-beneficial effect upon safety, which might have saved driver education, was not forthcoming.

What will take the place of high school driver education is uncertain. Deciding what should take its place offers both challenge and opportunity. It was the subject of a 1998 mid-year meeting of the TRB Committee on Operator Education and Regulation (A3B03). The Committee addressed three topics:

- Driver Needs—What drivers must learn about driving in order to meet their needs for mobility and safety, and how both can be facilitated by changes in lifestyle.
- Beginning Driver Education—The content and methods of basic driver education, standards for graduation and initial licensing, and the responsibility for overseeing the process.
- Advanced Driver Education—The objectives and incentives for instruction beyond the beginning stages, for drivers in general and those who have evidenced problems.

This Circular contains authored papers, many by committee members. The papers offer a variety of recommendations for improving driver education.

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Driver Needs

Introduction

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The highway transportation system offers significant benefits in the form of mobility and accessibility. An undesirable by-product of mobility is road crashes and the attendant loss of life, injury, and property damage. A principal challenge facing the safety system is maximizing the benefits offered by transportation, while minimizing its disbenefits. This balancing act is never more evident than in the case of novice drivers whose risk of suffering the disbenefits of the system are much greater than most other groups. Historically, and even today, the major initiatives used to ensure that novices are insulated from the risks associated with driving have been formal driver education/training and driver licensing.

The objectives of both these programs are very similar in that they attempt to ensure the novice has the skills, knowledge, and attitude to drive safely and collision-free. Unfortunately, young drivers continue to be over represented in road crashes and the absolute magnitude of the problem will almost certainly increase because impending demographic changes will produce a dramatic rise in the number of young drivers. Recognition of these facts has underscored the need for improving driver education/training and licensing programs.

In this regard, an increasingly popular form of qualification for driving—graduated licensing—is being promoted as a potentially effective means for reducing the risks encountered by novice drivers. Such a program is in place or being implemented in many states as well as in jurisdictions outside the United States. Similar improvements are needed in driver education/training if it is to effectively address the novice driver safety problem.

Improving driver licensing and driver education/training to meet the safety needs of novice drivers can, however, have an impact on their mobility, e.g., a night-driving restriction, a phased driver education/training program, the type and duration of driving practice encouraged or mandated. Accordingly, the safety needs and mobility needs of novice drivers deserve serious consideration in efforts to reduce their crash involvement through improved licensing and education/training programs.

Mobility Needs of Novice Drivers

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In order to plan effectively for driver education programs, policy makers should have a good understanding of the mobility needs of novice drivers. Currently there is a lack of research in the area of novice driver mobility needs. Surveys on the amount and type of driving done by licensed drivers have given us a reasonable perspective on the mobility patterns of young drivers. To the extent that teenage drivers are also novice drivers, these surveys can give us some insight into the mobility patterns of young novice drivers. We can obtain reasonable estimates of the times they are likely to travel, the average trip length, average speed, the most frequent destinations, and the average number of passengers carried.

Mobility patterns, however, do not necessarily coincide with mobility needs. Young novice drivers may do more of their driving at night, but it does not necessarily follow that they are meeting their mobility needs by doing so. To understand mobility needs, it would be helpful to survey novice drivers as well as teenagers just under the legal licensing age to find out which activities generate travel needs and, more specifically, travel needs that can only be met by driving an automobile.

At the present time we do not know how many young novice drivers really need to drive. In some cases it is clear that the ability to obtain full or part-time employment is contingent upon possession of a driver's license. In other cases, it is geographical location that compels individuals to drive. For example, teenagers in rural and suburban areas have fewer modal choices than their urban counterparts; public transportation services may be infrequent or non-existent and walking may not be a reasonable option.

Even a well-designed activity survey can only provide us with a snapshot of current mobility needs. Mobility needs are never static, they are continually evolving. Economists do well to remind us that (1) travel is a derived demand, and (2) demand is a variable. People travel because they want to go somewhere to do things. Travel is rarely an end in itself. To the extent that the so-called information highway can help teenagers meet many of their social, educational, and recreational needs by minimizing or eliminating travel, driving may become less attractive and/or restricted licenses may become more palatable. Research on mobility needs must, therefore, be conducted over time to identify emerging trends. Particular attention must also be paid to the problems parents can encounter when they provide for the transportation needs of their teenage children. In some cases, parents have a difficult time meeting the transportation needs of their unlicensed teenage children. This may be particularly true of single parents who face considerable time pressure and actually welcome the licensure of their teenage children as liberation from their driving duties. Graduated

licensing and/or curfew programs are sometimes criticized by a minority of parents for precisely this reason. In other cases, involving family farms and other small family-run businesses, parents may look forward to the licensure of their children because this will enable them, in turn, to play a greater role in the day-to-day operation of the farm or business. Nevertheless, preliminary surveys of parents in jurisdictions with graduated licensing indicate most parents support the restrictions associated with graduated licensing programs and seem to report little difficulty in obtaining compliance from their teenagers.

Under graduated licensing, parents are also discovering that they have an important role to play as driving mentors for their teenage children. Parents often act as the accompanying driver during the first phase of the program that prohibits novices from driving alone. The result is a greater involvement in their child's development as a driver. If this greater involvement is to be beneficial parents will themselves need educational material. There have not been many concerted efforts to formally acknowledge the important role many parents must necessarily play in novice driver education. Educational materials specifically targeting parents as de facto driving instructors are extremely rare although this has begun to change.

Mobility needs research should also help us to better understand when full driving privileges are required. At the present time, many jurisdictions allow full licensure at an arbitrary age, usually 16. Individuals acquire unlimited licenses regardless of their actual needs. This may have been a reasonable approach earlier in the century when many people left school and started their working lives at relatively young ages. While teenagers today certainly do engage in part-time work, they are primarily students pursuing their secondary and post-secondary education. Under these circumstances, an activity survey may show us that multistage licensing programs leading to full licensure over a period of several years can be more responsive to the mobility needs of young novice drivers. Such programs would also offer novices the opportunity to practice their driving skills in relatively low-risk situations.

Jurisdictions that have, in effect, raised the age of full licensure through the introduction of graduated licensing programs have not encountered much opposition from young people as we might expect. This lack of opposition may be an indication that the demand for full licensure at the age of 15 or 16 is largely an artifact of current practice. It must be stressed, however, that graduated licensing programs have been introduced after substantial public consultation, which serves to inform policy makers about the mobility needs of the affected population.

It is also important for policy makers to understand that in the case of teenagers, acquiring a driver's license not only helps them to meet their mobility needs, but also serves as an important rite of passage. It has become an important symbol of impending adulthood and personal independence. A driver's license may be vital from a teenager's perspective because it guarantees continued acceptance by his peer group. While some jurisdictions report that only about one-half of their 16 year olds are licensed, it is highly likely that the majority of the remaining 16 year olds have acquired a learner's permit. The symbolic value of the license is often as important to teenagers as the need to get from point A to point B.

Unfortunately, teenage peer groups may not only require their members to obtain a license, they may also require their members to adopt a lifestyle and, consequently, a driving style that emphasizes deviant behavior and thrill-seeking. When risky driving is combined with both the overconfidence and inexperience that characterizes young novice (especially male) drivers, the mix can be lethal.

The motivation to adopt risky driving practices forces us to consider the perennial trade-off between safety and mobility. At some point, increased mobility can only be bought with a reduction in safety. The aim has always been to meet mobility needs without unduly compromising safety. To address this issue we must consider two key questions. First, at which ages are novice drivers at the greatest risk? Second, do these risks exceed the benefits that can accrue from permitting people in this age group to drive a motor vehicle? The first question is relatively easy to answer. When we consider the fatal collision involvement rate per 100 million miles driven, the highest rate is observed for 16-year-old drivers and is followed closely by that of 17-year-old drivers. In fact, the fatal collision rate remains quite high with respect to middle-aged drivers until about age 20. Nevertheless, the prevailing pattern is a steep downward slope during the teenage years. The same trend is observed when we consider all collisions. Clearly, drivers age 16 and 17 are at the greatest risk of being involved in a collision. Their collision risk generally exceeds that of even the oldest driver age groups.

The answer to the second question is less straightforward. In order to answer it adequately, we must have good data on the actual mobility needs of young novice drivers. Only then can we have a clear indication of the costs associated with not meeting their mobility needs by driving. It is unlikely that we would conclude that people should not drive at age 16 or 17. However, after an assessment of their mobility needs we may conclude that the costs associated with unrestricted driving privileges are unacceptable. Much will depend on the social cost methodology we choose to adopt. Finally, while much of the discussion has focused on the young novice driver, it is imperative that any research program on mobility needs also consider the older novice driver. Older novices tend to have a collision risk that is substantially lower than that of young novice drivers, but still higher than drivers their own age. They also would have very different mobility needs. Older novices may find the restrictions imposed on teenaged novices as unnecessarily onerous. Moreover, they cannot rely on ready access to an accompanying driver like many of their teenaged counterparts. This may limit their ability to practice during the apprenticeship phase of a graduated licensing program.

Safety Needs of Novice Drivers

Driving Factors

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Novice drivers are over involved in crashes, especially young drivers. Causes of these crashes include driving too fast for conditions, inattention, and reckless driving. Other problems involve the use of alcohol (20 percent), and having teen passengers (65 percent of all teen passenger fatalities occur when another teen is driving).

Crash statistics tell us that young novice drivers are immature and reckless, and that novices at any age are inexperienced. Novices definitely do not understand the relationship between the mass of the vehicle, traction, speed, and stopping and turning the vehicle at speeds (many experienced drivers also have a poor understanding of this relationship). This situation is complicated by the fact that even with traffic laws and rules which regulates how and when people drive, the system runs (or not) on voluntary compliance of roadway users with these rules and regulations.

The highway system is complex and takes notable skill to negotiate safely on a continuous basis. Novice drivers are generally at a great disadvantage when they attempt to drive and interact in the system. This is quite understandable as they often have few driving skills and are still learning to perform safely and efficiently. There is no single solution to this problem, but there are several approaches that can definitely help. Graduated driver licensing systems have proven crash reduction potential. These systems allow novice drivers to gain experience under controlled circumstances and also to mature during the process. A driver training and education program appropriately designed for novices and part of a graduated license system has the potential to enhance the crash reduction of the licensing system. Driving can be defined in many different ways. At a general level, driving can be defined as transportation, vocation, and socialization. Certainly, driving is a means of transport—going from one place to another, for many different reasons. It is a mean of vocation for a large number of drivers. It also is a means of socialization, especially for youngsters who need a place to get away from others, especially adults (parents). These all have implications for mobility and safety, and they are not always compatible. For example, because the use of a private vehicle for transport is accepted as the norm, mobility is often valued more than safety. That is, because of the importance of mobility, a less safe highway system is accepted by society.

The issue facing driver training and education, is how to develop programs that will reduce the crashes of novice drivers and improve driving efficiency within the transportation system of today and the future. These programs will have to address both mobility and safety. The public must be educated that young novice driver crashes are a public health problem and are unacceptable at current levels. The public must also accept that resources will be needed and everyone (parents, novice drivers,

public and private sector organizations) has a role and must be involved in solving the young driver crash problem and reducing traffic crashes in general.

Any driver-training program must be based on the driving task. The driving task involves many different types of skills. Driving has many purposes and should be performed efficiently and safely. However, a precise, universally accepted definition of safe driving is yet to be developed.

The driving task can be described as involving basic driving skills and safe driving skills. Both involve physical and cognitive skills. Basic driving skills are those involved with starting, stopping, keeping the vehicle between the lines, and not running over or hitting anything. Basic knowledge would include the rules of the road, driver licensing requirements, and being personally prepared to drive (e.g., no alcohol and nonuse of occupant restraints). These basic driving skills and knowledge are needed for initial entry into the traffic system, hopefully, in a graduated licensing system. Safe driving skills primarily involve higher order cognitive skills (perception, recognition, decision making, task initiation, and vigilance) which lead to safe driving practices and interaction with the traffic environment. It is these practices which are the key to reducing the crashes of novice drivers. Safe driving practices include search, communication, speed and space management, risk management, and preparing to drive.

Search is being aware of the roadway environment and provides the driver basic visual information, including that needed for hazard perception. Visual information is critical for all other safe driving practices. Communication is notifying others of your presence, and what you are doing or are planning to do. Speed and space management includes situational awareness of traffic, roadway and environmental conditions, and requires knowledge of the physics of vehicle traction, especially its limitations (where the rubber meets the road). Risk management involves decisions both before and during driving and is the tool to reduce or better manage the risk associated with driving. Last is that both the driver and the vehicle are prepared for driving.

People can learn to drive more safely, but this takes time. Appropriately designed training can improve skills, but this takes time and resources. Learning complex skills takes time, lots of time, and practice. It is important that the public better understand this as they must contribute the resources that will be needed to reduce young novice driver crashes.

Novice driver training and education must be designed to allow for both formal and informal training, self-paced and interactive where possible, available to most everyone who desires it, and available at multiple locations within a community. To be most successful, driver education must start before the age of licensure and last throughout the driving years. There should be training standards developed, and resources made available to prepare, market, and maintain programs and materials.

To be a proficient and safe driver takes years of practice. To stay proficient takes continued practice. Using the game of golf as an analogy, even professional golfers practice their game continually, often on a daily basis, sometimes with instructors. Most drivers also practice driving on a regular basis. However, this practice usually is unguided, and even worst, often results in positive reinforcement of driving behaviors that are not always good or safe. Driving practice must be guided and positive.

Practice should be self-paced, have positive reinforcement, and performed under controlled (safer) conditions.

Reducing the crashes of novice drivers will take resources and a community effort. Reducing the crashes of experienced drivers will take the effort of all drivers to improve their own performance. Both can be done.

Driver education is viewed negatively by some. The goals, objectives, and structure of any improved driver training and education programs need to be well defined and tested. Positive results are needed to further sell training concepts to the public. Novice driver training has the greatest potential to reduce crashes and thus should be the flag bearer for further training developments. Creating positive political and public perceptions of driver education is critical to gain widespread support and resources for these programs. Without this support, progress will be difficult.

Safety Needs of Drivers
Lifestyle Factors

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How should driver education be structured to cope with adolescent lifestyle influences on driving, in particular, risk-taking tendencies, personality factors that relate to unsafe driving, and peer group influences that increase driving risk? Or, to rephrase the question, can driver education be structured to overcome these influences? Dealing with lifestyle influences is a real challenge for driver education, especially where licensing is allowed at a very young age, as in the United States. We know that risky driving is a feature of adolescence. Young people—more so than older drivers—are more likely to go too fast, tailgate, do dangerous passing, and perform other driving actions that increase the risk of a motor vehicle crash. To a large extent, these behaviors are a reflection of normative adolescent development. Jessor (1987), a specialist in adolescent development, discusses risky driving as an aspect of a larger adolescent lifestyle, a way of achieving goals that are functional and purposeful. These include expressing opposition to societal values, establishing a sense of personal identity, affirming independence from parents, and gaining status among peers. Other aspects of youth also contribute to risky driving. Adolescents tend to be characterized by sensation seeking, a personality characteristic reflecting thrill and adventure seeking. High scores on sensation-seeking scales relate to crash involvement (Beirness and Simpson, 1988), and scale scores peak during adolescence—at age 16—and decline with age (Zuckerman, 1978). Another aspect that promotes risk taking is adolescent egocentrism, a cognitive style discussed by Elkind (1968) that promotes feelings of invulnerability to negative consequences. When we talk about young people as being immature, we are talking about characteristics reflecting these various influences.

Much of the literature on risky driving among youth has been addressed to the subgroup of adolescents who are most likely to engage in this behavior. There is such a subgroup, comprised of young people with lower value on achievement, greater alienation, lower parental support and controls, greater influence of peers, and a likelihood of engaging in a variety of other problem behaviors. When people talk about lifestyle factors, they are often referring to this subgroup. However, the attitudes and motivations related to risky driving behaviors are prevalent among adolescents in general. Risky driving serves important functions for young people who are rewarded through feelings of power, esteem and independence, peer recognition, and the satisfaction that comes from mastering risk. Not all adolescents are risk-taking drivers, but risky driving is very much a part of adolescence. Driving inexperience is the other main factor influencing crash involvement among young people. Studies have indicated that inexperience and age factors each account for about half of the elevated crash risk among young people (Mayhew and Simpson, 1990). Age and

inexperience factors interact, e.g., some driving behaviors that are objectively risky primarily reflect inexperience in terms of car placement or speed adjustment rather than risk taking tendencies. However, both factors are important.

How can lifestyle factors be dealt with in educational programs? This is not an easy task. Because risky driving is associated with a variety of other problem behaviors, e.g., those who are most likely to drive in a risky fashion are more likely to smoke, use alcohol excessively, etc., it is instructive to see how health education programs addressing these other behaviors have dealt with lifestyle factors. A review of the literature on high school educational programs addressing smoking, alcohol, and other drug use does not provide strong encouragement. Some of these have been quite sophisticated programs based on social learning and communication theory principles, but in general the results have been disappointing. Some such programs have had no behavior change effect; in other cases there has been a short-term effect that dissipates in a few months (Ellickson et al., 1993; Dielman et al., 1989; Hansen et al., 1988; Baer et al., 1997). A few programs have had greater success, and these tend to be multi-faceted programs of longer duration (Shope, 1996).

There are no recent health education programs of this type that have addressed risky driving. The job of dealing with this behavior is left to driver education programs, which thus have a dual role: teaching people how to drive, and teaching people safe driving practices and getting them to apply these practices. There is good evidence that driver education courses with sufficient on-road practice can be a superior way to learn driving skills (Mayhew and Simpson, 1996). However, teaching and motivating young people to apply safe driving practices hasn't worked very well. There are several reasons why this is so. First, the typical driver education course is of short duration, readily overwhelmed by ongoing parental, peer, and other social influences. There should not be the expectation that brief inputs like this will be able to change the attitudes and motivations that are known to be so influential in shaping driving styles and crash involvement. Secondly, teaching people how to drive necessarily takes priority over trying to instill safety motivation. And it is likely that the audience is not very motivated to attend to admonitions concerning safe driving. The primary motivation at this age is to get a license, and for that one needs to know how to pilot a car. The traditional brief driver education course, concentrated on teaching driving skills, will have a difficult time influencing the lifestyle factors associated with adolescence that contribute to their elevated crash involvement. Advanced driver education courses, often touted as a way to deal with the inexperience factor among young beginners, can also interact with lifestyle factors. Skid control courses, for example, tend to backfire among young males, as those taking these courses have more crashes than those without such training (Glad, 1988; Katila et al., 1995). This is an example where skills have been learned through driver education, but they interact with developmental and lifestyle factors typical of young people—including sensation seeking, invulnerability feelings, desire to impress peers—to produce unintended results. The developmental process young people are going through makes it difficult for driver education to do other than to teach people how to drive.

The challenge for driver education in coping with lifestyle factors is probably

best addressed by taking advantage of the trend toward graduated licensing, a system designed to phase in driving privileges. This phase-in provides an opportunity to spread out driver education over time, as in Michigan, which has adopted a version of the two-stage driver education program recommended by the NHTSA. This provides more of a chance to address safe driving practices, once people already have learned basic driving skills and are also a little older. Research will be needed to confirm that this approach can work. Other ways that have been suggested to affect lifestyle factors/motivation to drive safely are to structure graduated licensing systems so that they encourage young people to apply safe driving practices in order to graduate, e.g., through having to have a clean record to graduate, or to provide demanding exit tests.

REFERENCES

Baer, J. S., M. G. MacLean, and G. A. Marlatt. Linking Etiology and Treatment for Adolescent Substance Abuse: Towards a Better Match. In *New Perspectives on Adolescent Risk Behavior* (R. Jessor, ed.). Cambridge University Press, 1997, in press.

Beirness, D. J., and H. M. Simpson. Lifestyle Correlates of Risky Driving and Accident Involvement Among Youth. *Alcohol, Drugs, and Driving,* Vol. 4, 1988, pp. 193-204.

Dielman, T. E., J. T. Shope, S. L. Leech, and A. T. Butchart. Differential Effectiveness of an Elementary School-Based Alcohol Misuse Program. *Journal of School Health,* Vol. 59, 1989, pp. 255-63.

Elkind, D. Cognitive Structure and Adolescent Experience. *Adolescence,* Vol. 2, 1968, pp. 427-34.

Ellickson, P. L., R. M. Bell, and K. McGuigan. Preventing Adolescent Drug Use: Long-Term Results of a Junior High Program. *American Journal of Public Health,* Vol. 83, 1993, pp. 856-61.

Glad, A. Fase 2 I foreopplaeringen. Effekt pa ulykkesrisikoen (Phase 2 in Driver Education. Effect on the Accident Risk). Institute of Transport Economics, Oslo, Norway, 1988.

Hansen, W. B., C. K. Malotte, and J. E. Fielding. Evaluation of Tobacco and Alcohol Abuse Prevention Curriculum for Adolescents. *Health Education Quarterly,* Vol. 15, 1988, pp. 93-114.

Jessor, R. Risky Driving and Adolescent Problem Behavior: An Extension of Problem-Behavior theory. *Alcohol, Drugs and Driving,* Vol. 3, 1987, pp. 1-12.

Katila, A., E. Keskinen, S. Laapotti, and M. Hatakka. *Changes in Slippery Road*

Accidents as an Effect of Renewed Driver Training in Finland. University of Turku, Turku, Finland, 1995.

Mayhew, D. R., and H. M. Simpson. *New to the Road, Young Drivers and Novice Drivers: Similar Problems and Solutions?* Traffic Injury Research Foundation, Ottawa, Canada, 1990.

Mayhew, D. R., and H. M. Simpson. *Effectiveness and Role of Driver Education and Training in a Graduated Licensing System.* Traffic Injury Research Foundation, Ottawa, Canada, 1996.

Shope, J. T. Preventing Risky Lifestyle and Problem Behaviour Among Adolescents. In *New to the Road: Reducing the Risks for Young Motorists, Proceedings of the First Annual International Symposium of the Youth Enhancement Service* (H. Simpson, ed.). University of California, Los Angeles, 1996, pp. 127-138.

Zuckerman, M., S. B. G. Eysenck, and H. J. Eysenck. Sensation Seeking in England and America: Cross-Cultural, Age, and Sex Comparisons. *Journal of Consulting and Clinical Psychology,* Vol. 46, 1978, pp. 139-149.

Beginning Driver Education

Introduction

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The inability of driver education to yield the expected reductions in accidents among novice drivers may say more about expectation than accomplishment. The hope that a new driver can progress from rank novice to safe operator in the short span of time encompassed by a single driving course seems unrealistic. Just what can we expect form a basic course? Clearly it is more than it has furnished.

The three papers in this section outline changes that can be introduced to improve the ability of driver education graduates to meet the challenges of road and traffic. These changes include better use of resources outside the school to furnish the guided practice needed to achieve minimally acceptable levels of proficiency, exploiting new technology to bring weeks and miles of driving experience into the classroom and self-instruction, sharper focus upon the elements of driving most critical to safety, formulation of and adherence to standards of performance, and a wider range of systems for delivery of instruction.

Driver Education Content

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Compared to experienced drivers, recently licensed drivers generally are less able to divide attention, scan the environment effectively, detect potential hazards early, and make tough decisions quickly. They perceive less risk in specific violations and high-risk situations but more risk in some low-risk situations. They often choose to drive too fast, too close to others, accept small gaps in traffic, have unrealistic confidence in their own abilities, and leave inadequate safety margins.

The safety mission of driver education has been to help novice drivers perform as safely as they will when they become more mature and experienced. How to achieve this raises issues of structure, method, and content. Graduated licensing suggests an opportunity to extend and stage the learning process.

FOCUSING ON CRITICAL OBJECTIVES

A number of distinct educable qualities influence drivers' safety outcomes, as suggested below (Lonero et al., 1995a).

1. Motivation—drives, emotions, utility expectations.
2. Knowledge—rules, principles.
3. Attention—control, dividing, switching cognitive resources.
4. Detection—search, scan, stimulus templates, noticing.
5. Perception—expectancy, recognition, identification.
6. Evaluation—outcome expectations, situation templates, attribution.
7. Decision—option matching, response selection.
8. Motor Skill—intended action delivery.
9. Safety Margin—time, speed and space.
10. Responsibility—self-monitor, transient states, social values.

There were 37 instructional topics identified under these 10 qualities, with a number of specific instructional objectives identified for each topic. Not all of these qualities, topics, and objectives need to be, or even can be, effectively addressed at once. Certainly, many of the most critical motivational and responsibility objectives can only develop after a certain amount of experience and insight has been achieved.

READINESS TO LEARN

McKnight (1984) pointed out that beginners are less capable of absorbing some needed information and training. As youth is said to be wasted on the young, much of driver education may be wasted on those who cannot yet drive. Richard Bishop

likened the problem to trying to put a gallon of water into a quart jar (Weaver, personal communication).

This too suggests a staged approach to driver education. A large number of multistage arrangements are logically possible. Lonero (1995a) outlined options for two-stage, just-in-time, multistage, and continuous-process structures. Elimination of fixed time frames of the instruction altogether could make learning continuous over the graduated license period. Ultimately this might be less like taking a course and more like joining a sports or other club where skills, self-discipline, commitment, values, personal standards of conduct, and leadership are developed and shared. Models might be an Alpine climbing club or martial arts club. Peer teaching and self-paced, self-directed and computer-based learning (CBL) could be integral to such an environment, with the in-class teacher serving more as clinical coordinator and facilitator of the student's development.

Content for early stage driver education should be directed to the needs of the beginner, rather than the licensed novice, and we can assume that this beginner will be driving under supervision and in a limited range of conditions, such as daylight. Many performance objectives, such as those addressing higher-order decisions, high speeds, night driving or risk acceptance, could be left out of the early stages. They are not yet needed within the graduated licensing restrictions, or they can be provided by the accompanying parent, or may be judged better left until later stages in terms of readiness to learn. For the first stage one could identify

1. A set of basic knowledge, psychomotor, and perceptual objectives to develop automatized basic driving skills;
2. A parental training package;
3. Practice exercises for driving with parents, perhaps; and
4. Self-instruction, home video, and interactive CBL materials.

EARLY DRIVER TRAINING AND EDUCATION

Given the short length of drivers' education courses, the great majority of time in the courses has been addressed to the basics of vehicle control and the rules of the road. These objectives need to be developed early so that supervised practice can continue in relative orderly manner. Mayhew and Simpson (1995) identified empirical research support for eight skills and capabilities that are central to reducing risk. The most pertinent to early training are steering control, speed control, and parallel processing and multitasking—skill integration

Only with practice can tracking and control become automatic and psychomotor skills integrated, which must occur so that attention resources can be directed to higher cognitive and perceptual skills. This is needed so that later training can progress to developing perceptual and decision skills and guided practice for the formation of habitual safe driving practices.

The textbook and classroom components of drivers' education have often been referred to as theory. Much of this theory consists of verbal and graphic descriptions of the mechanics of vehicle handling during basic maneuvers. For instance, action

sequences for various maneuvers are often listed. It is not clear if this is helpful, when the maneuvers themselves will shortly be learned in the car. It may be that the early classroom should be devoted not to learning about car handling but directed to basic knowledge objectives, such as rules of the road, signs and markings, the basics of the highway system, the basics of the driving task and human limitations in it, and the beginnings of insight into being a novice driver.

Background on highway system operations and laws, the driving task, and the demands on the driver should be started early, since understanding principles and reasons may make it easier to comply with safe practices. Many safe practices, such as proper speed and space management, are based on knowledge of rare possibilities and probability, quite beyond the novice's personal experience. These can, of course, be imposed by the supervision in early practice, but early exposure to principles may help to immunize the early novice against too much reliance on their own perceptions of the system. Common sense and limited direct experience in easy conditions can otherwise show the beginner that drivers can disregard prescribed safe practices with apparent impunity.

Certainly, many young novice drivers choose to operate in risky ways. This puts their decision-making processes among the most critical concerns. Nevertheless, skill deficiencies and inadvertent errors may be more important in novice drivers, at least very early in their careers, than in experienced drivers. Decisions are also based on information acquiring and processing skills, and not all errors are careless or deliberate. Perception of hazards and evaluation of risky situations probably can start building during the early stage of on road training. At the least, they should start learning to learn, perhaps by starting to practice narratives of their scanning, observations, and global risk assessments.

CONTENT AND METHOD

It is not possible to draw a sharp line between content and method in driver education. Curriculum needs to be driven by the objectives, but methods available will provide limits. Recent trends in general education could assist in improving the effectiveness of driver training. These include cooperative learning, constructivism, student and peer involvement, and automated, individualized instruction.

Greater efficiency in the mastery of basic driving abilities in the early stages is important to free up resources to address higher level skills. Recognition of these needs and possibilities is not new—they were identified in the Automotive Safety Foundation's *Resource Curriculum*, developed by Bishop et al. in 1970 (Automotive Safety Foundation, 1970). Improvements in technology and understanding may now make it possible to better address these long-recognized needs.

There are two principal trends currently emerging that could move drivers' education forward: (1) more participation and group work by the students in the classroom, and (2) individualized, computer-based, interactive multimedia training and testing. Computer-based instruction and part-task simulation have reached a point where we are now ready to make use of their largely untapped potential for training relatively complex capacities, such as allocation of attention (e.g., Gopher, 1992). I

see no reason that this sort of off-line part-task training cannot start early and run in parallel with the basic classroom and in-car sessions. Participational and interactive teaching methods are widely seen as desirable in general education, and they are now both desirable and feasible for driver education. Many of the highest risk young drivers have low self-esteem, low self-control, low social responsibility, and irrational beliefs. The highest risk young drivers may be the very ones who learn least well through conventional lecture/text methods. Social responsibility and the intrinsic motivations for self worth, task mastery, autonomy, and self-control are critical to the achievement of drivers' education safety goals. Therefore drivers' education should both target the growth of these qualities and provide opportunities for practising them in the curriculum. Self-pacing, diagnostics, frequent performance feedback, rewards for process effort and interim accomplishments, and a certain amount of self-direction and group goal planning should be included even in the early stage curriculum. Peer learning models and group work could help consolidate rational peer influences. New Zealand is implementing a national program called Street Talk to address these concerns for novices in the later stages after they have had some solo experience.

Some of the high-risk young drivers come to drivers' education with a great deal of knowledge about, and interest in, cars and driving. It is not helpful for drivers' education to bore these students, and this seems a great risk in the early stage of training.

CLASSICAL EDUCATION MODEL VERSUS THE FUTURE

Safety education, at its best, may facilitate learning of cognitive and psychomotor skills. Desirable and lasting influence over behavior is much harder to accomplish, and this remains a major challenge to all the safety, health, and other helping sciences. It is now clear that the classical education model is inadequate and fundamental changes in content, methods, and organization are needed. Effective reduction of novice drivers' crashes will also likely require linking drivers' education more closely with parental and conventional community influences, graduated licensing, and other influences such as incentives and disincentives. Careful planning of the early stages will provide a platform on which to build driver education's higher educational and training objectives.

REFERENCES

Gopher, D. The Skill of Attention Control: Acquisition and Execution of Attention Strategies. In *Attention and Performance XIV: Synergies in Experimental Psychology, Artificial Intelligence, and Cognitive Neuroscience* (D.E. Meyer and S. Kornblum, eds.). The MIT Press, Cambridge, Mass., 1992, pp. 299-322.

Lonero, L. P., K. M. Clinton, J. F. Brock, G. J. S. Wilde, I. Laurie, and D. Black. *Novice Driver Education Model Curriculum Outline.* American Automobile Association Foundation for Traffic Safety, Washington, D.C., 1995.

Mayhew, D. R., and H. M. Simpson. *The Role of Driving Experience: Implications for the Training and Licensing of New Drivers.* Traffic Injury Research Foundation, Ottawa, Ontario, Canada, 1995b.

McKnight, A. J. Driver Education B When? *Journal of Traffic Safety Education,* Jan. 13-15, 1984.

A Resource Curriculum in Driver and Traffic Safety Education. Automotive Safety Foundation, Washington, D.C., 1970.

Standards for Novice Driver Education and Licensing

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Whatever their attributes, driver education and licensing standards are no different than any other performance standard. They provide a criterion for evaluating existing systems and serve as a guide for developing new ones. The more important objective for novice driver education and licensing standards is their desired effect on safety. There is long-standing consensus that driver education and licensing programs should produce drivers who are less likely to be crash involved than would otherwise be the case. Only rarely do contemporary education and licensing programs achieve this standard. Most existing programs have minimal impacts on safety while encouraging licensure at younger ages, typically 16 years of age. Licensure at this earlier age is associated with a risk of crash involvement about three times greater than the risk of licensure at age 18. Although there are compelling reasons for allowing licensure at age 16, it is entirely appropriate that safety not be reduced as a result. The intent then should be to establish standards for novice driver education and licensing that produce novice drivers who are as safe as possible given their age and experience. A reasonable objective for these standards would be a five to ten percent improvement in safety for drivers 16 to 17 years of age. This range of effectiveness is typical for traffic safety countermeasures and should be achievable. Beyond these ages, the factors that contribute to young driver safety are likely beyond the influence of licensing and education programs.

CRASH FACTORS FOR NOVICE DRIVERS

If the objective of education and licensing standards are to improve safety for novice drivers, they must be established in consideration of the factors which contribute to the crash experience of novice drivers and the processes by which one “learns to drive.” It is these aspects of novice driver behavior that mediate crash risk. While differing in their details, studies of novice driver crashes indicate their crash experience is a product of three major factors.

- Poor vehicle control skills such as lane tracking, starting and stopping, all of which appear to be mastered relatively quickly.
- Inexperience—the effects of which are manifested in novice drivers’ failure to slow down prior to entering curves, follow too closely, and other more perceptually based driving tasks. Evidence indicates these kinds of safe operating practices are best learned by actual driving and not by lecture or demonstration.
- Inaccurate risk perception wherein novice drivers simply don’t recognize the risk associated with some driving situations, e.g., the effects of passengers on their ability to attend to driving. These skills are learned through the process of driving

under a variety of conditions and do not seem to be well learned in traditional classroom settings. Evidence from studies of novice driver crashes indicates that poor vehicle control skills are a factor in only about 10 percent of crashes. Inexperience and inaccurate risk perception are responsible for the remaining 90 percent of crashes in roughly equal proportions.

LEARNING TO DRIVE

The method by which these skills are acquired is as important a consideration in establishing standards for novice driver education and licensing as are the skills themselves. Human learning, particularly the type associated with learning to drive, is characterized by "trial and error" experiences. Simply stated, drivers learn by driving and making mistakes in the process. This style of learning virtually guarantees that novice drivers will make mistakes and some of these mistakes will result in crashes. The implications for education and licensing standards are

- Managed Risk—Novice drivers should not be allowed to drive in some environments because the high likelihood of crash involvement represents an unacceptable risk. The simplest example is driving at night. Research also indicates the risk of crash involvement increases dramatically when other passengers are present in the vehicle. Preventing novice drivers from operating in such conditions until crash risk is lessened by experience is an important consideration in developing licensing standards.
- Managed Experience—If novice drivers learn by doing, then requiring certain experiences is one way of ensuring that drivers are presented with, and have the benefit of learning from, exposure to specific driving environments and situations. Appropriate experiences include driving in inclement weather, driving long distances, operating in rush-hour traffic and driving in the vicinity of large vehicles. Garnering these and other experiences should be a part of any novice driver-licensing standard. The prevailing crash experience of novice drivers is a strong indication that the limited amount of time spent driving prior to being licensed is insufficient for this purpose. Likewise, this evidence suggests that significantly more "coaching" and managing of the novice driver's early driving experiences are also required. Neither of these elements are present in existing education and licensing systems.
- Motivation to Perform—Given their lack of experience and level of maturation, novices can fail to recognize the "need to perform" some driving tasks in ways that are conducive to safety. Incentives to adopt these more cognitively based driving practices coupled with more "behind the wheel" driving time are an important component of any education and licensing system until such time as these behaviors are internalized. Incentives for belt use and crash free driving are two good examples of this type of an incentive. Indeed, one of the more valuable benefits of a nighttime driving restriction for novice drivers is that it can be used as an incentive for them to drive safely during the day when crashes are much more prevalent. Such incentives should be part of any licensing and training system for novice drivers.

These aspects of novice driver crash experience, and the processes by which novices learn to drive, hold important clues for education and licensing standards. They clearly suggest that programs which emphasize classroom instruction and not "behind the wheel" driving experiences are unlikely to have any safety benefit whatsoever, at least when measured in terms of their impacts on crash experience. The driving skills most important for crash prevention are learned by doing, and in learning novice drivers will make mistakes which expose them to risk of crash and injury. Their exposure to these risks must be managed over a longer period of time than is currently the case and they must avoid certain experiences until they achieve some minimal level of proficiency in the more cognitively based driving skills which take longer to learn.

Given these considerations, areas of proficiency that novice driver education and licensing standards should address include the following:

- Knowledge of the rules of the road—Novice drivers should be able to demonstrate a mastery of basic rules of the road even though a lack of this knowledge is rarely related to crash experience. Requisite knowledge of traffic laws, rules of the road and basic vehicle operational concepts are easily learned through lecture and demonstration and would constitute the bulk of the subject matter of an educational standard for novice drivers.
- Basic vehicle operating skills—The ability to perform basic maneuvers inherent in the operation of a vehicle in the environment in which it is normally operated. Like all psychomotor skills, these are readily acquired through practice. Standards for their learning should emphasize behind the wheel instructional methods and specific performance criteria should be associated with individual skills.
- Specific experiences—Novice drivers should be required to accumulate specific experiences as part of the learning and licensing process. These experiences should include logging a minimum amount of mileage, driving in certain conditions (darkness, wet weather, etc.) and operating vehicles of specific types. In addition to specific experiences, the extent of experience should also be defined and provisions for verifying these experiences have occurred should be part of relevant educational and licensing standards. Assistance in managing the acquisition of this experience by parents or "mentors" should also be a part of any standard.
- Safe operating practices—Mastery of those safe operating practices known to contribute to novice driver crash experience, specifically the crash experience of 16- and 17-year-old drivers. Evidence indicates these more cognitive based skills are acquired largely through the act of driving. It is principally for this reason that licensing standards should require significantly more driving experience than is now the case in a majority of states. These skills are simply not learned in classroom settings. Their learning comes largely from actual driving and the amount of time required to acquire them is far beyond the ability of formal driver education programs.
- Incentives to perform—Incentives seen as valuable to novice drivers can provide an external reinforcement for adopting safe driving practices. Research suggests that 6 to 9 months of crash- and conviction-free driving coupled with the removal of some driving restrictions is an effective incentive. Other possible

incentives are higher fines for nonuse of safety belts and reduced insurance premiums for crash and conviction free driving. Any incentive, be it positive or negative, that is perceived as important to novice drivers can work. Their purpose is simply to motivate novices to behave in certain ways that help insure their “practicing” the safe operation of a vehicle to the point that these behaviors become internalized.

Who Is Responsible for Delivery of Beginning Driver Education?

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The paper is organized by three broad questions under consideration:

- Who should be responsible for beginning driver education?
- What are the specific responsibilities for individuals having a role in the beginning driver education system?
- How can emerging technology best be utilized in the beginning driver education system?

Some background on the status of driver education in the United States will serve as an introduction.

DRIVER TRAINING DEVELOPMENTS IN THE UNITED STATES FROM 1981 TO THE PRESENT

The 1980s were a devastating decade for driver education in the United States. In addition to stresses placed on all high-school-age education programs by declining enrollments, which mirrored the baby bust, driver education in the United States was impacted by a series of changes in the federal role and subsequent changes at the state level. In 1981, the federal role in driver education was softened when driver education was not included in a list of four national priorities established in the renewal of the Highway Safety Act.

In 1983, the final report of the Safe Performance Curriculum Driver Education Demonstration Project stated the beneficial effects of training were small and short-lived. A follow-up evaluation of the Safe Performance Curriculum Driver Education Demonstration Project conducted in 1986 concluded that even with training, large numbers of young drivers were having crashes and were being convicted of traffic violations during the first few years of their driving. In 1987, the federal government reconsidered whether changes should be made to the list of national priority program areas and in 1988 driver education remained off the list of priorities.

With the federal government's omitting driver education as a priority, states began to examine their responsibilities regarding driver education. These examinations resulted in less and less state involvement in driver education. In September of 1990 the Executive Director of the American Driver and Traffic Safety Education Association said in a speech to the National Association of Women Highway Safety Leaders:

> Today in the United States only about five or six states have quality Driver Education programs. The existence and continuance (of these programs) can be attributed to one or two dedicated people who aren't likely to be around too much longer. There are degrees of Driver Education Programs in another ten or twelve states with some state government involvement. Beyond that Driver Education is on a community (by community) basis.

In 1993, Congress became interested in driver education. The House of Representatives' Appropriations Committee report for the Fiscal Year 1994 Appropriations Bill requested that NHTSA develop a research agenda and plan of action for a strengthened research program in driver education. The NHTSA released this report in May of 1994. The report authored by Michael Smith discusses why novice driver education may not be as effective as it could be, and explains why the report recommends that improved driver education be an integral part of a graduated licensing system. The NHTSA is taking action to act on the plan articulated in the report. The research agenda extends into 1999.

WHO SHOULD BE RESPONSIBLE FOR BEGINNING DRIVER EDUCATION?

Many people and agencies have involvement in educating the beginning driver however, the direct responsibility for educating the beginning driver falls on instructors, parents and/or mentors. Government's role in the education of the beginning driver is to assure that minimum standards are being met. The standards should address instructor qualifications, curriculum content, driver performance expectations, scheduling of instruction parameters, and availability of instructional support resources. Requiring successful completion of driver education prior to licensure and providing resources for the driver education program reflect the government's acceptance of the highest level of responsibility for beginning driver education.

In the absence of government acceptance of any of its responsibilities for driver education these responsibilities shift to private individuals and groups. The groups include corporations, professional associations, highway user interest groups, and the higher education and research communities In fact the level of government involvement often reflects the degree to which groups and individuals have been successful in convincing government to assume specific responsibility for driver education.

The responsibility for establishing curricular content and the establishment of standards for students lies with the research community. Research should provide insight on what should be taught and on the most effective methods for achieving the content objectives. The establishment of standards for instructors and the means of preparing the instructors should also reflect best practices identified by research on instructor and teacher preparation. Responsibility for credentialing of instructors should shared by professional associations and government agencies.

Providing instruction, guided practice, and selective driving experiences is a responsibility shared by specially prepared and credentialed instructors working in either not-for-profit or for-profit setting and parents and/or an adult mentor. Instruction should be distributed throughout the second and third phases of a graduated driver license system. Classroom and laboratory instruction should be conducted by the instructor and the instructor should also be responsible for prescribing the guided practice needed by the beginning driver. The instructor is responsibility for assessing student performance and communicating the results of the assessment to both the student and the adults working with the beginning driving. Assessments are the basis of all instruction and practice.

The relationship between the instructor (practitioner), student (patient), and adults assisting in the preparation of the beginning driver (patient advocate) should be clinical in nature with the practitioner (Instructor) helping the patient (beginning driver) survive and then thrive as an independent and self-reliant driver. Parents and/or adult mentors are responsibly for providing guided practice consistent with the prescriptions offered by the professional instructor. Once instruction has achieved its purpose, parents and/or mentors are responsible for providing the beginning driver with selected driving experiences. The selected experiences move from those that are closely supervised to less and less supervision based on the beginning driver's demonstrated skill and responsibility.

The certification of the beginning driver's achievement of knowledge and skill levels which meet the standards for passage from one phase of a licensing system to the next phase could be the instructors responsibility or the responsibility of a government employee. Parents or legal guardians have the responsibility to certify that the beginning driver has both prescribed experiences and the inclinations for responsible driving. Finally, responsibility for financing the education of a beginning driver is to complicated an issue to be explored in this paper. However if the reader is interested in exploring this issue, the author's doctoral dissertation "The Role and Funding of Driver Education in Minnesota" offers some interesting insights into the question "Who should pay for driver education?"

HOW CAN EMERGING TECHNOLOGY BEST BE UTILIZED IN THE BEGINNING DRIVER EDUCATION SYSTEM?

The best utilization of technology for beginning driver education is to provide support for both the instructional and experiential dimensions of beginning driver education. Technology should not be used for technology's sake, but should be used when it improves either or both the efficiency or effectiveness of instruction and driving experiences. All of the emerging digital technologies have the potential to improve beginning driver education, but in order to achieve their potential, sound instructional design and appropriate content must serve as the foundation on which technology is applied to the education of drivers.

SUMMARY

This paper addressed these questions about driver education: Who should be responsible for it, what are the specific responsibilities, and how can emerging technology best be utilized? The simple and straightforward answers are

- Government's role in the education of the beginning driver is to assure that minimum standards are being met.
- Responsibility for credentialing of instructors should shared by professional associations and government agencies.
- Providing instruction, guided practice, and selective driving experiences is a responsibility shared by specially prepared and credentialed instructors working in either not-for-profit or for-profit setting and parents and/or an adult mentor.
- The instructor is responsibility for assessing student performance and communicating the results of the assessment to both the student and the adults working with the beginning driving.
- Parents and/or adult mentors are responsibly for providing guided practice consistent with the prescriptions offered by the professional instructor.
- Parents and/or mentors are responsible for providing the beginning driver with selected driving experiences based on the beginning driver's demonstrated skill and responsibility.
- The certification of the beginning driver's achievement of knowledge and skill levels which meet the standards for passage from one phase of a licensing system to the next phase could be the instructors responsibility or the responsibility of a government employee.
- Parents or legal guardians have the responsibility to certify that the beginning driver has both prescribed experiences and the inclinations for responsible driving.
- Responsibility for financing the education of a beginning driver is too complicated an issue to be explored in this paper.

The best utilization of technology for beginning driver education is to provide support for both the instructional and experiential dimensions of beginning driver education.

Advanced Driver Education

Introduction

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Increasing statistics of inexperienced drivers dying on our nations highways have attracted the attention recently of media professionals as well as legislators, law enforcement officers, educators, and the medical community. While driver education, as we have historically known it, may not be the answer, a redefined driver education curriculum could be the solution.

Traditionally, driver education has been taught solely at the entry level of driving and licensure. However, the knowledge, skills, and attitudes needed for a safe driver to emerge, are impossible to teach at the entry level and can only be developed after the student has been exposed to various scenarios. With this thought in mind, there is a need to renovate the way we teach driver education.

A two-step approach to driver education may be the prescription needed to fight the epidemic on our nation’s highways. The first stage of driver education would involve the student learning the basic skills and handling characteristics of the vehicle, of which has been a traditional part of the driver education curriculum. Stage two would focus on complex issues facing drivers including decision making, alcohol awareness, and night driving.

A focus on problem drivers should also be included in the second stage of the curriculum. The new system should also include driver improvement intervention for problem novice drivers and intervention should be initiated early if modification of negative behavior is to be affective. Activation of intervention strategies may occur after the driver's first crash or second moving violation.

Another selling point of the two-stage curriculum is the incentive it offers the driver for completing the program. Traditionally only 1 percent of all drivers seek a second level of instruction on their own. The desire for the novice driver to have an unrestricted license is incentive enough to complete the two-stage program and gain the knowledge, skills, and attitudes necessary to become a safe driver.

Objectives of Advanced Driver Education

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The term “advanced driver education” is but one name given to the new approach of training young drivers in a graduated driver license system. It is important that we understand that driver education (driver learning) is provided in two distinct settings with completely different objectives and outcomes.

Initial training of novice drivers will provide basic vehicle handling skills and the second training course will provide for other safe driving skills, including enhanced decision making to reduce the risk taking of young drivers. The initial course might be considered a pre-licensing course and must teach all the basic operator skills, including an introduction to perception, decision-making, risk-taking, and impairments that affect driving. We certainly can not put a new driver on our highways without giving them as complete an education as possible. However, we should not attempt to go beyond the capabilities and understanding of our students by asking them to apply knowledge they have had no practical experience with.

With these basic skills, new drivers now have an opportunity to practice their driving in controlled environments. It is critical that we provide as much experience as possible to increase driving skills. There must also be motivation to drive safely. That is, crash free, violation free, abiding by zero tolerance and successful completion of each level of training in order to graduate to the next level of licensing. We can not provide instant maturity, but we can provide realistic experiences that will teach safe driving practices. Any learner, young or old will only use new information when they see value in that information. To provide this experience, we need to provide guided practice through parent involvement; mentor training; guardian training; or any training effort that is guided by an older adult. These driving experiences should begin in low to moderate traffic environments and progress to more complex traffic situations.

Segment Two driver education must emphasize those safe-driving practices that reduce the probability of crashes. It is not intended that the emphasis of this level of training be on skid pads or other high performance skill training areas. Inexperienced drivers don't know where to look or what to look for. While they do take risks, some of these risks are compounded by a lack of awareness. Without basic driving skills and an opportunity to practice these basic skills, it is both hard to understand and to teach such things as gap selection; impaired driving; risk awareness and reasonable risk acceptance; night driving problems; aggressive driving; perceptual driving practices such as a 15 second projected path of travel; and decision making to include value judgments such as right vs. wrong. The following helps illustrate a two-phased driver education program:

All concepts and skills required of a new driver should be taught during Segment One. This would be the basic information required for skill development. During

Segment Two this information, along with the experiences acquired during practice between Segment One and Segment Two would allow for problem solving. Enhanced decision making of safe driving practices will be emphasized in Segment Two.

EXAMPLE: DRINKING AND DRIVING

- Segment One—You must teach the laws relating to drinking and driving. Also cover the statistical problem associated with this major problem.
- Segment Two—Now we deal with appropriate decisions and safe driving practices concerning drinking and driving. We emphasize the loss of judgment, and driving ability associated with impairment. Using problem solving they could make decisions about: who they ride with; what do they do about a friend who is drinking; what clues they follow to avoid those on the highway who have been drinking (time of day-place-driving characteristic of other driver).

EXAMPLE: DECISION-MAKING SKILLS

- Segment One—We must teach perceptual driving practices and introduce decision making skills. Students should be taught where to look and what to look for. They need to make basic decisions concerning lane placement, where to turn, gap selection in low moderate traffic; and how night driving affects their perceptual skills.
- Segment Two—Now they can use experience gained from actual driving to improve and practice their decision-making skills. Emphasis would be on high accident areas such as: running off the road, passing and intersections. This is where most crashes occur. Using problem-solving techniques they will need to make choices as to the best course of action. In most cases there will be more than one right solution. If their solution is incorrect then they need to see what the consequences are.

EXAMPLE: NIGHT DRIVING

- Segment One—Night driving - they will be taught problems with reduced vision and encouraged to drive in light/moderate night driving situations.
- Segment Two—Would deal with night driving in more complex situations: congested traffic; bad weather; other people in the car; how to handle mechanical problems; what to do when arriving at an accident scene. Now is the time to make changes in driver education content and delivery systems. We should not continue to let younger drivers die in car crashes simply because we have not scientifically proven what does and doesn't work. Segment Two driver learning should include the use of Advanced Instructional Technology. These systems can be inexpensive computer based instruction that enables the teacher or the learner to experience decision making in specific environments. It is very difficult to teach gap selection in complex driving environments. With the assistance of computer based instruction we can determine if the new driver has made the correct decision in a critical driving environment. It is not possible to put inexperienced drivers into high risk driving environments in order to teach the safe driving practices. Therefore, we must use advanced instructional

technology to accomplish this task.

In the early 1970s we describe the Driving Task Analysis in order to develop driver education curriculum. Now we need to describe the safe driving practices thought to be critical and adopt new technology to teach these safe driving skills.

REFERENCES

Research Agenda for an Improved Novice Drive Education Program. Report to Congress, NHTSA, U. S. Department of Transportation, Washington, D.C., May 31, 1994.

Traffic Safety Administration Graduated Driver Licensing System for Young Drivers: Guidelines for Motor Vehicle Administrators. American Association of Motor Vehicle Administrators with NHTSA, U. S. Department of Transportation, Washington, D.C.

McKnight, A. J., and A. G. Hundt. *Driver Education Task Analysis: Instructional Objectives*. Human Resources Research Organization, March 1971.

Incentives to Advanced Driver Education

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Granting the benefits of two-stage driver education in developing the knowledge, skills, and attitudes most conducive to safe driving, what incentives can be offered drivers to participate in instruction beyond basic driver education? Incentives can come from four sources

- Self-improvement—the desire to be a better driver;
- Insurance discount—offering premium reductions;
- Penalty reduction—mitigating the penalties for traffic violations; and
- Graduated licensing—requiring additional instruction to gain full licensure.

SELF-IMPROVEMENT

The simple desire to be a better driver is perhaps the healthiest incentive to instruction beyond the basics since it implies a willing learner. However, it appears to be the least potent of incentives. Courses designed to foster self improvement include the Defensive Driving Course of the National Safety Council, the American Automobile Associations Driver Improvement Course, and the 55 Alive program developed by the American Association for Retired Persons (AARP). Comparisons of annual enrollment in these courses with the numbers of licensed drivers amounts to less than 1 percent of eligible drivers. Most of the enrollment is made up of traffic violators, drivers seeking auto insurance discounts, and employees of firms that provide instruction as part of work.

INSURANCE DISCOUNTS

A number of insurance companies provide discounts for policyholders completing instructional programs unconnected with traffic violations. The apparent rationale is that the reduction in accidents, and subsequent claims, will pay for the discount. Ostensibly, the accident reduction will come from the benefits of instruction. However, it well may be that, like basic driver education in the early days, instruction pays for itself by attracting the more conscientious and possibly lower mileage drivers.

Several states require companies doing business in the state to offer such discounts. In most states the law applies only to senior citizens, although a few apply it to all drivers. A comparison of 55 Alive enrollment figures across states shows a higher enrollment in states offering discounts. Nevertheless, less than 2 percent of the AARP membership enroll in the course.

In the last 2 years at least two consortiums involving insurance companies have

embarked upon ambitious driver improvement programs for novice drivers making extensive use of electronic technology, including CD-ROM and computer-based training. These programs may permit a higher degree of interaction than more conventional classroom instruction, as well as permitting a more accommodating schedule of self study. Among most teenage novice drivers, the discount probably functions indirectly as an incentive. Since insurance premiums more often are paid by parents, it is the parents that enjoy the benefits and who are largely responsible for getting the novices to participate. The second stage instruction fostered by discounts is not confined to formal school and self-study programs. At least one insurance carrier has offered discounts in the form of rebates to young policyholders whose parents provide adult supervised instruction.

The incentive value of discounts to drivers may be undermined to some extent by other available discounts. Policyholders with good driving records may already qualify for the maximum available discount. The laws in most states are vague as to the manner in which the discount is figured; some laws don't even specify the amount of the discount. There is also some concern that some discounts are offset by initially high premiums.

PENALTY REDUCTION

To the present time the great majority of drivers participating in instruction beyond basic driver education are doing so in order to mitigate the consequences of one or more traffic violations. The two primary sources of students are the courts and licensing agencies. Those handles by licensing agencies are repeat offenders and will addressed among problem drivers in the next section. Judges may allow reduced penalties for traffic offenses, or allow violations to go unreported to licensing agencies, upon agreement of offenders to participate in an instructional program. The courses given are typically those offered to the public at large rather than being tailored to the violator population. However, since a single violation doesn't necessarily signal a particular problem, the subject matter is not particularly inappropriate. In this sense, court referral programs simply provide a means of gaining attendance by ordinary drivers who would not otherwise participate.

The drawback of instruction offered in return for allowing violations to go unreported, referred to as "masking" violations, is that repeat offenders can go undetected. Many participants have attended two or more sessions of a course that has obviously been unsuccessful in deterring violations rather than being subject to steps that are more appropriate to repeat offenders.

GRADUATED LICENSING

Probably the most promising approach to driver education aimed at the improvement of licensed drivers is a graduated license system. A number of graduated licensing programs call for instruction after receipt of the initial license as a requirement for full licensure. At the time of the workshop, they included four U.S. states, New Zealand, and Ontario, Canada). The advantage of graduated licensing as an incentive to driver

improvement instruction is twofold. First, it provides an extremely powerful incentive. To young novices, the opportunity to drive free of the restriction, to drive where and when they wish, is probably a greater inducement to successfully complete second-stage driver education than is any of the other incentives described. Second, it is likely to extend instruction to far more drivers than any or all of the other three incentive sources. If it became a standard element of graduated licensing, and graduated licensing were to reach all states, it would provide a means of reaching all drivers, rather than just the 1 or 2 percent receiving it now.

EFFECTIVENESS AS AN INCENTIVE

A necessary element of almost any incentive system is knowledge that the target of the incentive is worthwhile. In the case of driver improvement instruction, it is evidence that it leads to safer driving. The incentives or self-improvement, penalty reduction, insurance discounts, and licensing assume that the instruction reduces the likelihood of accidents. Unfortunately, evidence is lacking. Struckman-Johnson et al. (1989) reviewed 65 driver improvement courses. While the great majority of them led to a reduction in further traffic violations, the effect upon subsequent accidents was equivocal, some showing a reduction and some showing a gain. Yet, in studies with large enough samples and sufficient statistical power to detect accident effects, significant reductions in accidents were observed. However, almost all of the programs evaluated involved traffic violators, the problem drivers addressed in the next paper. Sound evaluations of improvement courses for the driving population at large have yet to be conducted.

One assessment of advanced instruction showing evidence of improvement involved a 3-h course for motorcycle operators in which a random half of those failing a test of such skill by the California Department of Motor Vehicles were assigned to a 3-h skill development course. Those required to take the course had fewer accidents over the following year. The fact that the two groups had equal numbers of traffic citations suggests that the accident reduction was not due to exposure reduction or greater compliance with the law.

SUMMARY

One advantage that advanced driver education enjoys over basic instruction is that its student population consists of people who already drive, freeing the instruction from any taint of exposure inflation. However, in order attract a following it must meet more than the “do no harm” test. It must show evidence of tangible benefit. Thus far improvement programs have flourished on the assumption by courts, insurance companies, legislators, educators, and others that it must accomplish something. However, programs that depend upon faith alone for their existence tend to suffer under economic pressure and competition for funds. The greatest incentive to the expansion of, and participation in second-stage driver education, will be proof that it works.

Problem Driver Educational Component

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Presently, the great majority of the drivers who receive driving instruction after being licensed do so because they have committed one or more traffic violations and have been required to attend a course by the courts or the license administration. This paper will focus on the role intervention components emphasizing educational and informational strategies and content for young problem drivers. In considering this issue, seven key issues or questions should be addressed.

1. Do traffic violations and accidents involving young drivers reflect skill and knowledge deficits?
2. Are the deficits remediable through educational or behavior modification interventions?
3. Are young problem drivers modifiable?
4. At what point should driver improvement intervention be initiated?
5. Do accidents and traffic citations have different implications as to educational strategies?
6. Are there possible applications for computers and simulators?
7. How should educational and driver improvement interventions be linked with post license control structure?

The remainder of this paper is organized around a consideration of each of the questions above.

ROLE OF KNOWLEDGE AND SKILL DEFICITS

There is general consensus among authorities that attitude, maturity, and lifestyle variables are more important factors than are knowledge and skill deficits. Studies of accident and violation—involved young drivers have not provided any consistent evidence showing that these drivers have less knowledge or skill than do young drivers with clean records. There is also evidence to show that youth and maturity are more important risk factors than is driving experience. However, experience does have an independent effect, perhaps by improving risk perception and decision making. More research is needed in determining how experience improves skill and how such information can be incorporated into problem driver remediation programs.

MODIFIABILITY OF YOUNG PROBLEM DRIVERS

Existing research evidence and analytic considerations suggest that the underlying causes of accidents and violations involving young problem drivers are difficult to modify through educational interventions. In addition, programs attempting to affect the behaviors of young drivers by improving attitudes have not met with demonstrated success. One notable exception to this conclusion is a study by the Sacramento Safety Council (1975) that evaluated a group discussion format structured around “trigger films.” Peck (1985, 1993) has pointed out that young drivers are prone to view risk and personal vulnerability to accidents differently than older people. This reflects both biological factors and maturational changes that evolve through the passage of time. There is also research evidence to show that young drivers are less responsive to driver control interventions than are older drivers.

DRIVER IMPROVEMENT INTERVENTION THRESHOLDS

For maximum impact potential, driver improvement intervention should be initiated early, perhaps upon the second moving violation or first accident. Due to the large volume of drivers who would qualify at this level, some form of mailed home-study treatment with point reduction incentives contingent upon maintaining a clean record might offer the most potential because of their relatively low cost (Kadell, 1987). Another variant would be the development of computer- and video-based programs.

INTERVENTION IMPLICATIONS OF ACCIDENTS AND TRAFFIC VIOLATIONS

Although many accidents involve traffic law violations, the fact remains that most young drivers with elevated traffic conviction counts are accident free and, conversely, most accident-involved young drivers are violation free. Young drivers with accidents on their record in absence of violations probably represent a different population than do violation repeaters, particularly violation repeaters who are accident free. It seems reasonable to hypothesize young drivers who have accidents without traffic violations might profit more from educational interventions.

ARTICULATION OF DRIVER IMPROVEMENT WITH LICENSE CONTROL INTERVENTION

Any educational interventions should occur before the license suspension. For high-risk drivers who have had their license revoked, the completion of a driver improvement course might be required as a condition of reinstatement.

In conclusion, educational programs do not offer a great deal of potential for young problem drivers, but they may have more potential for the older novice problem driver and for young drivers involved in accidents not associated with traffic citations. A great deal of research is needed to develop and empirically validate effective problem driver educational modules for graduated licensing programs.

REFERENCES

Kadell, D. J. Traffic Safety Impacts of the Home Instruction/Point Reduction Incentive (HI/PRI) Program. *Journal of Safety Research*, Vol. 18, No. 4, 1987, pp. 149-178.

Peck, R. C. The Role of Youth in Traffic Accidents: A Review of Past and Current California Data. *Alcohol, Drugs, and Driving*, Vol. 1, No. 1-2, 1985, pp. 45-61.

Peck, R. C. The Identification of Multiple Accident Correlates in High Risk Drivers With Specific Emphasis on the Role of Age, Experience and Prior Traffic Violation Frequency. *Alcohol, Drugs, and Driving*, Vol. 9, No. 3-4, 1993, pp. 145-166.

Traffic Court School Countermeasure Project. Sacramento Safety Council, Sacramento, Calif., 1975.