



Graduated driver licensing and safer driving

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Abstract

Graduated Driver Licensing (GDL) inserts between the learner permit and full licensure an intermediate or “provisional” license that allows novices to drive unsupervised but subject to provisions intended to reduce the risks that accompany entry into highway traffic. Introduction of GDL has been followed by lowered accident rates, resulting from both limiting exposure of novices to unsafe situations and by helping them to deal with them more safely. Sources of safer driving include extended learning, early intervention, contingent advancement, and multistage instruction. To extend the learning process, most GDL systems lengthen the duration of the learner phase and require a specified level of adult-supervised driving. Results indicate that extended learning can reduce accidents substantially if well structured and highly controlled. Early intervention with novice traffic violators have shown both a general deterrent effect upon novice violators facing suspension and a specific effect upon those who have experienced it. Making advancement to full licensure contingent upon a violation-free record when driving on the provisional license has also evidenced a reduction in accidents and violations during that phase of licensure. Multistage instruction attempts development of advanced skills only after novices have had a chance to master more basic skills. Although this element of GDL has yet to be evaluated, research indicates crash reduction is possible in situations where it does not increase exposure to risk. While the various elements of GDL have demonstrated potential benefit in enhancing the safety of novice drivers, considerable improvement in the nature and enforcement of GDL requirements is needed to realize that potential.

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1. Introduction

Initial attempts at unsupervised driving by teenage novices are characterized by inordinately high risk. The per-mile fatal crash rate of 16-year-old drivers is three times that of 18-year-olds and 10 times that of adults (Williams & Ferguson, 2002). Teens report their crash rate falling by half over the first 250 miles and by two-thirds over the first 500 miles of driving (McCartt, Leaf, Farmer, Ferguson, & Williams, 2000). Similar reductions in crash rate are reported at all ages (Maycock, Lockwood, & Lester, 1991). While estimates as to the magnitude of risk may vary, it is clear that introduction to the demands of the traffic environment are fraught with danger. One means to helping novices to better cope with these demands has been introduction of a “provisional” license between the closely supervised driving required by a learner permit and the unrestricted driving allowed by full licensure.

The provisional license was first introduced during the 1960s by the States of Victoria and New South Wales in Australia. In the mid-1970s, the National Highway Traffic Safety Administration (NHTSA) studied the threats to novice drivers and formulated a three-step licensing process now generally known as Graduated Driver Licensing (GDL; Croke & Wilson, 1977). Application of the NHTSA model first occurred under a contract to the State of Maryland, which introduced in 1978 a provisional license allowing unsupervised driving but requiring a period of parent-guided instruction, a night-driving restriction, early intervention with traffic violators and full licensure only after a period of violation-free driving. Various versions of GDL were introduced in California in 1983 and New Zealand in 1987. However, it was not until the 1990s that it began to gain wide acceptance, being introduced at an accelerated pace throughout North America and Europe.

While the various forms of GDL call for a provisional license phase, the elements of that phase differ widely across jurisdictions. In addition, although almost all GDL systems have been associated with some reduction in crashes, the simultaneous introduction of the different

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elements has made the sources of the reduction difficult to identify. Broadly speaking, the sources can be divided into two categories: exposure reduction and safer driving.

1.1. Exposure reduction

Certain restrictions in driving during the provisional phase of GDL are intended to reduce exposure to high-risk situations until novices have achieved a degree of experience and proficiency. Night-time restrictions limit exposure to the dangers of driving under low illumination, alcohol impairment and fatigue. Passenger restrictions are expected to reduce crashes resulting from the influence of teenage passengers as well as the numbers than might be injured in any crash. Both restrictions have been associated with significant crash and injury reduction without serious limitations in mobility. A third source of exposure reduction occurs when the learner phase is extended. While the objective of an extension primarily is to improve ability and lead to safer driving, it also serves to delay licensing, reducing the numbers of novices operating unsupervised, as well as the mileage they compile, essentially raising the licensing age.

1.2. Safer driving

Those elements of GDL intended to improve the safety with which novices actually drive include extended learning, early intervention with traffic violators, making advancement to full licensure contingent on violation-free driving, and multistage instruction. Extension of the learner phase, while reducing exposure, is intended primarily to provide opportunities for greater learning and thus improved safety when novices are allowed to drive unsupervised on the provisional license. The effects can be assessed where crash records for the newly licensed are compared before and after the introduction of GDL. Early intervention with traffic violators is expected to have both a general deterrent effect upon those novices facing action with the next offense and a specific deterrent effect upon those who have experienced the intervention. Making advancement from provisional to full licensure contingent upon a violation-free driving record is expected to serve as an incentive to safe driving. Finally, multistage instruction calls for a period of basic skill development following initial instruction before attempting to introduce more advanced skills.

This paper will address those GDL elements that seek primarily to improve the safety of operation among novices, including both the nature of the elements themselves and the available evidence as to their effectiveness. Exposure reduction is addressed in the paper by Lin and Fearn (2003).

2. Extended learning

GDL systems have generally attempted to extend learning by increasing the duration of the learner phase and the

amount of supervised driving required. The most common combination of these is a required 6 months driving on the permit and 50 h of supervision before issuance of a provisional license. A number of jurisdictions specify only the duration of the period and a few only the hours of driving. The Insurance Institute for Highway Safety maintains an up-to-date summary chart of GDL requirements at its website (www.hwysafety.org).

Attempts to improve upon the quality of supervised driving include the development of materials to guide the novices as well as adult drivers providing supervision. A variety of materials have been created by various jurisdictions in support of supervised driving under GDL. In addition, safety-oriented organizations prepared materials for more general use. A “Checkpoints” program has been devised to encourage and aid parents in the imposition of restrictions on the conditions under which teenage novices drive. An evaluation found both parents and teens participating in the program reporting greater restriction in driving than a comparison group (Simons-Morton, Hartos, & Leaf, 2002). The Network of Employers for Traffic Safety (NETS) has developed materials that are currently being evaluated through a large-scale experiment in Tennessee.

Attempts to evaluate the effects of extended learning upon the independent driving of licensed novices have been hampered by difficulty in distinguishing their driving records from those novices not yet licensed. Table 1 shows the reductions in crash rate following extension of the learner phase within those jurisdictions assessing effects upon safety of operation by novices driving unsupervised, on provisional or full licenses. Other attempts to evaluate GDL have studied either all drivers, including learners driving under supervision and compiling greatly reduced mileage or the eligible population at large, which includes those not driving at all. The effect upon licensed drivers provides the best indication of GDL’s effect upon safety of operation by drivers operating on their own. In the three Canadian provinces and Ohio, introduction of GDL was associated with significant declines in crashes among licensed drivers. While the decline cannot be attributed

Table 1
Reductions in crashes of licensed novice drivers following extension of the learner phase

State	Date Enacted	Length of Extension	Percent Reduction	Reference
California	1983	1–1.5 months	3.8%	Hagge & Marsh, 1988
California	1998	6 months	0%	Peck unpublished
San Diego	1998	6 months	0%	Smith et al., 2001
Nova Scotia	1994	6 months	12%	Mayhew et al., 2002
Ontario	1994	12 months	16%	Boase & Tasca, 1998
Quebec	1996	8–12 months	5%	Bouchard et al., 2000

solely to extension of the learning phase, it is the element of GDL most likely to affect the overall crash rate.

The clearest assessment of just what extended learning by itself can contribute to reduction of crashes among unsupervised drivers comes from the work of Gregersen et al. (2000) in Sweden, where it took place outside of GDL and independent of any other changes in licensing. A new law lowered the learner permit age from 17 1/2 to 16 1/2 under the condition that those seeking the earlier permit be supervised either by professional driving school instructors or by adults at least 24 years old who had to obtain instructor's permits. The licensing age remained 18 years.

Those who took advantage of the early start accumulated 2 1/2 times more driving hours and had 24% fewer crashes than those starting at 17 1/2 after equating the groups for demographic differences.

No current GDL systems even approaches the amount or level of supervised driving that characterizes Sweden's program. Few provide any means of assuring that even those requirements that are imposed will be fully met. In California, drivers reported completing an average of 500 miles in meeting the 50-h requirement (Williams, Nelson, & Leaf, 2002). Since this works out to an average of 10 miles an hour, the veracity of reporting can be questioned and it is possible that substantial numbers of novices are not meeting the requirement. It seems very likely that gaining appreciable benefit from extended learning will require some means of strengthening the supervision and assuring that requirements are met.

3. Early intervention

One of the more pervasive GDL elements is the introduction of driver improvement interventions at a lower violation threshold than is the case for adults. Moreover, where the first rung on the driver improvement ladder for adults is typically an informational or instructional intervention, license suspension is often the first step for those in the provisional phase of GDL. The expected effect of suspension is twofold: general deterrence for all drivers operating on provisional licenses at a point where they face driver improvement action on the next (including first) violation, and specific deterrence for drivers whose licenses are suspended, both while under suspension and after reinstatement.

The effects of an early intervention program with GDL can be found in the previously cited study by Hagge and Marsh (1988), who examined the effects of the specific provision of the initial California system, which lowered the traffic violation point count triggering driver improvement action. If the intervention was effective, one would expect the 16-year-olds to exhibit a proportionally greater reduction in crashes and violations as they neared the threshold for action after the law change than before. A reduction in crash and violation rates among 16-year-olds exceeded

that of a 19-year-old comparison group not subject to the low threshold. The program demonstrated both a general deterrent effect on violators, reducing numbers reaching the suspension level and a specific deterrent effect in reducing recidivism after suspension. Under the Oregon GDL, novices received a warning on the first violation and were suspended on the third (Jones, 1994). The author judged the suspension provision of the Oregon graduated licensing to be relatively ineffective upon finding no significant decline in violations. Eavy, Edwards and Lee-Gosselin (1987) in a random experiment with young traffic violators found those assigned to a group meeting had significantly fewer ($P < .05$) crashes and violations during a 6-month period following assignment. Edwards and McKnight (1986), also employing a random experimental design, evaluated the general deterrent effect of very short-term suspension on novice drivers and found that the threat of deterrence affected only females, while the experience of it reduced crashes among drivers of either gender. The significance of the latter effect for females was difficult to establish because of the small numbers actually suspended.

4. Contingent advancement

While the provisional license phase is a fixed period in most GDL systems, some make advancement to full licensure contingent upon a violation-free driving record for some period of time, most often one year. Under such an arrangement, each violation extends the duration of the provisional license phase for the specified period. This contingent advancement element is a part of graduated licensing in Maryland, Michigan, North Carolina, and New Zealand, as well as the Model Graduated Licensing Law put forth by the National Committee on Uniform Laws and Ordinances. The clearest assessment of contingent advancement comes from the 1978 Maryland GDL, where it was the only element capable of influencing the full range of crashes, the others being the night-driving restrictions and early intervention with violators (parent involvement was discontinued). The contingent advancement provision was deemed largely responsible for the overall 10% decline in violations and the 5% decline in crashes (McKnight, Hyle, & Albrecht, 1983).

Where the upper limit of the provisional phase is fixed at age 18, the deterrent effect of contingent advancement would be largely negated by allowing full licensure at that age regardless of driving record. This limitation has been overcome to an extent in jurisdictions that extend provisional licensing beyond that age, some to age 21 and others indefinitely. The latter necessarily prevails where the three-stage licensing process is imposed upon novices of any age. In most of the jurisdictions, those over age 18 are generally exempt from the night driving restriction owing to its interference with employment and other important adult activities that involve driving at night.

5. Two stage instruction

In most jurisdictions making formal instruction a prerequisite to licensing, the instruction is a one-shot affair. Novices are expected to progress from total lack of skill to a finished product in 6 h behind the wheel. Much of safe driving demands the ability to share attention between the basic control required in keeping the car on the road and surveying the highway traffic scene to respond appropriately to changing roadway and traffic conditions. Such attention sharing demands that the more basic skills be routinized to a degree that control is exercised almost automatically. Further, mastery of basic skills underlies development of the advanced skills required in responding appropriately to emergencies involving degraded road conditions and impending collisions.

Multistage instruction has been advanced as a means of allowing novices to fully develop basic driving abilities before attempting to acquire more advanced skills. However, once a license is obtained, the incentive for additional instruction largely vanishes. GDL offers the opportunity to apply the licensing requirement to two levels of instruction. Under GDL, New Zealand and the State of Michigan inaugurated a formal two-stage licensing process. The fact that it has been introduced simultaneously with other GDL elements poses an obstacle to its assessment, and evidence as to its effectiveness comes largely from outside of licensing. Some tangential evidence as possible benefits comes from evaluation of “driver improvement” courses encouraging safer driving practices. However, served by these courses are almost entirely experienced drivers, and the subject matter is intended to serve more as a knowledge refresher than a means of developing advanced skills.

One form of advanced skill instruction involves the ability to handle vehicles under adverse weather conditions. The results of instruction in driving over slippery, snow-covered surfaces is somewhat equivocal. Studies by Glad (1988) in Norway and Katila et al. (1995) in Finland show such instruction to be associated with increased crash rates among male drivers. However, one might expect those who seek and receive instruction to be more likely to attempt driving under those circumstances. The issue to be resolved is how the benefits of being able to drive under such circumstances relate to the risks. One form of advanced skill not directly associated with added risk exposure is the ability to avoid collisions through emergency braking and evasive steering. Some indication as to the potential risk reduction from advanced training in collision avoidance skill comes from a randomized experiment in which half of those motorcycle operators seeking licenses were assigned to a 3-h course in emergency braking and swerving (Anderson, Ford, & Peck, 1980). Those taking the course had 22% fewer crashes over the following year. The fact that the two groups had equal numbers of traffic citations suggests that the crash reduction was not the result of lowered mileage or safer all-around driving.

6. Summary

Those elements of GDL that seek to improve the safety of novice drivers have included (1) extending the length and effectiveness of the learning process, (2) intervening early with novices who violate traffic laws, (3) making advancement from provisional to full licensure contingent upon a violation-free driving record, and (4) providing instruction in stages such that novices achieve a degree of mastery in basic skills before more advanced skills are introduced.

6.1. Extended learning

GDL systems have extended the period of time during which a learner permit is held, most often 6 months, as well as the hours of adult-supervised driving that must be provided, typically 50 h. Introduction of extended learning under GDL has been followed by crash reductions of up to 16% among licensed drivers, some of which may be the result of other changes. The singularly clearest test of extended learning showed reductions of 24% from a program that required a lengthy period of supervised driving under greater structure and control than that which characterizes programs introduced under GDL.

Realizing the full potential of extended learning will require measures that assure well supervised driving takes place.

6.2. Early intervention

Most GDL systems impose sanctions upon novice violators at lower thresholds than is the case with adults, some on the first violation. Research both within and outside of GDL has shown a general deterrent effect upon both those violators facing license suspension on the next violation and a specific deterrent effect upon those suspended. Making advancement to full licensure contingent upon a violation-free record appears to exert a general deterrent effect across the population of drivers in the intermediate stage.

6.3. Contingent advancement

Making advancement to full licensure contingent upon a violation-free record appears to exert a general deterrent effect across the population of drivers in the provisional phase of licensing. However, gaining full benefit from this element of GDL requires ability to extend the provisional license of violators for a specified period of time regardless of the age at which the violation occurs; the full license cannot be granted automatically at age 18 regardless of driving record.

6.4. Two stage instruction

The ability to cope with the attentional requirements of everyday traffic and the vehicle control demands of adverse

weather conditions and impending collisions requires advanced skills that cannot be achieved until more basic skills are mastered. Two stage instruction allows novices an opportunity to develop basic skills through a period of licensed driving before attempting to acquire advanced skills. The few two stage approaches to instruction currently included in GDL have yet to be evaluated. A random experimental evaluation of collision avoidance instruction outside GDL found it to result in substantial crash reduction. However, instruction in driving on slippery roads has been associated with a crash increase, possibly because it facilitates driving under those conditions.

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