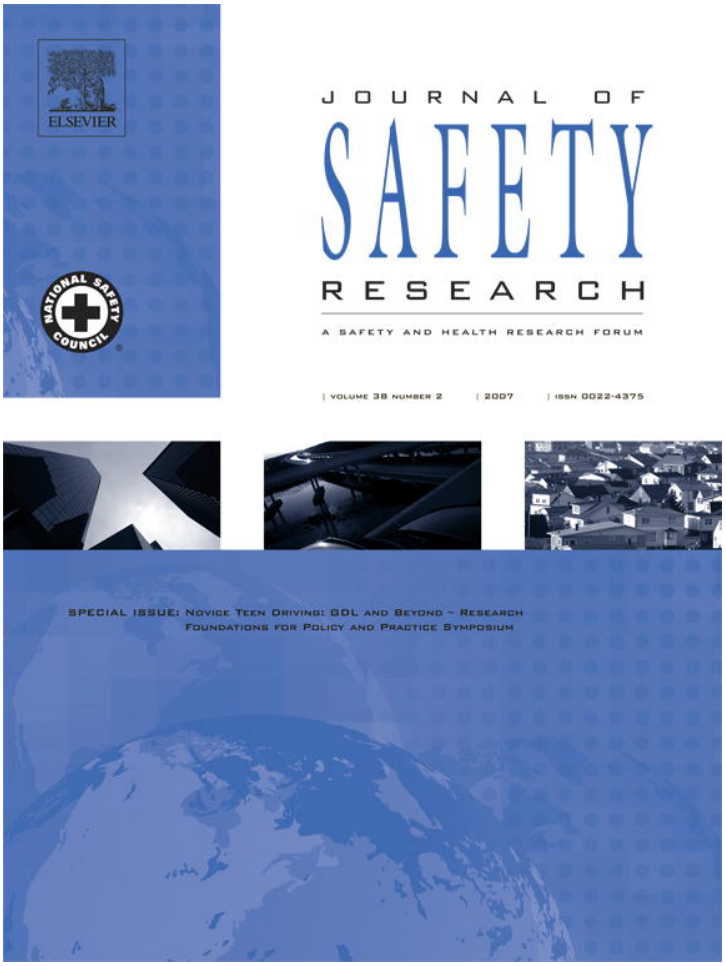

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Contribution of the components of graduated licensing to crash reductions

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Abstract

Problem: It has been established that graduated licensing systems lead to crash reductions among beginning drivers. What is the contribution of the various components of graduated licensing to these reductions, and how can their effectiveness be increased? *Method:* Literature review and synthesis. *Results:* Extended learner periods, nighttime restrictions, and passenger restrictions have contributed to crash reductions. Presently there is insufficient evidence concerning the contribution of seat belt or cell phone provisions, or contingent advancement penalties. *Discussion:* There is more to learn about graduated licensing and its component features. However, there are ways to increase the contribution of all the components through stronger laws and greater compliance. With the right kind of community commitment and focus, substantial further reductions in young driver crashes are achievable. *Impact on Industry:* The results can guide states in establishing graduated licensing systems that maximize crash reductions.

Keywords: Graduated driver licensing; Young drivers; Nighttime restrictions; Passenger restrictions; Learner permit

1. Introduction

It is now well established that graduated driver licensing (GDL) works as a system to reduce crashes among young people. What are the individual components that contribute to these reductions? In this paper, a non-exhaustive review of components of North American GDL systems is provided, each being assessed in terms of its effectiveness, what the main avenues are for enhancing effectiveness, and information we would like to have to know how to make the components more effective. This paper builds on information on these topics presented in the 2002 Chatham symposium on graduated licensing (Lin & Fearn, 2003; Mayhew, 2003; McKnight & Peck, 2003). Where relevant, information also is provided on how these components are treated in licensing systems outside of North America.

Information on licensing rules presented in this paper is derived from the website of the Insurance Institute for Highway Safety (www.iihs.org), which maintains an up-to-date compilation of licensing laws in the United States, and are current as of February 2007. Information on fatal crashes is based on analyses of data from the Fatality Analysis Reporting System, a census of U.S. fatal crashes on public roads maintained by the National Highway Traffic Safety Administration.

Graduated systems are structured in a way that takes into account well established research findings about known crash risk factors for young beginners. That is, supervised practice driving is known to be a low risk activity, the period immediately after licensure is extremely high risk, and some types of driving during early licensure are particularly risky. The basic elements of a graduated system are an extended learner period, often including a requirement for parents to attest that a minimum number of hours of supervised driving have been spent, and an intermediate stage following licensure, featuring restrictions on the highest risk types of driving. These include late night driving, driving with young passengers, cell phone use, and not wearing a seat belt. Many graduated systems also have provisions that make full licensure contingent on having a violation-free record while in the system, intended to encourage compliance with GDL rules.

All states now have one or more key elements of graduated licensing. There is substantial variation in GDL components in terms of when they were introduced, what

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they cover, and how long they last, and this provides plentiful opportunity to study their effects. In many cases, several components were introduced simultaneously, making it difficult to sort out their separate effects. We do have growing knowledge about their individual effects; however, there also is much we do not know. The primary concern, and most of the available data, pertain to how well GDL protects young people while they are in the system. This is largely a matter of the comprehensiveness of the components and compliance with the requirements. However, there is also the issue of how the components affect what happens after graduation. Are there positive effects because participants have acquired more driving experience than those in predecessor licensing systems? Are there negative effects because, for example, GDL drivers had little experience driving at night due to nighttime restrictions? These are important questions, and the limited evidence available so far suggests neutral or positive effects. In Nova Scotia, it was found that there were no significant differences in crash rates for 16–17 year-olds in the year after graduation, compared with pre-GDL drivers (Mayhew, Simpson, Desmond, & Williams, 2003). In a forthcoming study based on North Carolina data, it was found that the positive effects for GDL drivers while in the program persisted after they had graduated (Foss, 2006).

2. Extended Learner Permit Period

2.1. License Delay

Prior to the graduated licensing movement, most states had no required minimum holding periods for the learner stage. A few had short ones, typically 30 days or less (Williams, Weinberg, Fields, & Ferguson, 1996). That situation has changed dramatically (see Table 1), with all but three jurisdictions having extended the learner phase, 44 requiring a stay of at least six months. This can reduce crashes by delaying licensure beyond when young people got their licenses in the pre-GDL period. The amount of delay depends largely on the minimum permit age, which varies from 14 to 16 in the United States, and the length of the holding period. There are three scenarios: the same minimum age for both the learner's permit and the intitial license; a younger learner's permit age with the difference between the learner's minimum age and the initial license minimum age the same as the holding period; and a younger learner's permit age with the difference between the learner's permit age and the initial license age significantly greater than the holding period. Adding a learner's holding period or lengthening a pre-existing one will guarantee license delay in the first scenario for all teens; it will delay licensure for some in the second; it may delay licensure for relatively few in the third.

Table 1
Learner Stage Mandatory Holding Periods*

Number of months	Number of jurisdictions
12	5
9	1
6	38
2–5	4
0	3**

*Two states have lesser requirements for driver education graduates.
**Includes Wyoming, which has a 10-day holding period.

In 13 jurisdictions (Delaware, District of Columbia, Connecticut, Hawaii, Kentucky, Louisiana, Maryland, New York, New Mexico, Pennsylvania, Rhode Island, South Carolina, and Virginia), extension of the minimum learner permit holding period has forced license delay, by at least 2–6 months. For example, Kentucky has always had a minimum permit age of 16. Prior to GDL, a license could be obtained a month after the 16th birthday, but with the addition of a minimum holding period of six months, licensing is delayed until at least 16 years, 6 months. This situation also exists in Canada. For example, Nova Scotia, which has a minimum permit age of 16, increased the 2-month learner stage to 6 months. British Columbia increased the learner stage from 6 to 12 months (from 3 to 9 months for those with driver education). Studies in Kentucky, Connecticut, and Nova Scotia indicate substantial crash reductions resulting from these changes. Fatal/injury crash involvements of Connecticut 16 year-old drivers declined by 22% in the first year following the law change (Ulmer, Ferguson, Williams, & Preusser, 2001). In Kentucky, crash rates for 16 year old drivers dropped by 33% (Agent et al., 1998). In Connecticut and Kentucky, these were the only GDL changes made at the time. In Nova Scotia, a more comprehensive GDL program was introduced, but the effect of the extended permit period was estimated separately. The crash rate for 16–17 year old novices in Nova Scotia was 50% lower than the rate for pre-GDL novices during the six months after they received their learner permits (Mayhew et al., 2003). These reductions are largely due to there being greater proportions of 16 year-olds in the graduated system who have learner permits rather than licenses.

There is another set of states in which some license delay will occur, compared with pre-GDL periods. In 16 states, the time between permit age and licensing age is equal to the time that must be spent in the permit period. For example, in North Carolina, permits can be obtained at age 15, have to be held for a year, and licensing is available at age 16. In Ohio, a permit can be obtained at age 15 years, 6 months, has to be held for six months minimum, and the licensing age is 16. To the extent young people do not get their permit the first day they are eligible, and take their driving test the day the mandatory period is up, license delay will be fostered, although the amount of delay in this scenario has not been adequately quantified.

In the remaining states, the minimum holding period is much less than the time between the permit age and licensing age, so although some license delay may occur, it can readily be circumvented. A typical arrangement is that permits can

be obtained at age 15, have to be held for six months, and a license is available at age 16. Introduction of an extended learner period may result in license delay even with this arrangement. For example, in Michigan, where there is 15 months between minimum permit and minimum licensing age, a six month holding period combined with parent certification requirements of 50 hours driving resulted in 16 year-olds under GDL obtaining their licenses about 1.3 months later than 16 year-olds before GDL (Shope & Molnar, 2004).

Further increasing the amount of time that has to be spent as a learner, or raising the minimum permit age, are ways to enhance license delay. California, Hawaii, and Virginia have raised the permit age. For example, in 2004, California increased the minimum permit age from 15 to 15 1/2, and this combines with a holding period requirement of six months and a licensing age of 16. Studies are needed of how these changes affect licensing ages, and whether there are negative effects, for example, an increase in illegal driving. Six states have lowered the permitted starting age, by three or six months, which could encourage earlier licensure, and this also needs study. For example, Michigan lowered it from 15 to 14 years, 9 months. As indicated above, 16 year-old licensure was delayed by GDL, so earlier licensure did not occur in at least this one case.

2.2. More Practice Driving

An extended learner period also provides more time to practice and gain driving experience, and this is also encouraged by parent certification requirements. Table 2 shows that in 43 states, parents are required to avow that their teen drove at least a minimum number of hours under supervision, anywhere from 12 to 100, although the norm is 40–50, and the 100-hour requirement in Oregon is only for those who have not taken driver education. In 32 jurisdictions, some of these hours of practice, generally 10, have to be done at night. There are two questions here: to what extent do the requirements produce more driving experience, and does more driving experience produce drivers less likely to be in crashes? In reality, we do not have a lot of information on either the quantity or the quality of driving in the learner stage, and how this has changed from pre-GDL periods. And we know little about how parent certification requirements affect mileage quantity, whether teens get at least the minimum that must be certified, and the extent to which variation in certification requirements relates to amount of practice driving obtained. In Michigan, which instituted a six month permit period and 50 hours of certified driving, a survey indicated that the average number of hours parents reported supervising was 75 (Waller, Olk, & Shope, 2000). However, there was no information on how this compared with pre-GDL learner driving. In California, where surveys of teens and parents were undertaken before and after GDL, 81% of parents reported compliance with the 50-hour requirement, compared with 67% of pre-GDL parents who said they reached this level. The median number of reported practice driving miles was much greater among post-GDL teenagers (500) than pre-GDL teens (200) (Williams, Nelson, & Leaf, 2002).

Table 2
Learner Stage Parent Certification Requirements*

Number of hours	Number of jurisdictions
100	1
60	2
50	18
40	9
35	1
30	4
25	2
20	4
0	10

*Five states have lesser requirements for driver education graduates.

Presumably there is some amount of increased practice driving under GDL permit rules. How does increased practice driving affect crash involvement once licensed? Comparisons of crash rates for those with more or less mileage driven as learners would seem to get at this, but self-selection factors temper conclusions that can be made. Better comparisons would be based on crashes per licensed driver for all drivers pre-GDL and post-GDL, assuming similar groups of teens get licensed in these two periods. That has been done in Nova Scotia, for crashes outside the hours covered by the nighttime restriction. In these comparisons, collision rates for 16–17 year old GDL drivers were 11% lower during the first six months of licensed driving during nonrestricted, unsupervised driving, a statistically significant difference, but the benefits appeared to dissipate beyond this stage. Crashes per GDL licensed driver were 5% lower than the rate for pre-GDL drivers for the first full year of the intermediate stage, and 7% lower for the second year (Mayhew et al., 2003).

2.3. Learner Periods in Other Countries

There have been some developments of note in how other countries are handling the learner period. In Australian states, learner periods have generally been six months with 50 hours of certified driving. There is now movement to increase these requirements. In recent consultative papers, Victoria and Queensland have proposed to extend the six month period to one year, and to require 120 hours of supervised driving (Queensland Transport Queensland Government, 2005; Victoria Ministry of Transport, 2005). New South Wales has proposed to extend the learner period to one year and require 100 hours of driving (New South Wales Government Initiative, 2004). Western Australia is planning to increase the minimum number of hours of supervised driving from 25 to 120 over a longer period (Road Safety Council, 2005). These minimum hour requirements are far beyond what presently exists in the United States. How they will affect amount of driving and

Table 3
Beginning Hours for Night Driving Restrictions*

Hour	Number of jurisdictions
6 pm	1
Sunset	1
9 pm	2
10 pm	4
11 pm	12
Midnight	17
12:30 am	2
1 am	6
No restriction	6

*Five states have different start times depending on day of week or time of year; the table tallies the earlier starting hour.

subsequent crash rates is unknown. Interestingly, Australian states with parent certification requirements call for driving hours to be recorded in logbooks, and impose substantial fines for false or misleading statements. In the United States, parent certification requirements are based on the honor system.

In Europe, where the licensing age in most countries is 18, there has been a trend to lower the permit age, to allow the accumulation of more driving experience prior to licensure. In the few U.S. states that have lowered the permit age, it has been changed by 3–6 months. The changes in Europe have been more dramatic. For example, Sweden lowered the permit age from 17 years, 6 months to 16. Norway reduced its permit age from 17 to 16. Both countries retained their licensing age of 18.

One concern in lowering the permit age is that this will increase exposure and therefore crashes. In addition to the extra crashes during the learner stage, involving either legal or illegal driving, those who start much earlier can be expected to get licensed quicker once they reach 18, and possibly to drive more in the early stages of licensure.

Results of this policy have been mixed. In Norway, there were no overall changes in crash rates following the reform (Sagberg, 2002). In Sweden, about half the novices self-selected to use this extended period, accumulating an average of about 120 hours of supervised driving. This group had a substantially lower crash rate once licensed than drivers who chose not to use the extended period (and who averaged about 40 hours practice driving), and overall there was a 15% reduction among licensed drivers in crash rates per kilometer driven following introduction of this initiative, compared with drivers licensed prior to the policy change. (Gregersen et al., 2000). Despite these results, their interpretation is not straightforward. One issue is that this policy was introduced during a period of economic recession in Sweden, and the licensing rate for 18–19 year-olds dropped by 19% between 1993 and 1996, the period in which the policy was introduced. This raises the possibility that teens choosing to obtain licenses after the policy was in place may be substantially different from those licensed in prior periods in ways that related to crash involvement, separately from the policy change. It is of interest that when the entire age cohort of 18–19 year-olds (including licensed and unlicensed) is taken into account, the 17% reduction in crash rates in this group 1993–1996 was less than the 19% reduction in licensure during this period (Gregersen, personal communication).

These data and methods issues, the mixed results from Norway and Sweden, and concerns about the consequences of extra exposure generated by earlier commencement of the licensing process suggest caution in assessing this policy.

3. Late Night Driving Restrictions

Before graduated licensing finally caught on in North America, debate about it primarily revolved around night driving restrictions, and whether they were appropriate for young people. Because a few states have had night restrictions since the 1960s or 1970s, starting anywhere from 9 p.m. to midnight, their effectiveness in reducing crashes had long been established. However, equity and mobility issues were of concern. A 1983 editorial in the Los Angeles Times reflected the then-prevailing sentiment about night restrictions, raising these and other objections to such legislation, concluding, "And, finally, it is contrary to the nature of teen-agers to be home from a date by midnight."

With that as background, it is interesting that night driving restrictions are now the most popular feature of graduated licensing, in place in 45 of the 51 jurisdictions. Table 3 shows the wide range in starting times that exists, the most popular being midnight or later. Table 4 indicates the effectiveness of night restrictions in jurisdictions that have reported effects during both restricted and unrestricted time periods. These data show much greater reductions during the restricted hours. Effects are limited by two factors. Driving after midnight is particularly risky, but not many crashes of 16 and 17 year olds take place then. In 1995, prior to most of the night restrictions being enacted, 14% of all fatal crashes occurred from midnight to 5:59 am. Secondly, many 16 and 17 year olds are influenced by their parents from driving during these hours without a restriction in place. For example, in California, 89% of GDL parents said they never let their son or daughter drive after midnight during the first six months of licensure, but so did 79% of pre-GDL

Table 4
Percent Crash Reductions, Nighttime vs. Daytime*

		Percent reduction	
Jurisdiction	Restricted hours	Night	Day
Florida	11–6	16	9
Michigan	12–5	59	32
North Carolina	9–5	47	22
Nova Scotia	12–5	49	5

*Data are for 16 year-olds in Florida, Michigan, and North Carolina and for 16–17 year-olds in Nova Scotia.

parents (Williams et al., 2002). A third factor that may limit effects is exemptions that are allowed for unsupervised night driving that is thought to be essential and to entail lower risk. This usually includes work related activities and in some jurisdictions school-related activities. Whether driving to and from school related activities at night qualifies as lower risk has yet to be established.

The majority of nighttime fatal crashes of young beginners take place before midnight. If nighttime is defined as encompassing the hours 9 p.m.–5:59 a.m., 32% of all 16–17 year old driver fatal crashes occurred during these hours. The key to increasing the effectiveness of night restrictions is to expand the number of hours covered. North Carolina's restriction begins at 9 p.m., is comparably effective to restrictions beginning at midnight (see Table 4), and surveys indicate that, in both urban and rural areas, most parents and the majority of teens support North Carolina's 9 p.m. restriction. Eighty-eight percent of parents in urban/suburban areas and 86% in rural areas agreed with it, as did 56% of teens in urban/suburban areas, and 63% in rural areas (Foss, 2001). Needed are studies in other states with early-starting restrictions to determine effectiveness and acceptability.

4. Passenger Restrictions

For teenage drivers, passenger presence—particularly peer passengers—increases crash risk; the more passengers, the more risk. For example, Chen, Baker, Braver, and Li (2000) found that 16–17 year old driver deaths per million trips were 1.99 without passengers, 2.76 with one, 3.69 with two, and 5.61 with three or more. This is a high risk and high exposure activity. In pre-GDL 1993, 53% of 16 year-old drivers in fatal crashes had one or more teen passengers in their vehicle and no other occupants (Williams, Ferguson, & Wells, 2005).

New Zealand included a passenger restriction in their 1987 GDL, but passenger restrictions were not part of the debate about graduated licensing that took place in the United States in the 1970s, 1980s, and early 1990s. The initial systems in the United States did not include passenger restrictions. Nighttime restrictions are also passenger restrictions, but only for the few hours covered. The bulk of crashes occur during daytime, and passenger presence for teenagers elevates crash risk both day and night.

In 1998, California enacted a passenger restriction, and subsequently many other states did, or went back and amended their original legislation to include one. The 37 passenger restrictions in existence as of late 2006 vary in several ways, including number of passengers allowed, as displayed in Table 5. In most states, no passengers or not more than one are permitted, although some relax restrictions over time, for example, allowing none for the first few months, then one or more (not shown in Table 5). It is most common to prohibit only those under a certain age, generally 18, 20, or 21. Family members are exempted in almost all cases.

Table 5
Maximum Number of Passengers Allowed*

	Number of jurisdictions
None	15
1	18
2	2
3	2
No restriction	14

*Ten states relax their restrictions over time (e.g., allowing none the first 6 months then up to 3); the table includes the restriction that applies immediately after licensure.

Evidence is beginning to accumulate concerning the effectiveness of passenger restrictions. New Zealand reported mildly positive effects of their restriction (Begg & Stephenson, 2003), and reductions in crashes or injuries involving teens transporting teens are being found in U.S. systems. Four studies of California's strong restriction (no passengers under age 20) have indicated positive effects (Cooper, Atkins, & Gillen, 2005; Masten & Hagge, 2004; Rice, Peek-Asa, & Kraus, 2004; Zwicker, Williams, Chaudhary, & Farmer, 2006). For example, in the Zwicker study, there was a 38% reduction of 16 year-old drivers in crashes per capita in which teen passengers were injured or killed, and this was not offset by teens driving alone. Positive effects of passenger restrictions in California, Massachusetts (no passengers younger than 16), and Virginia (no more than one passenger younger than 18) are being reported in a forthcoming study (Chaudhary, Williams, & Nissen, in press). In North Carolina, it has been reported that multiple passenger crashes declined by 32% among 16 year-old drivers, and by 15% among 17 year-old drivers, since a passenger restriction was enacted (Highway Safety Center Research Directions, 2006). National studies of GDLs also are picking up evidence of positive effects due to passenger restrictions (Chen, Baker, & Li, 2006; Morrisey, Grabowski, Dee, & Campbell, 2006; Williams et al., 2005). Clearly, however, studies of more of the existing passenger restrictions are needed, covering a wider variety of rules.

Despite the presence of passenger restrictions in more than two-thirds of U.S. jurisdictions, and evidence of positive effects, teens traveling with teens is still a very major problem. In 2005, 42% of 16–17 year-old drivers in fatal crashes were transporting teens with no other occupants in the vehicle (Williams & Ferguson, 2006).

There are two factors that limit effects of passenger restrictions. One is compliance, known to be less than in the case of night restrictions. The other is that some ways of compliance also entail crash risk, for example, a teen driver and three teen passengers converting to four teen drivers. Based on the known crash risk of various types of travel, it has been calculated that even if all teen passengers became drivers, there would still be net crash reductions (Chen, Braver, Baker, & Li, 2001). However, to the extent this does happen, it lessens the effects of the restrictions. Future evaluations of passenger restrictions need to take into

account crashes resulting from alternative types of travel resulting from passenger restrictions.

There have been attempts to increase compliance with passenger restrictions through programs involving parents (Simons-Morton, Hartos, Leaf, & Preusser, 2006) or police (Goodwin, Wells, Foss, & Williams, 2006), which have achieved modest success. More experimentation is needed here, including programs targeting parents and police in combination (Williams, 2006). Such programs would benefit from more thorough information than presently available on attitudes and practices of teens, parents, and police in regard to passenger restrictions, and how they vary depending on the specific rules in force. It is not clear at this point whether dangerous types of passenger travel are more likely to be reduced by laws allowing one young passenger, or by more restrictive laws allowing none, which may be more likely to be ignored and to engender disrespect for the law.

4.1. Night and Passenger Restrictions in Other Countries

Outside of New Zealand, there are none presently. As was the case in North America in the 1970s, 1980s, and early 1990s, there has been little interest in night or passenger restrictions. Arguments against them center around the contention that they are less appropriate for countries that license at 17 or 18. Two factors are influencing a change in these attitudes. One is the realization that whether licenses are available at age 16, 17, or 18, the first few months of licensure is a high crash risk period. The second is the mounting evidence that night and passenger restrictions in the high-risk post-licensure months work to reduce the young driver crash problem, whereas just about everything else that has been tried does not. In a recent comprehensive assessment of the young driver problem around the world, it was recommended that night and passenger restrictions be considered by all countries (Organisation for Economic Co-operation & Development, 2006). In some Australian states, night and passenger restrictions have been actively debated recently (Blow, Ivers, & Chapman, 2005), and several states have announced plans to introduce them (Senserrick, 2007). The government in Western Australia has granted approval for both night and passenger restrictions to apply for the first six months of licensed driving. The new rules are expected to be issued in 2007.

5. Seat Belt Use

Teenagers, because of their elevated crash risk, need seat belts more than lower-risk adult populations, but they are less likely to use them (Williams, McCartt, & Geary, 2003). Teens are covered by seat belt laws in all states except New Hampshire, which has no law for persons age 18 and older, but some states have special rules and penalties for those who are in the graduated system. North Carolina is one state that calls out belt use explicitly and imposes increased penalties. Under the law, every person in the vehicle of a driver who is in the graduated system must be properly restrained, with a $100 fine for noncompliance (compared with $25 under the state law covering all drivers) and a delay in proceeding to the next GDL level. In some other states, there can also be special penalties applied for non-use of belts, although seat belt use is not specifically mentioned in the law.

Only one study has been completed that addresses effects of GDL rules regarding belt use. Belt use was targeted in a program in North Carolina involving education and publicized enforcement of the graduated licensing law provisions, although baseline use was already high and the program had minimal effects in increasing it further (Goodwin et al., 2006). A forthcoming program in Tennessee and Wisconsin, under a contract from the National Highway Traffic Safety Administration, will provide another test of the extent to which seat belt use as part of GDL rules can be increased.

One problem with attempting to address seat belt use through GDLs is that most people do not think of belt use as part of a graduated system. In North Carolina, surveys prior to the enforcement program revealed very high awareness on the part of teens and parents about night and passenger restrictions, but only 3% of teens and 5% of parents claimed knowledge about the special GDL seat belt rule (Goodwin & Foss, 2004). There will need to be much greater awareness of seat belt penalties and application of them if seat belt use is to be increased by special provisions applying to participants in graduated systems.

6. Cell Phone Use

Cell phone bans are a recent addition to graduated systems. In a few jurisdictions (Connecticut, District of Columbia, New York, and California in 2008) bans on hand-held phones are in place for all drivers. Thirteen states have introduced laws barring all types of cell phone use phone use by learners and/or initial license holders in graduated systems.

Distraction is thought to be a particular problem for inexperienced beginners, especially when others are in the vehicle, and cell phone use can add to the distraction. Crash risk for both hand-held and hands-free cell phone use has been established for drivers in general, but not for teenagers specifically. However, survey data indicate that young people (ages 18–24) are more likely than adults to use cell phones in vehicles (Glassbrenner, 2005), and there is some evidence that their driving is more disrupted than among adults. In a recent review of the literature it was concluded that "…there is evidence that cell phone use among young novice drivers may be particularly problematic, although enforcement of a ban on such use would be challenging." (McCartt, Hellinga, & Braitman, 2006).

The cell phone bans for young novices are relatively new, and data on their effects are not yet available. Studies of the effects of cell phone bans for adults have generally found short term reductions in use that may or not hold up, thought

to be dependent on the continuance of publicity and enforcement (McCarrt & Geary, 2004; McCartt, Hellinga, & Geary, 2006). Enforcing a cell phone ban for teenagers only is problematic, and it has not been established that reductions in use will lead to crash reductions. The contribution of cell phone bans to graduated licensing effects are to be determined but are likely to be slight, if any.

7. Contingent Advancement

In many jurisdictions, on-time advancement through the graduated system is contingent on having no violations. This provision should motivate teenagers to drive safely and obey the rules, both to avoid penalties and get rid of the restrictions. This was thought to be a factor in the 5% decline in crashes that followed Maryland's 1978 law, which permitted licensure and release from the nighttime restriction after six months of violation free driving (McKnight, Hyle, & Albrecht, 1983).

In modern GDLs, there was an attempt to take advantage of the contingent enforcement provision in North Carolina's GDL (Goodwin et al., 2006). The education/enforcement/publicity program was dubbed "Ticket Today=License Delay" and featured the information that "Although teens can be fined if they're convicted of a moving violation, seat belt violation, or GDL violations, the primary penalty is that the teen is required to maintain a clean driving record for 6 months before advancing to the next licensing level." As indicated earlier, this program had minimal effects in increasing compliance with graduated licensing rules. There is no other information available on the effectiveness of contingent advancement.

In some states contingent advancement is unlikely to be a major factor. A unique feature of graduated licensing in the United States is that in almost all states, novices automatically graduate to full licensure at age 18. In North Carolina a full license is available at age 16 1/2, so contingent advancement may be a motivator, but some states hold off full license privileges until age 18. If night and passenger restrictions apply until age 18 but you automatically graduate at 18, some of the associated motivation for safe driving is lost. Canadian GDLs apply to all novices, so contingent advancement has more potential in that country.

In theory, contingent advancement can be a major incentive for safe, lawful driving. However, even in states like North Carolina, where contingent advancement is a potential motivating force, under present conditions it is unlikely to have much effect. Surveys have indicated that teens and parents lack awareness of penalties for GDL rules violations or other traffic violations such as speeding, and do not know that progress through the system may be delayed by violations (Goodwin & Foss, 2004; Mayhew, Simpson, Ferguson, & Williams, 1998). Police also lack knowledge about the penalties, enforcement is lax, and even where enforcement exists, graduation delays are not necessarily applied (Goodwin & Foss, 2004; Steenbergen et al., 2001). Unless a serious effort is made to vigorously publicize and enforce GDL rules as written, fear of graduation delays and the motivation that might generate to drive safely is likely to be limited.

8. Discussion

We continue to learn about the effectiveness of graduated licensing systems and what makes them work. There is clear evidence that the extended learner permit period, night restrictions, and passenger restrictions separately contribute to the positive effects of GDL programs. There also is some evidence that GDL programs combining these components yield the greatest crash reductions (Chen et al., 2006). What is not established is the extent to which the learner period effect is due to safer driving resulting from the acquisition of more extensive pre-licensure driving experience, in addition to license delay. So far, there is lack of evidence that special seat belt provisions, cell phone restrictions, or contingent advancement penalties contribute. Night and passenger restrictions are often portrayed as the keystone or the centerpiece of graduated licensing. It is true that these are what distinguish North American/New Zealand licensing policies from other licensing systems around the world. However, although it is not an easy task to sort out the relative contribution of the various GDL components, it is probable that the more major effect comes from the extended learner permit period. Substantial further gains could be achieved by combining longer minimum permit periods with increases in the minimum permit age.

As we learn more about graduated licensing and its component features, there also comes increasing awareness of all that we do not know and would like to know in order to improve the structure and functioning of graduated systems. However, even lacking some basic knowledge, there is also awareness of the many ways in which the effectiveness of graduated licensing systems could be enhanced. With the right kind of community commitment and focus, components that work could be made to work better, and it is possible that components where evidence of their contribution is presently lacking could be made to work. This is the challenge that lies ahead.

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