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Perceived Risk and Other Predictors and Correlates of Teenagers' Safety Belt Use During the First Year of Licensure

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Abstract

Objectives—Teenagers have the lowest rate of safety belt use and the highest crash rate compared to other age groups. Past studies on teenagers' belt use have mostly been cross-sectional. The first goals of this study were to examine, at licensure, teenagers' and parents' perceptions of risk of crash/injury for newly licensed teenagers when driving unbelted and teenagers' perceived and parents' intended consequences for safety belt rule violations. In addition, the comparability of these variables to other risky driving behaviors was explored. The second goal was to evaluate the importance of these variables in the prediction of teenagers' belt use during the first year of licensure, relative to other factors related to belt use, including demographics and substance use.

Methods—More than 2,000 parent-teenager dyads were interviewed by telephone, parents at permit and licensure and teenagers at permit, licensure, and 3, 6, and 12 months after licensure.

Results—Approximately a third of the teenagers reported at least once at 3, 6, or 12 months post-licensure not always using their safety belt in the past week. At licensure, participants' perceived risk of safety belt non-use was high and ranked among the behaviors most related to crash/injury for newly licensed teenagers, behind driving under the influence of alcohol or drugs. Parent-imposed consequences for safety belt rule violations were not as highly rated as parent-imposed consequences for driving under the influence of alcohol or drugs. Sequential logistic regression modeled the relationship between safety belt use and perceived risk and consequences of non-use, as well as other prospective predictors assessed at permit and licensure, and driving correlates measured after licensure.

Teenagers' extreme perceived risk and parents' intended sure consequences for non-use were significant prospective predictors of regular use during the first year of licensure. Other significant

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predictors and correlates were race (White), high school grade average of “A,” not smoking cigarettes, driving a passenger vehicle, and never receiving a traffic citation or engaging in risky driving behaviors, including driving under the influence of alcohol or drugs and running a red light.

Conclusions—While the effect size was small for perceived risk of non-use, it is a modifiable factor and focused intervention contrived to enhance perceived risk could increase teenagers' belt use. Perceived risk is discussed as a target for intervention in relation to the Protection Motivation Theory. This theory appears helpful in guiding future research into the modifiable factors studied here as well as other factors, including perceived rewards and costs associated with non-use.

Keywords

Protection Motivation Theory; Risk Perception; Seat Belt; Adolescent

Introduction

In the United States, safety belt use has been found to be lower among teenage drivers and passengers than adults (Wells et al., 1989; Williams et al., 1983, 1997, 2003; Womack et al., 1997). Self-reported safety belt use collected in a national telephone survey indicated use rates of 79% for 16- to 20-year-old drivers, compared to 84% for adults (Boyle & Vanderwolf, 2003). Cross-sectional observational studies examining rates of high school students' use at the same locations over time (1982, 1988, and 1995) indicated increases in teenagers' belt use, but recurrent lower rates than adults (Wells et al., 1989; Williams et al., 1983, 1997, 2003). Because teenagers also have a higher crash risk than adults (e.g., Evans, 2004), which increases particularly with teenage passengers (e.g., Chen et al., 2000), they have a greater need for the injury protection that belts provide.

Many factors have been associated with teenagers' safety belt use, including demographics, substance use, and driving and vehicle characteristics. Information on characteristics of teenage belt users and non-users is available from observational surveys (Wells et al., 1989; Williams et al., 1983, 1997, 2003); studies of fatally injured drivers (McCartt & Northrup, 2004; Williams & Shabanova, 2002); and studies based upon self-reports (Boyle & Vanderwolf, 2003; Maron et al., 1986; Mathews et al., 2001; Petridou et al., 1997). Collectively, these studies indicate that belt use among teenagers is lower in states with secondary laws (i.e., law enforcement officers can write a citation for belt non-use only if they also observe some other driving violation) compared to those with primary laws (i.e., law enforcement officers can write a citation solely for belt non-use); among males and non-Whites; among drivers of older vehicles or non-passenger vehicles such as SUVs, vans, and pickup trucks; among those who consumed tobacco, illegal drugs, or alcohol and those with high blood alcohol concentrations in crashes; and among those with more tolerance for other risky driving behaviors, more traffic violations, and more crashes. These findings are consistent with differences that have been found between belt users and non-users in the adult population (e.g., Boyle & Vanderwolf, 2003; Cliff et al., 1982; Eiser and Harding, 1983; Preusser et al., 1991; Reinfurt et al., 1996; Wagenaar et al., 1987; Williams & Shabanova, 2002; Wilson, 1990). Also, young drivers are known to be more likely than adults to engage in risky driving behaviors, such as speeding and close following (e.g., Simons-Morton et al., 2005), and not wearing a safety belt has been associated with this profile of risk (e.g., Jonah & Dawson, 1987).

Influence of parents and peers on teenagers' safety belt use and perceived crash/injury risk when driving unbelted are among other factors examined in the research. Teenagers' belt use has been related to parents' insistence on use (Boyle & Vanderwolf, 2003; Riccio-Howe, 1991; Shin et al., 1999) and belt use by parents, other accompanying adults, and peers (Lau et al., 1990; Maron et al., 1986; McCartt & Northrup, 2004; Page, 1986; Riccio-Howe, 1991;

Shin et al., 1999; Williams et al., 2003; Williams & Shabanova, 2002). Lower use was found when driving with other teenage passengers than with adult passengers. The time of licensing represents an opportunity for parents to influence teenagers to use a safety belt and ask their passengers to use one by imposing consequences for non-use. Results of studies on perceived crash/injury risk of non-use are mixed. Higher perceived risk has been associated with higher use in participants of different ages (Cunill et al., 2004; Jonah & Dawson, 1987; Ryb et al., 2006); others found no relationship (Calisir & Lehto, 2002) or a higher use in participants who perceived less crash risk in a general driving situation (Svenson et al., 1985). Young drivers reported lower perceived risk of non-use than older drivers (Jonah & Dawson, 1987). Also, young drivers asked to drive unbelted on a second run of the same circuit were found to have a decreased perceived risk compared to older drivers, belted and unbelted, and belted young drivers (Bragg & Finn, 1985). No studies have examined the perceived risk of non-use of newly licensed teenagers and their parents and parent-imposed consequences for rule violations on belt use.

Understanding which variables predict or are associated with post-licensure safety belt use would be instrumental in focusing theory-based prevention efforts to increase use amongst teenagers upon licensure. In the Protection Motivation Theory (PMT), perceived risk is one important element related to coping actions, which lead to healthy and safe behaviors (Floyd et al., 2000; Rogers, 1975, 1983). When applied to driving, the PMT proposes an explanation about how safe behaviors are chosen over risky behaviors. The PMT involves two cognitive processes: threat appraisal and, if threat is perceived, coping appraisal. In threat appraisal, factors associated with a maladaptive response are evaluated: response rewards, which increase the probability of risky behavior, and threat perception (risk severity for all teenagers and vulnerability for the individual teenager), which decreases it. In coping appraisal, factors associated with an adaptive action to manage threat are evaluated: response efficacy (belief that an adaptive action will be protective) and self-efficacy (perception that one can perform an action), both of which enhance probability of adaptive action; and response costs (e.g., money, time, and effort), which decrease it. In other words, to increase safety belt use among teenagers, families must consider the severity of the threat of non-use for new drivers (e.g., increased crash/injury risk) and how vulnerable their own teenagers are to the threat. Families must also understand the limited reward values of belt non-use. Then, families must believe an adaptive action will protect teenagers and can be performed without too much cost. Possible adaptive or coping actions include requiring teenage drivers and their passengers to wear a safety belt and imposing consequences for noncompliance.

While research on the prevalence of safety belt use among teenage drivers is relatively well developed, less is known about modifiable factors associated with use, and very few studies have examined early predictors and driving correlates of belt use during the first year of licensure. The first goals of this study were to examine, at licensure, teenagers' and parents' perceptions of risk of crash/injury for newly licensed teenagers when driving unbelted and teenagers' perceived and parents' intended consequences for safety belt rule violations. In addition, the comparability of these variables to other risky driving behaviors was explored. The second goal was to evaluate the importance of these variables in the prediction of teenagers' belt use during the first year of licensure, relative to factors related to belt use (i.e., demographics, substance use, vehicle driven, mileage, other risky driving behaviors, traffic citations, crashes, and other characteristics). Increased knowledge about the parental role in teenage belt use and information on the characteristics of regular belt users may suggest ways to increase use in this vulnerable population.

Methods

Recruitment and Procedure

The study was conducted in Connecticut, where safety belt use is a primary law. Participants were teenagers aged 16½ years old or younger and one accompanying parent recruited after obtaining a learner's permit at Department of Motor Vehicles offices. If both parents were present, the one expected to be most involved with the teenager's driving was asked to participate. Data for the present study were drawn from a larger randomized controlled trial designed to test the effects of the Checkpoints Program, which aimed to persuading parents to restrict their teenagers' initial driving privileges in order to lessen their exposure to risky driving conditions (i.e., driving at night, with passengers, in bad weather, and on high-speed roads) during the first year of licensure (e.g., Simons-Morton et al., 2006a, b, c). Participants who completed the baseline questionnaire were assigned to either the experimental condition (i.e., a video, a series of newsletters, and a driving agreement designed to persuade parents to restrict initial driving privileges) or the comparison group (i.e., standard information about drivers' safety, such as airbags). Materials were sent by mail over a one-year period.

Of the 4,920 parent-teenager dyads asked to participate in this study, 4,503 (92%) agreed. Of those, 4,295 (95%) completed the baseline telephone survey within about 1 week and were randomized to the treatment or comparison groups of the Checkpoints Program. Of those completing the baseline survey, 3,743 (87%) obtained their license within the 16-month timeframe and were eligible for this study. Teenagers were interviewed at baseline right after permit (T_0), licensure (T_1), and 3, 6, and 12 months after licensure (T_2 – T_4); parents were interviewed at T_0 and T_1 . All interviews were conducted by telephone. Data were analyzed for the 2,334 dyads who met eligibility requirements and whose teenagers completed all five surveys (62%).

Measures

At permit (T_0), the following variables were measured in teens: gender; race; high school grade average; cigarette smoking and alcohol or drug use in the past 30 days; impulse control issues (mean of 8 items; adapted from Weinberger, 1996); parental expectations (mean of 8 items; Simons-Morton et al., 2006b); and parental monitoring (mean of 11 items; adapted from Hetherington et al., 1992). Parents were asked about family income; tickets and crashes in the past 5 years; teen maturity (mean of 7 items; Simons-Morton et al., 2006b); and family communication (mean of two 10-item subscales: Open Family Communication and Problems in Family Communication; Barnes & Olsen, 1982).

At licensure (T_1), dyads were asked about their risk perception of crash/injury for newly licensed teenagers when driving unbelted (e.g., Simons-Morton et al., 2006b). Thirteen other conditions were evaluated, including driving under the influence of alcohol or drugs, at night, and with teenage passengers. Answers were on a 1 (“no risk”) to 10 (“extreme risk”) scale. Teenagers were probed about their perceptions of parent-imposed consequences and parents about their intentions to impose consequences, such as the loss of some driving privileges (e.g., Simons-Morton et al., 2003), if teenagers were to drive without a safety belt or not require all passengers to wear one. Twelve other conditions were examined (e.g., risky behaviors, such as driving under the influence of alcohol or drugs, and non-respect of trip limits, such as not getting permission for a trip). The scale went from 1 (“definitely not”) to 10 (“definitely yes”). Furthermore, teenagers answered questions about their access to and ownership of a vehicle and the age, size, and type of the vehicle driven (Williams et al., 2006).

After licensure (T_2 – T_4), teenagers were asked about the number of trips in which they were not belted in the past 7 days. Ten other risky behaviors were investigated, such as driving under

the influence of alcohol or drugs. Miles driven in the past 7 days and citations and crashes since last measurement time were also examined.

Categorization of Data

All variables were dichotomized. Perceived risk was classified as “lower” (1–9) and “extreme” (10) and parent-imposed consequences as “unsure” (1–9) and “sure” (10). All variables measured after licensure were first aggregated and then dichotomized. For safety belt, “regular user” means that at the three measurement times, participants reported always wearing their safety belt in the past week, while “irregular user” means that participants were unbelted at least once at one of the three measurement times. For other risky behaviors, citations, and crashes, “never” means that participants did not signal behaviors or events at any of the three measurement times; when they were signaled, responses were classified as “at least once.” Impulse control issues, parental expectations and monitoring, teen maturity, family communication, and miles driven were classified as “lower” and “higher” based on the median split of their distributions.

Data Analysis

First, differences in proportions between regular and irregular safety belt users were evaluated via chi-square tests. Then, a sequential logistic regression was conducted to evaluate the relative importance of perceived risk and parent-imposed consequences in the prediction of regular belt use. Intervention assignment was entered to adjust estimates of belt use to control for possible within-sample differences. Variables significantly associated with belt use ($p < 0.05$) and not highly correlated with each other, as evaluated with biserial correlations, were entered in the regression. Intervention assignment and basic demographics were forced at step 1 and prospective predictors and driving correlates were entered simultaneously at step 2.

Results

The selection of the final sample, based on teenagers who completed all five surveys, included 2,334 parent-teenager dyads (1,196 girls, 1,138 boys, 1,463 mothers, and 871 fathers). Teenagers who dropped out before the end of the study and their parents were more often non-White, and parents were younger, had lower levels of education and family income, and were more often separated or divorced. There were no significant differences for perceived risk and parent-imposed consequences for safety belt non-use between the final sample and those who did not complete all surveys. In the final sample, a total of 428 participants had missing data at one or more time point; family income was the variable contributing the most, with 273 missing entries (11.7%). Teenagers and parents with missing data fell under similar demographic categories as those who dropped out. However, there were no differences between parents' age, and fathers had more missing data than mothers. No missing data were replaced.

Mean age for teenagers at baseline was 16.1 years old ($SD=0.13$). About 42% of parents were 44 years old or younger, 36.8% were 45–49 years old, and 21.6% were 50 years old or older. The majority of teenagers (91.2%) and parents (92.2%) were White with family income equal or higher than \$70,000 USD (62.7%). At baseline, all but 4 teenage participants were in high school. One year after licensure (T_4), about 87% were still in high school and about 12% were in college. At T_2 – T_4 , respectively, 8.8, 9.3, and 11.4% of the sample reported not driving in the week before the interviews; of those who drove, rates of always using a safety belt in the past week were 84.6, 81.1, and 79.3%, respectively. Of those reporting always wearing their safety belt at T_2 , 92.4 and 90.8% were still always wearing it at T_3 and T_4 . The dichotomous classification aggregating all measurement times indicated that 68.7% were classified as regular and 31.3% as irregular users during the first year of licensure.

Perceived Risk and Parent-Imposed Consequences for Safety Belt Non-Use

Teenagers' and parents' risk perceptions, at licensure, of crash/injury for newly licensed teenagers for several driving conditions are shown in Table I. Teenagers' safety belt non-use was perceived as an extreme risk by more parents than teenagers (72.7 vs. 40.0%, $p<0.001$). Perceived risk of non-use was ranked highly by both teenagers and parents, right after driving under the influence of alcohol or drugs and while passengers are using these substances in the vehicle. The percentage of participants who considered belt non-use as an extreme risk was lower than for driving under the influence of alcohol or drugs (40.0 vs. 83.5%, $p<0.001$, for teenagers; 72.7 vs. 95.8%, $p<0.001$, for parents).

Table II presents teenagers' perceived and parents' intended consequences, at licensure, for rule violations with respect to several driving conditions. More parents than teenagers anticipated sure consequences for teenagers not wearing their safety belt (63.0 vs. 23.0%, $p<0.001$) and not asking their passengers to wear one (61.3 vs. 21.6%, $p<0.001$). More dyads anticipated sure parent-imposed consequences for teenagers driving under the influence of alcohol or drugs than for belt non-use (89.4 vs. 23.0%, $p<0.001$, for teenagers; 98.1 vs. 63.0%, $p<0.001$, for parents). Similar results were found for not asking passengers to wear their safety belt.

Early Predictors and Driving Correlates of Safety Belt Use During First Year of Licensure

As shown in Table III, compared to irregular safety belt users, more regular users perceived extreme risk and sure parent-imposed consequences for non-use and had parents who intended sure consequences for non-use. Also, regular belt users were different than irregular users on almost all other variables considered: demographics, substance use, vehicle and distance driven, risky driving behaviors, traffic citations, crashes, and characteristics such as impulse control issues.

A sequential logistic regression was conducted to evaluate the relative importance of perceived risk and parent-imposed consequences for non-use in the prediction of regular belt use. Biserial correlations were conducted on the variables in Table III showing significant differences ($p<0.05$) between regular and irregular users. Diagnostic analyses for multicollinearity reveal that correlations were in the 0.20–0.40 range. Only the correlations between parent-imposed consequences for the two safety belt rule violations (if teenagers were to drive without a safety belt or would not require all passengers to wear one) were higher, for both teenagers ($r = 0.69$) and parents ($r=0.73$). Consequently, the latter consequence was not regressed. As income had more than 10% missing data and did not contribute significantly to the model, it was removed from the final analysis.

The variables were entered in a 2-step model. At step 1, three variables were forced as covariates: intervention assignment, gender, and race. At step 2, other variables were entered simultaneously: early predictors collected at permit (i.e., high school grade average, cigarette smoking and alcohol or drug use, teen impulse control issues, maturity, parental monitoring, and problems in family communication); and at licensure (i.e. perceived risk and parent-imposed consequences for belt non-use, and vehicle age and type); and correlates collected at 3, 6, and 12 months after licensure (i.e. mileage, other risky driving behaviors, traffic citations, and crashes). Significant predictors and correlates at first and final steps of the model are shown in Table IV. Odds ratios are provided as a measure of effect sizes for each variable. The variance explained by the model is estimated at 39%.

At the final step, teenagers' extreme perception of risk and parents' intended sure consequences for safety belt non-use were significant prospective predictors of regular belt use during the first year of licensure. Other significant predictors measured at permit were race (White), high school grade average of "A," and not having smoked cigarettes in the past 30 days; and at

licensure, driving a passenger vehicle. Significant driving correlates of higher use measured after licensure were never having received a traffic citation or engaged in the following risky driving behaviors: driving after drinking alcohol or using illegal drugs, going through an intersection when the light was red or just turning red, changing lanes with very little room between vehicles, making an illegal U-turn, and racing another vehicle, even just for a short distance.

Discussion

Irregular safety belt use during teenagers' first year of licensure is of particular interest for two reasons: crash risk is at its highest and non-use directly impacts injury severity. The strengths of the study include the prospective aspects of the design, large sample of parent-teenager dyads, and multiple assessments of safety belt use during the first year of licensure. The exclusion of participants who did not complete all five assessments limits the generalization of the results to subgroups found in the present study, and in many others, to have lower safety belt use (e.g., lower-income families and non-Whites). However, there were no significant differences for perceived risk and parent-imposed consequences for safety belt non-use between the final sample and those who did not complete all five assessments. Another possible limitation is the assessment of safety belt use. While self-reported use has been estimated to be 8.9–19.4% higher (a factor of 1.2 to 2) than observed use, they have been found to be highly correlated (Streff & Wagenaar, 1989), and studies based upon self-reports also allow the collection of prospective predictors of use. Contrary to other studies that measured safety belt use for the past year at one measurement time, belt use in this study was measured for the past week at three measurement times (T_2 – T_4) since the length of time seems to have an impact on reported use. Boyle and Vanderwolf (2003) showed that 7% of those reporting constant use over the past year also admitted in a further question to not having used their safety belt in the past week. The aggregation of the results appears to be a viable way to measure belt use: it reduced self-reported use by a factor of about 1.2 (84.6, 81.1, and 79.3% of regular users at T_2 – T_4 , respectively; 68.7% of regular users after aggregation) and provided similar results on aspects measured in other studies, such as basic demographics and substance use.

The first goals of this study were to examine, at licensure, teenagers' and parents' perceptions of risk of crash/injury for newly licensed teenagers when driving unbelted and teenagers' perceived and parents' intended consequences for safety belt rule violations. In addition, the comparability of these variables to other risky driving behaviors was explored. Results indicated that perceived risk of non-use was high and ranked by the dyads as one of the driving behaviors most related to crash/injury among newly licensed teenagers, next in importance to driving under the influence of alcohol or drugs and while passengers are using these substances in the vehicle. However, the percentage of teenagers and parents who perceived belt non-use as an extreme risk was lower than for driving under the influence of alcohol or drugs. Teenagers perceived less risk than parents, consistent with the results of Jonah and Dawson (1987), who used a sample of unrelated young and older participants. Interestingly, teenagers' fatal crashes more often involve safety belt non-use than alcohol consumption (e.g., Gonzales et al., 2005). One reason for lower risk perception might be that driving under the influence of alcohol or drugs, while less common amongst teenagers than adults, directly increases crash risk, especially for inexperienced drivers. However, safety belt non-use does not directly increase crash risk but increases the severity in the event of a crash. Also, being convicted for driving under the influence can have strong social and monetary consequences, such as the suspension of the driver's license, while safety belt infractions are punished with a small fine, and some states still consider it a secondary law issue.

Parent-imposed consequences for safety belt rule violations were not as highly rated as perceived risk of non-use, and, again, important discrepancies exist with driving under the

influence of alcohol or drugs, especially for teenagers. More dyads anticipated sure parent-imposed consequences for driving under the influence than safety belt non-use. In a study conducted in the early 1980s, when safety belt laws were first implemented across the United States, most teenagers indicated that although their parents would tell or expect them not to drive under the influence of alcohol or drugs, they were less strict about wearing a safety belt (Preusser et al., 1985). A decade later, another study showed that more than 80% of parents reported restricting their teenagers from driving unbelted and under the influence of alcohol or drugs (Ferguson & Williams, 1996). Similarly, the results of the present study, conducted in Connecticut where belt use is a primary law, showed that parents were generally concerned about teenagers' belt use. Because states require safety belt use, parents could probably be easily convinced to insist on teenagers' belt use and impose consequences for rule violations. However, it can be harder for parents to discover safety belt non-use than driving under the influence of alcohol or drugs, which may be detected when teenagers come home. In another study, many parents reported having rules about their teenagers drinking (e.g., Beck & Lockhart, 1992), which, in this case, would make driving under the influence a violation of two parental rules and therefore less likely to be violated by teenagers.

The second goal of this study was to evaluate the relative importance of perceived risk of safety belt non-use and parent-imposed consequences for rule violations in the prediction of belt use during the first year of licensure, compared to other factors related to belt use. Results indicated that teenagers who perceived, at licensure, safety belt non-use as an extreme risk and whose parents intended sure consequences for non-use were more likely to have worn it regularly during the first year of licensure. For teenagers, it appears that perceived risk (an internal motivation) was related to belt use, while perceived parent-imposed consequences (an external motivation) was not. The reason why teenagers whose parents intended sure consequences for belt non-use were more likely to wear their safety belt while teenagers' perceptions were not related to belt use is not clear. One plausible explanation is that it reflects other family characteristics not measured in this study, such as parents' general values system or specific values with respect to the law.

The effect size for teenagers' perceived risk of safety belt non-use was small in the present study. We were unable to find other studies focusing on newly licensed teenagers' perceived risk. Studies with other age groups found perceived risk to be a modifiable factor (Bragg & Finn, 1985; Weinstein et al., 1986). Hence, it seems plausible that a focused intervention contrived to enhance perceived risk in this age group could increase teenagers' belt use. As noted above, the Protection Motivation Theory (PMT; Floyd et al., 2000; Rogers, 1975, 1983) is one potential framework within which to further test this possibility. Studies that have not focused on belt use, have shown that newly licensed drivers can be trained with a computer to perceive risk and that has been related to less risky driving behaviors in a simulator (Fisher et al., 2006; Regan et al., 1998, 2000) and on the road (Fisher et al., 2006). Further research focusing on perceived risk to increase newly licensed drivers safety belt use is required.

Future interventions should also focus on other elements of the PMT not examined in this study (e.g., vulnerability for the individual teenager, rewards and costs associated with non-use). In a general driving context, Ulleberg (2004) showed that teenage passengers' willingness to address their friends' unsafe driving behaviors was related to higher perceived risk and lower response costs. In another study, McKenna and colleagues (2006) found that perceived benefits of behaviors could play a more important role in risk-taking than perceived crash risk. Also, many studies have demonstrated that higher perceived risk and lower perceived benefits are associated with less involvement in a variety of negative behaviors (e.g., Lavery et al., 1993). The adoption by parents of adaptive or coping actions has been demonstrated to increase teenage drivers' safety. The Checkpoints Program, aimed to persuading parents to restrict teenagers' initial driving privileges to less risky driving conditions during the first year of

licensure, was linked to less risky driving and fewer citations (e.g., Simons-Morton et al., 2006a, b, c). Another potential tool for parents to increase their teenagers' belt use is electronic reminder devices (Regan et al., 2006), which can include both auditory and visual warnings if any occupant is unbelted. However, effectiveness studies are lacking at the present time, especially with teenagers. More research is clearly needed to evaluate the effectiveness of these devices for teenagers' safety. Also, as belt use (e.g., Cunill et al., 2004) and perceived risk (Stasson & Fishbein, 1990) vary across situations, these should also be examined. PMT appears helpful in guiding future research into the modifiable factors related to safety belt non-use. Future research on PMT application to increase safety belt use is clearly warranted.

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Table 1
Teenagers' and parents' risk perception of crash/injury, at licensure, for newly licensed teenagers

Driving conditions	Teenagers (n=2334)					Parents (n=2270)				
	M	SD	% Ext. risk	Ra		M	SD	% Ext. risk	Ra	
Under the influence alcohol/drug	9.7	1.0	83.5	1		9.9	0.7	95.8	1	
Passengers using alcohol/drug in vehicle	8.7	1.8	49.2	2		9.7	1.1	85.8	2	
Not wearing safety belt	8.3	1.9	40.0	3		9.3	1.4	72.7	3	
Between midnight and 6 am	7.6	2.1	22.8	4		9.2	1.5	68.4	4	
2+ Teen passengers (weekend night)	7.1	2.0	13.1	5		8.8	1.6	52.3	5	
Bad weather	6.9	1.9	11.1	6		8.3	1.8	39.6	6	
2+ Teen passengers	6.2	2.1	7.9	7		8.0	1.8	31.4	9	
Late night (weekend)	6.1	2.0	6.1	8		8.2	1.8	34.6	7	
Freeways or expressways	6.0	2.1	5.8	9		7.6	2.0	25.1	12	
Unfamiliar roads	5.9	1.9	4.2	10		7.7	1.9	25.1	11	
Outside of local areas	5.8	2.0	4.9	11		8.0	1.9	31.0	8	
Late night (week)	5.7	2.0	4.1	12		7.8	2.0	28.8	10	
Between 9 pm and midnight	5.6	2.0	3.1	13		7.2	2.0	17.7	13	
1 Teen passenger	4.0	2.0	1.3	14		6.0	2.2	9.1	14	

Note. Responses are on a 1–10 scale. % Ext. risk=% of participants who evaluated each condition as an extreme risk; Ra=rank based on mean; only one decimal is provided, but ranking is based on the full number.

Table II
Teenagers' perceived and parents' intended consequences, at licensure, for driving rule violations for teenage participants

Driving conditions	Teenagers (n=2298)				Parents (n=2279)			
	M	SD	% Sure cons	Ra	M	SD	% Sure cons	Ra
Under the influence alcohol/drug	9.6	1.6	89.4	1	9.9	0.7	98.1	1
If rode with driver under influence alcohol/drug	9.1	1.9	72.6	2	9.8	1.0	91.1	2
Drove aggressively	7.9	2.3	35.5	3	9.4	1.2	73.9	4
No call if unsafe to drive home	7.9	2.5	42.2	4	9.5	1.4	80.4	3
Got a ticket	7.8	2.5	43.1	5	8.7	2.0	57.8	12
No call if late	7.4	2.6	34.4	6	9.3	1.4	70.0	6
No permission for a trip	7.4	2.8	39.0	7	9.4	1.4	76.7	5
Not tell where going	7.0	2.8	31.4	8	9.1	1.6	66.0	7
No call if plan changed	6.9	2.6	25.0	9	9.1	1.5	61.3	9
Not tell when return	6.7	2.8	27.0	10	9.1	1.6	65.0	8
Not wear safety belt	6.5	2.8	23.0	11	9.0	1.7	63.0	10
Not ask passengers to wear safety belt	6.3	2.9	21.6	12	8.9	1.7	61.3	11
Not tell who are passengers	6.0	2.9	20.8	13	8.6	1.9	51.0	13

Note. Responses are on a 1–10 scale. % Sure cons=% of participants who evaluated each condition as generating sure consequences; Ra=rank based on mean; only one decimal is provided, but ranking is based on the full number.

Table III

Chi-square tests of prospective predictors and driving correlates of teenagers' safety belt use during the first year of licensure by teenagers' safety belt user groups

Variable	Category	Regular users %	Irregular users %	$\chi^2(1)$
Demographic and Substance Use (T_0)				
Gender	Female	55.4	42.0	35.9**
	Male	44.6	58.0	
Race	White	92.6	88.4	10.9*
	Others	7.4	11.6	
High school grade average	A	35.4	24.5	27.0**
	B or lower	64.6	75.5	
Family income (parent reported)	< \$70,000	35.6	40.6	4.7*
	≥\$70,000	64.4	59.4	
Cigarette smoking (past 30 days)	No	94.2	87.2	33.0**
	Yes	5.8	12.8	
Alcohol or drugs use (past 30 days)	No	84.5	74.2	34.6**
	Yes	15.5	25.8	
Parent's number of tickets (past 5 years)	0	76.6	77.6	0.3
	≥1	23.4	22.4	
Parent's number of crashes (past 5 years)	0	79.4	79.4	0.0
	≥1	20.6	20.6	
Other Characteristics (T_0)				
Impulse control issues	Lower	56.4	45.5	24.1**
	Higher	43.6	54.5	
Parental expectations	Lower	38.4	42.5	3.5
	Higher	61.6	57.5	
Parental monitoring	Lower	44.0	56.1	29.4**
	Higher	56.0	43.9	
Teen maturity (parent reported)	Lower	44.1	54.8	22.6**
	Higher	55.9	45.2	
Open family communication (parent reported)	Lower	49.7	53.4	2.7
	Higher	50.3	46.6	
Problems in family communication (parent reported)	Lower	53.7	47.7	7.0*
	Higher	46.3	52.3	
Intervention assignment	Treatment	50.3	47.2	1.9
	Comparison	49.7	52.8	
Perceptions and Intentions (T_1)				
Perceived risk	Lower	56.8	67.2	22.6**
	Extreme	43.2	32.8	
Perceived risk (parent reported)	Lower	26.2	30.0	3.5
	Extreme	73.8	70.0	
Parent-imposed consequences				

Variable	Category	Regular users %	Irregular users %	$\chi^2(1)$
– Teen not belted	Unsure	74.7	82.1	15.1**
	Sure	25.3	17.9	
– Teen not belted (parent reported)	Unsure	34.6	42.1	11.7**
	Sure	65.4	57.9	
– Teen's passengers not belted	Unsure	76.6	82.7	10.7*
	Sure	23.4	17.3	
– Teen's passengers not belted (parent reported)	Unsure	36.8	43.0	7.9*
	Sure	63.2	57.0	
<i>Vehicle Characteristics (T₁)</i>				
Access	≤Once daily	61.7	60.9	0.1
	>Once daily	38.3	39.1	
Ownership	No	50.7	47.1	2.6
	Yes	49.3	52.9	
Age	0–5 Years	41.5	35.5	6.9*
	6+ Years	58.5	64.5	
Size	Mini/small	44.5	46.0	0.4
	Medium/large	55.5	54.0	
Type	Passenger	76.5	71.8	5.4*
	Others	23.5	28.2	
<i>Driving Characteristics (T₂–T₄)</i>				
Miles driven	Lower	52.5	45.3	10.3*
	Higher	47.5	54.7	
Driving after drinking alcohol or using illegal drugs	Never	94.4	63.1	374.0**
	At least once	5.6	36.9	
Driving 20 miles+ over the limit	Never	57.5	27.3	182.5**
	At least once	42.5	72.7	
Going through an intersection on red light	Never	63.0	29.1	230.5**
	At least once	37.0	70.9	
Purposely tailgating or following very closely	Never	67.6	35.0	216.8**
	At least once	32.4	65.0	
Changing lanes with very little room between vehicles	Never	59.3	26.2	219.3**
	At least once	40.7	73.8	
Cutting in front of a vehicle to turn	Never	67.8	36.6	199.4**
	At least once	32.2	63.4	
Not waiting for a large space to pull out into traffic	Never	48.4	20.9	157.1**
	At least once	51.6	79.1	
Making an illegal U-turn	Never	75.3	37.3	310.1**
	At least once	24.7	62.7	
Racing another vehicle, even just for a short distance	Never	81.4	43.3	341.9**
	At least once	18.6	56.7	

Variable	Category	Regular users %	Irregular users %	$\chi^2(1)$
Driving in a way to show off to other people	Never	78.9	46.0	250.1**
	At least once	21.1	54.0	
Number of citations	0	74.9	55.9	83.5**
	≥ 1	25.1	44.1	
Number of speeding citations	0	85.0	73.1	46.3**
	≥ 1	15.0	26.9	
Number of crashes	0	62.3	57.6	4.7*
	≥ 1	37.7	42.4	

Note. Unless specified otherwise, questionnaires were answered by teens.

*
p<.05;

**
p<.001.

Significant prospective predictors and driving correlates of the sequential logistic regression model for teenagers' safety belt use during the first year of licensure

Table IV

	Comparison	β	Wald (1)	AOR	95% CI
<i>Step 1^a</i>					
Gender	Female vs. male	-0.54	28.87	0.59	(0.48-0.71)
<i>Step 2^b</i>					
<i>Predictors (T₀-T₁)</i>					
Race	White vs. others	-0.55	6.44*	0.58	(0.38-0.88)
High school grade average	A vs. B or lower	-0.37	7.33*	0.69	(0.53-0.90)
Cigarette smoking (past 30 days)	No vs. yes	-0.61	7.38*	0.54	(0.35-0.84)
Teens' perceived risk	Extreme vs. lower	-0.30	5.17*	0.74	(0.57-0.96)
Parents' intended consequences for teens not wearing belt	Sure vs. unsure	-0.35	7.83*	0.71	(0.56-0.90)
Vehicle type	Passenger vs. others	-0.29	4.55*	0.75	(0.57-0.98)
<i>Correlates (T₂-T₄)</i>					
Driving under the influence of alcohol or drug	Never vs. at least once	-1.19	45.19**	0.30	(0.22-0.43)
Going through intersection on red light	Never vs. at least once	-0.34	5.67*	0.72	(0.54-0.94)
Changing lanes with very little room between vehicles	Never vs. at least once	-0.30	4.01*	0.74	(0.55-0.99)
Making an illegal U-turn	Never vs. at least once	-0.84	40.15**	0.43	(0.33-0.56)
Racing another vehicle, even for just a short distance	Never vs. at least once	-0.66	20.95**	0.52	(0.39-0.69)
Citations	0 vs. ≥ 1	-0.47	13.53**	0.63	(0.49-0.80)

Note. AOR=adjusted odds ratio; CI=confidence interval. Nagelkerke $R^2 = .40$, $b_0 = .39$.

* $p < .05$;

** $p < .001$.