Young Driver Crashes in Louisiana: Understanding the Contributing Factors to Decrease the Numbers

INTRODUCTION

The over-involvement of young drivers in crashes is a long-established problem in the United States. The disproportionately high rate of young driver crashes is also prevalent on Louisiana roadways. Total crash rates and fatal and injury crash rates of young drivers are considerably higher compared to any other age groups. Although they constituted 13.6% of all licensed drivers, young drivers were at fault in more than 20% of Louisiana's fatal traffic crashes in 2018. The Young Driver Emphasis Area team of Louisiana's Strategic Highway Safety Plan (SHSP) aims to reduce fatalities and injuries involving young drivers (defined as 15- to 24-year old) by 50% by 2030 (compared with 2009). The Graduated Driver Licensing (GDL) program was deployed in 1998 in Louisiana. A typical GDL program includes a learner stage (supervised driving, cumulating with a driving test); an intermediate stage (limiting unsupervised driving in high-risk situations); and a full privilege stage—allowing young drivers to safely gain driving experience. Despite the early adoption of this strategy, teens and young adults in Louisiana continued to experience crashes at higher rates and thereby considered high-risk drivers.

OBJECTIVE

The major objectives of this study were to identify underlying contributing factors associated with young driver crashes and to evaluate Louisiana's GDL program.

SCOPE

The focus of the project was on young driver crashes (15 to 24 years old) on all state-owned and locally owned roadways in Louisiana. As this study heavily relies on crash data, the scope of gathered data narrowed down to the young drivers who are identified and reported as responsible for crashes by the police.

METHODOLOGY

Using the crash data obtained from DOTD, young drivers were divided into three age groups: novice teen (15-16 years), young teen (17-19 years), and young adult (20-24 years). Besides performing descriptive analysis of young driver crash data, a Multinomial Logit (MNL) model was developed for possible associations with crash attributes related to the vehicle, roadway, environment, and human factors available in Louisiana crash data.

To fulfill the broad objective of evaluating the GDL program in Louisiana, several approaches have been undertaken. Trend analyses of the disaggregated time series data for estimating the magnitude of crash trend and measuring the increase or decrease of crashes by age group and selected characteristics were performed with Mann-Kendal (M-K) tests to indicate the impact of the GDL program over the years. These crash trends have also been visualized by the Innovative Trend Analysis (ITA) method to supplement the M-K test results. Time series models with Seasonal Autoregressive Integrated Moving Average with Explanatory Variables (SARIMAX) method accounting for the presence of legislative changes around GDL components were developed to evaluate their impact on changes in young driver crash casualties. Spatial analysis was performed in ArcGIS for identifying clusters of young driver crashes and presenting the trend of selected crash characteristics across Louisiana regional safety coalitions. Finally, countermeasures were proposed based on the combined understanding of these analyses of crash data and the extensive literature review.

CONCLUSIONS

The MNL model results reveal that the top crash contributing factors of the young driver groups are violation, distraction, passenger presence, time of crash, and driver protection system. As presented in Figure 1, three driving violation-related factors—"failure to yield," "careless operation," and "following too closely"—appear in all three young driver groups with the highest odds. Crashes due to distraction from electronic devices other than cellphones is also common for all three groups with relatively high variability (i.e., bigger confidence interval). All three young driver age groups appear to be at fault in crashes with higher than 1 odds while driving during midday to 11 pm (categorized in two intervals: 6 pm to 11 pm and 12 pm to 6 pm).
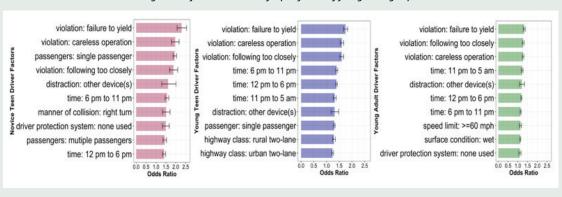
Figure 1: Adjusted odds ratios of top 10 factors of young driver groups

The M-K trend tests and ITA suggest the number of crashes and associated casualties involving young drivers declined significantly over the years. The young driver crashes caused by drinking, cellphone usage, no safety restraints, nighttime single novice teen driver (without passengers), and associated fatal and injury crashes generally showed a decreasing trend even though these crashes are still substantial among all young drivers.

The results from disaggregated time series data performed with SARIMAX method also indicate that the GDL program appears to have reduced casualties with young driver crash overall, particularly for novice teen and young teen drivers. A somewhat increasing trend has been observed for young adult drivers (aged 20-24 years) in recent years.

Spatial analysis was undertaken to segregate the five-year trend of selected young driver crash types in nine safety coalition areas. The six clusters with a high concentration of young driver crashes identified are correlated with highly populated areas. The research team also identified the top 10 parishes with the highest young driver crash rates.

RECOMMENDATIONS

The key recommendations from the analysis findings on crash contributing factors and evaluation of GDL programs, supported by literature review and issues identified by researchers, are:

- Developing a plan that promotes parent or guardian involvement within the GDL program framework to increase GDL program participation, which can promote safety behavior in the early years of driving.
- Continually supporting strategic measures of educating young drivers about GDL and driving laws, real-life impact of risk-taking behavior, awareness campaigns at the local level targeting prevention of underage drinking, cellphone use, and non-usage of restraints.
- Standardizing the state GDL program's curriculum for consistent driver education and easy program evaluation, which can be updated by including the knowledge of attitude patterns linked with teen and young driver crashes.
- Enhancing the data flow system between enforcement agencies and the state motor vehicle office, which can make the up-to-date young driver record available for their performance evaluation at their license upgrading time.
- Strongly enforcing of current passenger restrictions. Increased minimum ages of GDL stages, earlier passenger restriction hours, limited teen passengers, enforcement of color-coded decal during nighttime have been proven successful in terms of safety benefits in other states, but separate feasibility analyses with comprehensive driver data are required to assess those changes.