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Author:

[Burkett, Katie M.](#), Georgia Department of Community Health, Division of Emergency Preparedness and Response, Injury Prevention Program, Jesup, GA

[Davidson, Steve.](#), Georgia Department of Community Health, Division of Emergency Preparedness and Response, Injury Prevention Program, Jesup, GA

[Cotton, Carol.](#), The University of Georgia's Traffic Safety Research and Evaluation Group, Athens, GA

[Barlament, James.](#), The University of Georgia's Traffic Safety Research and Evaluation Group, Athens, GA

[Loftin, Laurel.](#), The University of Georgia's Traffic Safety Research and Evaluation Group, Athens, GA

[Stephens, James.](#), Georgia Southern University's Jiann-Ping Hsu College of Public Health, Statesboro, GA

[Dunbar, Martin.](#), Georgia Southern University's Jiann-Ping Hsu College of Public Health, Statesboro, GA

[Butterfield, Ryan.](#), Georgia Southern University's Jiann-Ping Hsu College of Public Health, Statesboro, GA

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Address for Correspondence: Katie Burkett, MPH, Program Consultant RRI, Georgia Department of Community Health, Division of Emergency Preparedness & Response, Injury Prevention Program, 292 E. Cherry St. Suite 3 Jesup, GA 31546. Email: kburkett@dhr.state.ga.us Grant Support: Rural Roads Initiative of the Governor's Office of Highway Safety.

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Abstract:

Objective: To increase teen seat belt use among drivers at a rural high school by implementing the Drive Alive Pilot Program (DAPP), a theory-driven intervention built on highway safety best practices.

Methods: The first component of the program was 20 observational teen seat belt surveys conducted by volunteer students in a high school parking lot over a 38-month period before and after the month-long intervention. The survey results were published in the newspaper. The second component was the use of incentives, such as gift cards, to promote teen seat belt use. The third component involved disincentives, such as increased police patrol and school policies. The fourth component was a programmatic intervention that focused on education and media coverage of the DAPP program.

Results: Eleven pre-intervention surveys and nine post-intervention surveys were conducted before and after the intervention. The pre- and post-intervention seat belt usage showed significant differences ($p < 0.0001$). The average pre-intervention seat belt usage rate was 51.2%, while the average post-intervention rate was 74.5%. This represents a percentage point increase of 23.3 in seat belt use after the DAPP intervention.

Conclusion: Based on seat belt observational surveys, the DAPP was effective in increasing seat belt use among rural high school teenagers. Utilizing a theory-based program that builds on existing best practices can increase the observed seat belt usage among rural high school students. [West J Emerg Med. 2010; 11(3): 280-283.]

Supporting material:

Figure 1

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Drive Alive: Teen Seat Belt Survey Program

Katie M. Burkett, MPH*
Steve Davidson, M.Ed*
Carol Cotton, PhD†
James Barlament, MA†
Laurel Loftin, BSFCS†
James Stephens, PhD‡
Martin Dunbar, MS‡
Ryan Butterfield, MPH‡

* Georgia Department of Community Health, Division of Emergency Preparedness and Response, Injury Prevention Program, Jesup, GA
† The University of Georgia's Traffic Safety Research and Evaluation Group, Athens, GA
‡ Georgia Southern University's Jiann-Ping Hsu College of Public Health, Statesboro, GA

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INTRODUCTION

Because motor vehicle crashes are a leading cause of death for children aged 15-19 in the United States,¹⁻³ many states have passed teen driving laws, including those stipulating graduated driver's licensing. These laws provide young drivers a controlled driving experience before unrestricted driving privileges are granted. Also, primary seat belt laws were introduced to improve the safety of both teens and adults. In one such state with teen driver and primary seat belt laws, crash data from the Fatality Analysis Reporting System (FARS) shows that legislation from 2006 to 2008 was effective in reducing teen fatalities. In this state, the fatal

crash rate for teen drivers fell 25.9% from 1.58 fatal crashes per 10,000 license drivers in 2006 to 1.17 in 2008. Despite this success, teens continue to die in preventable crashes, warranting additional improvement in the safety of teen drivers.

Teens in rural areas are at greater risk of motor vehicle collision death than their urban counterparts. The National Highway Traffic Safety Administration (NHTSA) reported 56% of the fatal crashes and 57% of the fatalities involving teen drivers occurred on rural roadways in 2008.⁴ Higher fatality rates on rural roads result from several factors. Design elements often result in crashes more severe than in urban

areas. Narrower lanes, lack of guardrails or shoulders, non-graded curves, and tree lined roadways may increase crash risks.⁵⁻⁶ Such road hazards can be treacherous for new and inexperienced drivers.⁷⁻⁸ Speed limits on rural roads are often set at higher limits than in urban areas. Additionally, rural drivers frequently commute longer distances than urban drivers.⁹ The increased distances allow greater exposure to the risk of crashing from lack of attention to driving or from simple fatigue.¹⁰⁻¹¹ Such distances also can delay the detection of an accident and the administration of medical care.⁸⁻¹¹

Rural and teen drivers share several driving habits that contribute to an increased risk of injuries and fatalities.⁶ These high risk groups are more likely to speed and to drive unrestrained than urban drivers.¹²⁻¹³ In 2007, 33% of motor vehicle collision fatalities in rural areas were due to speed, compared to 31% in urban areas.¹⁴ Seat belt usage among urban residents in 2009 was 83%, while rural residents wore seat belts at a slightly lower rate of 81%.¹⁵ National seat belt use was 80% among 16- to 24- year olds in 2008, the lowest rate of any age group.¹⁶

As part of a Rural Roads Initiative, the Drive Alive Pilot Program (DAPP), a theory-based program building on highway safety best practices, was developed and implemented to increase seat belt use among teen motor vehicle occupants. This report focuses on the results of the DAPP at a high school in a small town in southeastern Georgia, and discusses how DAPP has increased seat belt use among the high school's students.

The DAPP model derived from three theories (Theory of Reasoned Action, Social Cognitive Theory, and Fuzzy-trace Theory) described by Dr. Robert Foss as they pertain to altering individual behavior.¹⁷ DAPP is accomplished through four steps: 1) high visibility surveys, 2) incentives, 3) disincentives (enforcement), and 4) programmatic interventions (education/media).

METHODS

Surveys

Observational seat belt surveys were conducted at the entrance to the student parking lot of the studied high school by a student observer over a 38-month period from February 2006 to April 2009. The student was a volunteer. Over this time period, 11 pre-intervention surveys were conducted from February 2006 to April 2007. After the education/awareness intervention (termed the intervention period, although other aspects of intervention continued throughout the project) in October 2007, nine post-intervention surveys were conducted from November 2007 to April 2009. The goal for each observational survey was to record seat belt use of teen drivers and front seat passengers in 100 vehicles entering the parking lot. The pre-surveys were conducted by a different student than the post-surveys. The results of the surveys were published in the local newspaper to give the results high

visibility. Individual student permission from parents was not sought as participants were randomly observed in the public domain; however, permission from school administrators was obtained. SAS 9.2.1 was utilized as the analysis tool for this study, and the procedure used to measure significant differences was proc logistic.

Incentives

After the education/awareness intervention in October 2007, incentives were used to promote teen seat belt use. Wal-Mart gift cards were awarded during the program to students who were observed using seat belts. At least five \$10 Wal-Mart gift cards and one fast food gift card were given away. Pictures of teens receiving incentives were placed in the local newspaper.

Disincentives (Enforcement)

As evidenced by Click-it-or-Ticket programs, high visibility enforcement measures are effective in increasing actual seat belt usage.¹⁸⁻¹⁹ During the DAPP education/awareness intervention in October 2007, students were informed through morning announcements over the public announcement system that there would be increased enforcement. The local police department increased patrols near the school during the education/awareness intervention month and placed a decoy car near the high school all day for three straight days. Though the police department did not make any stops for seat belt violations, they did increase the perception of enforcement. In addition, the school principal announced over the school public announcement system a policy that student drivers caught unbuckled by teachers or the principal would lose their parking privileges. Although this policy was never enforced, this non-police/non-traditional enforcement intervention further increased the perception of enforcement.

Programmatic Interventions (Education/Media)

Education and media interventions were implemented to increase seat belt usage and were tailored to the community. A specific week was chosen to conduct the programmatic intervention in October 2007. During this education/awareness week intervention, activities included a high school safety day with safety displays, daily highway safety videos played over the high school video system, seat belt public service announcements played over the public announcement system in the high school, buckle up messages scrolled on the electronic sign outside the high school, and a clearly visible crashed car was placed near the school. As part of the community efforts, calls were made to local youth ministers encouraging them to incorporate seat belt use into their message, and they were provided educational materials for use during meetings. During the week, the local newspaper carried a full page of pictures and narratives detailing how local "celebrities" had been saved by wearing seat belts.

RESULTS

The first observational survey revealed a seat belt usage rate of 47%. The average seat belt use during 11 pre-intervention (February 2006 to April 2007) observational surveys was 51.2% with 1,097 vehicles observed, 753 persons wearing seat belts, and 717 not wearing seat belts. The average seat belt use during nine post-intervention (November 2007 to April 2009) observational surveys was 74.5% with 897 vehicles observed, 887 persons wearing seat belts, and 304 not wearing seat belts (Figure 1). Therefore, the average seat belt use at the high school increased 23.3 percentage points after the DAPP education/awareness intervention ($p < 0.0001$; odds ratio 2.806; confidence interval 2.32-3.40).

DISCUSSION

From 2006 to 2009, overall seat belt usage in the studied high school's state was 89.4%, and seat belt usage in rural areas of the state was 82.9% over the same period.³ The results of the initial survey at the rural high school of 47.0% seat belt use by teen vehicle occupants confirmed the need for intervention. The DAPP replicated methods theorized by Foss¹⁷ that altering driver behavior could be accomplished through the employment of the Theory of Reasoned Action, Social Cognitive Theory, and Fuzzy-trace Theory. The program affected reasoned action by creating a culture of seat

belt use through high visibility efforts, including observational seat belt surveys, incentives, enforcement and programmatic interventions. High visibility media was employed through traditional (newspaper articles) and non-traditional (electronic signs and public school announcements) means. The goal of this exposure was to create a perception to teens that important others (police officers, school officials, peers and parents) possessed raised expectations of seat belt use. The goal of the incentive/disincentive component was to further reinforce these raised expectations. Newspaper stories about seat belt use were intended to mimic Foss' use of the Fuzzy-trace Theory, which theorizes an anecdotal approach to traffic safety intervention, rather than statistics.

LIMITATIONS

This project was carried out as a pilot program funded to increase seat belt usage, not as a study. Although observational seat belt surveys were intended to be conducted on a monthly basis, school schedules, summer months, illness and other commitments constrained student observers to 20 surveys over a period of 38 months. Seat belt surveys were conducted primarily by students who were oriented to collecting the data on a standardized form but did not go through other training. The program lacked a second set of observers to derive a measure of observer reliability. Data were only taken

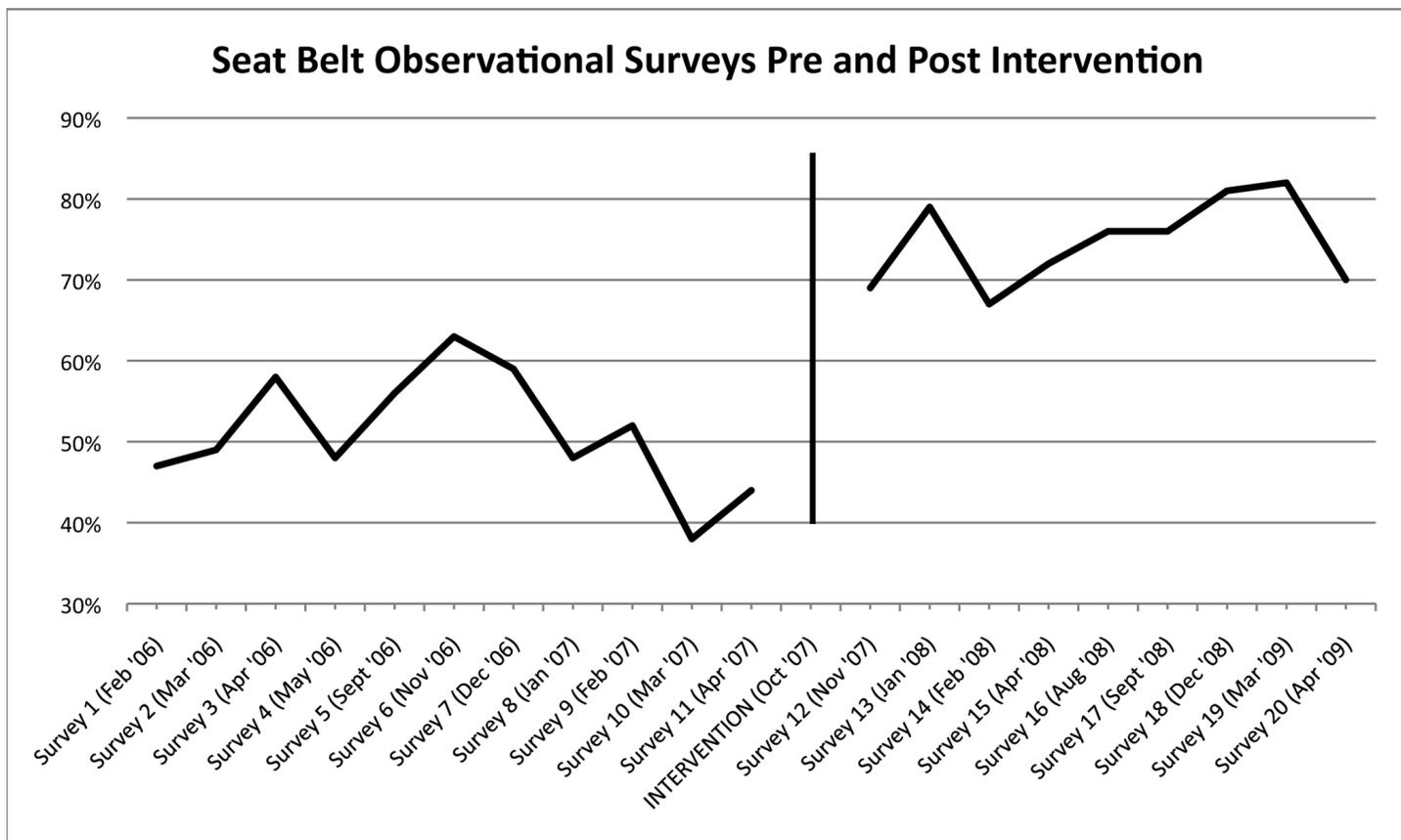


Figure 1. Seat belt observational surveys pre and post intervention

from one entrance to the high school. The publishing of the observational surveys may have affected the behavior of student drivers entering the school by creating a confrontation bias. Students could have buckled up just prior to entering the school grounds only on days when there were observers. The fact that the observations are used as part of the intervention (they were routinely published), as well as part of the evaluation, could lead to confounding of the data. Last, given that observational surveys were used for evaluation, there is the potential for a Hawthorne effect with a reduction in seat belt rates when observations end.

CONCLUSION

Based on seat belt observational surveys, the DAPP was effective in increasing seat belt use among rural high school teenagers during the time period measured. Using a theory-based program that builds on existing best practices can increase the observed seat belt usage in rural high school age drivers. Based on subsequent seat belt surveys at area high schools, the student population affected by the DAPP appears to be representative of other rural teen populations; therefore, the program is being implemented in other rural high schools using the methodology and results of the pilot program. Further study is needed to confirm the maintenance of teen behavior over time.

Address for Correspondence: Katie Burkett, MPH, Program Consultant RRI, Georgia Department of Community Health, Division of Emergency Preparedness & Response, Injury Prevention Program, 292 E. Cherry St. Suite 3 Jesup, GA 31546. Email: kburkett@dhr.state.ga.us

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