Journal of Adolescent Health 62 (2018) 618–625

ELSEVIER

JOURNAL OF ADOLESCENT HEALTH

www.jahonline.org

Original article

Cellphone Legislation and Self-Reported Behaviors Among Subgroups of Adolescent U.S. Drivers

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Article history: Received May 8, 2017; Accepted December 3, 2017
Keywords: Adolescent; Automobile driving; Cellphones; Legislation; Epidemiology

A B S T R A C T

Purpose: The relationship between cellphone use while driving legislation and self-reported adolescent driver behavior is poorly understood, especially across demographic subgroups. This study investigated the relationship between statewide cellphone legislation and cellphone use behaviors across adolescent driver subgroups, including age (16/17 vs. 18), sex, race/ethnicity (white non-Hispanic and others), and rurality (urban or rural).
Methods: Data from the 2011–2014 Traffic Safety Culture Index Surveys were combined with state legislation. The outcomes were self-reported texting and handheld cellphone conversations. The exposure was the presence of a texting or handheld cellphone ban applicable to all drivers (i.e., universal) in the drivers' state of residence. A multilevel, modified Poisson regression model was used to estimate the risk of engaging in these behaviors.
Results: Approximately 34% of respondents reported to have driven while conversing, and 37% texted and drove in the 30 days before the survey. Universal handheld calling bans were associated with lower occurrences of cellphone conversations across all groups except rural drivers. Overall, handheld cellphone bans were associated with 55% lower (adjusted risk ratio .45, 95% confidence interval .32–.63) occurrences of cellphone conversations. However, universal texting bans were not associated with fewer texting behaviors in any subgroup.
Conclusions: Universal handheld calling bans may discourage adolescents from engaging in handheld phone conversations, whereas universal texting bans may not fully discourage texting behaviors. More interventional or educational work is necessary, particularly addressing texting while driving.

IMPLICATIONS AND CONTRIBUTION

Studies of the relationship between legislation and self-reported cellphone use while driving, such as talking and texting, are limited for adolescents. This study investigated these relationships by sex, age, race/ethnicity, and rurality in a national sample of adolescent drivers across multiple data years.

It is well established in the literature that motor vehicle collisions pose formidable public health challenges to adolescent health (i.e., those ≤18 years of age). Motor vehicle collision rates are highest among teenage drivers relative to other ages, which are attributed to both youth and inexperience [1–3]. In 2015, the Centers for Disease Control and Prevention identified motor

Conflicts of Interest: The authors have no conflicts of interest to disclose. The data were obtained from the AAA Foundation for Traffic Safety.

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1054-139X/
https://doi.org/10.1016/j.jadohealth.2017.12.001

vehicle collisions as the leading cause of death among 14–19 year olds [4].

Although the collision rate among adolescent drivers is high, cellphone-related distracted driving could exacerbate this situation. Mobile technology has become an integral component of U.S. culture, particularly among adolescents [5]. Research has shown that these technologies enable complex social interactions [6]. Therefore, adolescents are highly dependent on these technologies and use them habitually [5,7,8]. In a 2011 national survey, the median number of text messages sent by 14–17 year olds was 100 per day, and 26% of all teens surveyed reported making daily cellular phone calls [7]. Thus, it is not surprising that younger drivers reported the highest level of cellphone-related crashes and near crashes compared with older groups [9].

Previous research has shown that behaviors associated with cellphone use and driving (i.e., reaching for a phone and dialing) may increase collision risk [10–17]. As distracted driving has gained national attention, many states have passed legislation that limits cellphone use while driving. As of March 2017, 46 states banned text messaging for all drivers, 14 states banned all drivers from conversing with handheld cellphones, and 37 states banned all cellphone use while driving by young/novice drivers [18].

To date, few studies have investigated the relationship between cellphone use legislation and driver behavior, particularly among adolescents. To the authors' knowledge, seven studies have investigated the relationship between roadside observed cellphone use and legislation among drivers <25 years [19–23]. Studies investigating the relationship between young driver all cellphone bans and teen driver phone use in North Carolina found that the law did not overtly alter behavior [20,21]. However, studies using observational data in New York state and nationally have shown that handheld calling bans applicable to all drivers (i.e., universal) are associated with approximately 50% less handheld cellphone use/conversations among young drivers [19,22–25].

As for the relationship between self-reported driver behavior and legislation, which is the focus of this analysis, four studies have investigated this topic, but only two pertained to young drivers [26–29]. One national survey of drivers ≥18 years of age found that more drivers self-reported not talking on a cellphone or always using a hands-free device in states with handheld calling bans (44% and 22%, respectively) compared with states without such bans (30% and 13%, respectively) [26]. Another study conducted among health-care workers in Georgia reported that 32% texted less after the passage of the state's universal texting ban [27]. Two studies, which utilized similar data, investigated self-reported texting while driving and cellphone legislation among a nationally representative sample of high school students [28,29]. One reported that adolescent drivers were 30% less likely to text if they lived in a state where universal texting bans with primary enforcement were in effect; primary enforcement means a driver could be pulled over for that offense [28]. The other study found that the percentage of adolescent drivers who texted while driving was 36% in states with both universal texting and young driver all cellphone bans, 42% in states with only universal texting bans, and 43% in states with no universal texting bans [29]. Rudisill and Zhu also found that the prevalence of texting while driving was similar in males and in females, tended to increase with age, but was typically lower among African-American and Hispanic teenage drivers compared with white non-Hispanics [29].

Although it appears that cellphone legislation may be associated with lower frequencies of self-reported driver behavior, there are extant gaps in the literature. The studies that applied to young drivers were limited to 1 year of data and mainly applied to texting; also, driving exposure time was unknown [28,29]. None of these studies investigated the relationship between cellphone conversations and universal handheld calling bans in adolescent drivers. Considering these previous studies, there is an indication that important subgroup differences may exist by demographics, but these were not fully explored [29]. Based on other traffic safety research, it is known that driver behavior can vary by age, race, sex, and rurality [30–35]. Therefore, the purpose of this analysis was to investigate the relationship between cellphone legislation and self-reported driver behaviors, including texting and handheld phone conversations, by population subgroups of adolescent drivers across multiple data years.

Methods

Data sources

The data for this analysis were obtained from the 2011–2014 Traffic Safety Culture Index surveys. The Traffic Safety Culture Index, which is administered by the AAA Foundation for Traffic Safety, is an annual survey conducted in June or September that assess individuals' self-reported behaviors and beliefs regarding traffic safety. Survey participants are randomly selected from a panel of ~58,000 individuals. This panel is nationally representative of all U.S. households, which are reachable by phone or mail. Survey respondents are ≥16 years of age. In some years, participants <19 years may be recruited through parents/guardians who are panel members; the survey is weighted to account for this and nonresponse. Because respondents may or may not currently drive, the survey may not be representative of all U.S. drivers. Approximately 3,000 individuals participate annually [36].

Additionally, a dataset of state legislation pertaining to cellphone use while driving was compiled by the study authors. The authors conducted numerous Internet searches of government and traffic safety organizations' Web sites to discern which states had cellphone legislation in effect between January 1, 2011, and December 31, 2014. The states' legislative archives were then consulted and each individual law was retrieved and independently coded by two individuals for accuracy. The resulting dataset contained variables including type of law, who it applied to, and effective dates. These laws are included in Appendix Table S1.

Study population

The study population was limited to individuals 16–18 years of age at the time of the survey, which indicated they were a current driver.

Variables

The primary exposures were the presence/absence of universal handheld calling bans or texting bans in the respondents' state at the time of the survey; these variables were dichotomized for each exposure. Other covariates of interest were drivers' ages, sex, race/ethnicity, and rurality of primary residence, driving time per week (in minutes), and the presence of a young driver all cellphone ban in the respondents' state. The categorization of these variables is presented in Table 1. Rurality of primary residence was based on whether the respondent lived in a metropolitan statistical area, which is a geographic area with an urban core of ≥50,000 residents determined by the U.S. Census Bureau. Those living in