

The Prevalence of Cell Phone Use while Driving in a Canadian Province

Abu Sadat Nurullah
Department of Sociology
University of Alberta
5-21 Tory Building
Edmonton, Alberta, T6G 2H4, Canada
nurullah@ualberta.ca

Jasmine Thomas
Department of Sociology
University of Alberta
5-21 Tory Building
Edmonton, Alberta, T6G 2H4, Canada
jthomas@ualberta.ca

Fatemeh Vakilian
Department of Public Health Sciences
University of Alberta
3-300 Edmonton Clinic Health Academy
11405–87 Ave, Edmonton, Alberta, T6G 1C9, Canada
fvakilia@ualberta.ca

Cite this article as:

Nurullah, A. S., Thomas, J., & Vakilian, F. (2013). The Prevalence of Cell Phone Use while Driving in a Canadian Province. *Transportation Research Part F: Traffic Psychology and Behaviour*, 19, pp. 52–62. [doi:10.1016/j.trf.2013.03.006](https://doi.org/10.1016/j.trf.2013.03.006)

The Prevalence of Cell Phone Use while Driving in a Canadian Province

Abstract

The use of a cell phone while driving has been recognized as a form of distracted driving across the world. Many countries have banned the use of handheld mobile devices while operating motor vehicles. In Canada, all the provinces and territories now ban the use of handheld cell phones while driving. Utilizing the 2011 annual Alberta Survey, this study examined the current prevalence of cell phone use while driving in the province of Alberta. Moreover, this paper investigated the impact of the perception of risk on actual behaviors, and if demographic factors played a role. Our results indicated that despite being cognizant of the risks involved, many Albertans (52%) still use cell phones (45% of cell phone users utilized hands-free devices) while driving. Logistic regression analysis indicated that gender, age, employment status, home ownership, household income, immigrant status, and risk perceptions were significant predictors of cell phone use while driving in the province. These findings imply that the use of cell phones while operating a vehicle remains quite high despite legislative efforts to limit such behavior.

Keywords: cell phone use, distracted driving, Alberta

1. Introduction

The use of cell phones while driving has become a common phenomenon contributing to distracted driving across the world. As a result, more than 70 countries have banned the use of (mostly hand-held) cell phones while driving. Canada banned the use of *hand-held* cell phones while driving in all provinces and territories (as of January 1, 2012). However, no jurisdiction in Canada bans drivers from using *hands-free* cell phones while driving (Government of Alberta, 2010). Ishigami and Klein (2009) indicated that the danger associated with using hands-free cell phones is as great as using hand-held ones, as studies across a wide range of driving behavior show that talking on a cell phone, regardless of the phone type, results in difficulty in detecting and identifying events (Amado & Ulupinar, 2005; Collet, Guillot, & Petit, 2010a, 2010b; Ishigami & Klein, 2009; McEvoy et al., 2005; Törnros & Bolling, 2005) and causes driver reaction time decrements (Caird et al., 2008; Hendrick & Switzer, 2007). Therefore, using a hands-free cell phone can potentially result in drivers failing to notice pedestrians crossing streets or missing traffic signals, resulting in critical accidents.

There is widespread agreement in research that using a cell phone while driving increases the risk of an accident (Collet, Guillot, & Petit, 2010a, 2010b; McCartt, Hellinga, & Bratiman, 2006). Naturalistic studies found that talking on a cell phone increases the risk of collision by over 30 percent (Wilson & Stimpson, 2010). In general, research has shown that drivers' talking on a hand-held or hands-free cell phone increased crash risk by about four times compared to the drivers who were not using cell phones (Dragutinovic & Twisk 2005; McEvoy et al., 2005; Redelmeier & Tibshirani, 1997). In contrast, Olson et al. (2009) found in a naturalistic study of truck drivers that talking or listening to a hand-held phone was not related to increased risk, and

that talking or listening to a hands-free phone had a significant protective effect, i.e., decreasing the risk of a safety-critical event (OR = 0.4).

Although a large majority of Canadians (66%) think that cell phone use while driving is a road safety threat (Vanlaar et al., 2006), this risk perception may not always influence their actual behavior. A large number of Canadians continue to use their cell phones while driving. A 2006 survey by the Traffic Injury Research Foundation found that 37 percent of drivers reported using a cell phone while driving in the past week (Vanlaar et al., 2006). One explanation is that the perception of the practical, social, and psychological benefits of using cell phones outweigh the associated risks (Atchley, Atwood, & Boulton, 2011; Nelson, Atchley, & Little, 2009; Walsh & White, 2006; White, Eiser, & Harris, 2004; White et al., 2007). For instance, Hafetz et al. (2010) found that drivers' perception of social benefits (e.g., "I would not be able to tell people where I am or when I will arrive") were associated with more frequent use of cell phones while driving.

The 2007 Alberta Survey illustrated that about half of Albertans were using their cell phone while driving, with men using more (58%) than women (42%) (see Nurullah, 2009). According to the survey, 94 percent of Albertans (98% of women and 91% of men) thought it was dangerous (43% saying very dangerous) to use a cell phone while driving. Moreover, 76 percent of Albertans generally held the belief that people should not be allowed to use cell phones while driving; and 74 percent would support legislation that makes it illegal to use a cell phone while driving (see Nurullah, 2009).

Similar to self-report surveys, studies based on direct observation report the use of cell phones while driving in Canada. In an observational study, Burns, Lecuyer, and Chouinard (2008) found that during 2006-2007, the use of cell phones while driving was the highest in Alberta (10.7%, which was twice the national average), and the lowest in Nova Scotia (1.7%). Another report based on observed driver cell phone use in Alberta showed that the rate of cell phone use in light duty vehicles (e.g., passenger cars, pickup trucks, minivans and SUVs) was 10.7 percent in 2007, which has since declined to 0.9 percent in 2011 in both urban and rural areas (Government of Alberta, 2012). It should be noted, however, that observational studies are limited to the ability of the observer to detect the actual use (e.g., talking or texting) of cell phones while driving at the moment of observation, and detection can be even harder for the use of hands-free devices. As such, observational studies generally report lower incidences of cell phone use while driving compared to self-report surveys.

The aim of this paper is to explore the current situation and prevalence of cell phone use while driving in Alberta. Using self-reported survey data, this study intends to answer the following questions:

1. What is the current state of (both hand-held and hands-free) cell phone use while driving in Alberta?
2. Among those who use cell phones, what are the strategies to respond to calls on a cell phone while driving?
3. What do Albertans think about the dangers of (both hand-held and hands-free) cell phone use while driving?

4. To what extent do demographic factors (gender, age, income etc.) predict the use of cell phones while operating a vehicle?

2. Methodology

The data set utilized for this analysis is the 2011 Alberta Survey administered by the Population Research Laboratory (PRL) at the University of Alberta. The Alberta Survey is an annual telephone survey of households across the province that allows academics, governments, and non-profit organizations to develop questions for the survey instrument. The following section of this paper outlines the data set and sampling design, general data collection procedures, and a description of the variables and data analyses.

2.1. Data Set and Sampling Design

The 2011 Alberta Survey has a sample size of 1,203 households across Alberta, with 401 respondents in Edmonton, 400 in Calgary, and 402 from the remaining areas of the province. The population targeted for the survey was individuals 18 years of age and older who lived in a dwelling reached through direct dialing. The PRL implemented the Random-Digit Dialing (RDD) method to ensure systematic selection of participants. A quota sampling design produced an equal gender distribution in each of the three regions sampled. The PRL publishes the 2011 Alberta Survey data on their website for public usage (Population Research Laboratory, 2011). Table 1 presents the demographic characteristics of the survey sample used for our analysis of cell phone use while driving.

[Table 1 about here]

2.2. Data Collection

The PRL collected data between May 25, 2011 and June 22, 2011 using computer-assisted telephone interviewing (CATI) technology. The survey questions were approved by the university's Research Ethics Board to ensure suitability for administration to the public. Informed consent was obtained from participants, participation was voluntary, and confidentiality of responses was maintained. Supervisors monitored the data collection process, validated data, and developed progress reports. Ten percent of the respondents were randomly selected and re-contacted by the supervisors to validate the initial results ($n=120$). On average, 3.3 call attempts were required to finish an interview, and 85 percent of completed interviews were made in five attempts. The overall response rate was 26.1 percent. Sampling error for the 2011 Alberta Survey for 1,203 households at the 95% level of confidence was ± 2.8 percentage points.

2.3. Survey Instruments

Cell phone use and driving. The dependent variable measured the specific use of cell phone devices while driving. We examined this phenomenon by asking, "Do you talk on a cell phone while operating a vehicle, which may include talking while moving, or stopping at a red light?" The following questions applied only to the respondents who used a cell phone while driving. We asked the respondents, "Do you use a hands-free device when talking on a cell phone while operating a vehicle?" Both of these questions were measured on a dichotomous 'yes' and 'no' scale, and the respondents were asked to base their answers on cell phone usage within the past

12 months. The frequency of cell phone use was measured by asking, “In a typical day, how often do you talk on your cell phone while driving? Is it...” with response categories ranging from 1 ‘never’ to 5 ‘all the time’. The purpose of talking was measured by asking, “In general, how often do you talk on your cell phone while operating a vehicle for personal and for work/business purposes? Is it...” with five response categories – ‘always for business purposes’, ‘mostly for business purposes’, ‘both for business and personal purposes’, ‘mostly for personal purposes’, and ‘always for personal purposes’. Finally, strategies to respond to calls were measured by asking, “How do you usually respond to calls on your cell phone while driving?” with five options: ‘I answer the call right away while driving’, ‘I pull over to answer the call right away’, ‘I answer the call when I feel it is safe to do so’, ‘I let the call go to voice mail’, and ‘I leave my phone off while driving’.

Collision involvement. Involvement in accidents was measured with a single item on a dichotomous ‘yes’ and ‘no’ scale. We asked the respondents, “In the past 12 months, have you had an accident or been close to having an accident when you were talking on your cell phone while driving?” This question applied only to the respondents who used a cell phone while driving.

Risk perception. We asked all of the respondents about their perceptions of dangers associated with using cell phones while operating a vehicle. They responded to agreeing or disagreeing (1= ‘strongly disagree’ and 5= ‘strongly agree’) with the following statements: “Using a hands-free device is safer than using a hand-held cell phone while driving,” “It is dangerous to write and send text messages on a cell phone while driving,” “People who talk on a cell phone while

driving are more likely than others to be in a collision,” and “Using a cell phone while driving is as dangerous as driving while under the influence of alcohol.”

2.4. Analysis

Data were analyzed using IBM SPSS® 18.0 for Windows® and included computation of percentages, cross-tabulations, χ^2 -test, and logistic regression analyses. The sample was weighted in the analyses making it representative of the population surveyed. Block-wise logistic regression analyses (Peng, Lee, & Ingersoll, 2002) were conducted [since the outcome variable represents dichotomous response categories (yes and no)] to evaluate the factors that predict distracted driving. Odds ratios with 95% confidence intervals (95% CI) were used as summary statistics. Nagelkerke R^2 was used to estimate the variance explained by the model. All reported p values were two-sided; and $p < .05$ was considered significant.

3. Results

3.1. Cell Phone Use and Driving

Table 2 illustrates the self-reported behaviors and perceptions of cell phone use while driving among Albertans in 2011. About one half (52%) of the respondents indicated they used their cell phones while driving in the past 12 months, and 37.8 percent did not. Additional questions about distracted driving behavior focused upon the sample of respondents who did use their cell phones while driving. For the 622 respondents who used a cell phone while driving, we asked about hands-free devices, the frequency of cell phone use, the purpose of using cell phones while driving, their strategies to respond to calls, and their involvement in automobile accidents

while using cell phones. Approximately one half (45.1%) of the respondents said they used hands-free devices while operating a vehicle, while 54.9 percent said they did not. With regard to the frequency of cell phone use while driving, 23.0 percent of the respondents reported using a cell phone ‘sometimes’ and 11.4 percent used it ‘very often’.

[Table 2 about here]

We asked the respondents about their purpose of talking on a cell phone while operating a vehicle. A majority of the respondents (50.6%) used a cell phone for personal purposes, while 19.5 percent of them used it for business purposes, and 30.0 percent of them used it for both business and personal purposes. Regarding the strategies for responding to calls on a cell phone, the majority of respondents (57.7%) indicated that they answered the call when they felt it was safe to do so, 20.9 percent of them answered the call right away while driving, 13.9 percent of them let the call go to voice mail, 5.9 percent of them pulled over the vehicle to answer the call, and only 1.9 percent left their phone off while driving. Most of the respondents (92.4%) mentioned that they were not involved in an accident when talking on a cell phone in the past 12 months, while 7.6 percent of them reported that they were.

3.2. Public Perceptions of Danger

Several statements examined general perceptions regarding the dangers of cell phone usage while operating a motor vehicle. These are presented in the last section of Table 2. All of the participants responded to these statements regardless of whether they used a cell phone while driving or not. The data indicated that, overall, respondents were cognizant of the risks related to

the use of cell phones while driving. Texting while driving illustrated the strongest awareness of risk, with 92.6 percent of participants stating that they strongly agreed with the statement, “It is dangerous to write and send text messages on a cell phone while driving.” Moreover, when asked if cell phone use was likely to result in a collision, 71.2 percent of respondents stated that they ‘strongly’ agreed, and 23.3 percent reported that they agreed ‘somewhat’. In response to the statement, “Using a cell phone while driving is as dangerous as driving while under the influence of alcohol,” 42.1 percent ‘strongly’ agreed and 29.2 percent agreed ‘somewhat’ that the danger of these driving impairments carry equivalent risk. Finally, a large majority of the respondents (68.4%) agreed (‘somewhat’ or ‘strongly’) that a hands-free device is safer than a hand-held cell phone while driving; however, 22 percent disagreed with the statement.

In order to differentiate the perceptions of danger between the respondents who used cell phones while driving and those who did not, we used cross-tabulations. Results indicated that statistically significant differences existed between these two groups in their perceptions of dangers associated with cell phone use while driving. The respondents who talked on a cell phone were more likely than those who did not talk on a cell phone to perceive hands-free device as safer and texting while driving as dangerous, but were less likely to think that using cell phones would result in collisions. They were also less likely to think that using a cell phone while driving is as dangerous as alcohol-impaired driving. See Table 3 for details on those differences.

[Table 3 about here]

3.3. Socio-demographic Differences

Table 4 portrays the rates of cell phone usage while driving cross-tabulated with the demographic characteristics of the sample. Statistically significant results indicated that gender differences existed, with males being 9.0% more likely than females to use their cell phones while driving. Additionally, younger age groups including those between 35-44 reported the highest percentages (74.9%) of cell phone use while driving. Respondents over the age of 65 had the lowest percentage of cell phone use while driving at 28.9 percent. Married and cohabiting participants (62.2%) reported a higher rate of phone use while driving when compared to those who were single (47.4%).

Respondents with completed post-secondary credentials were 23.2% more likely than those with less than a high school education to use cell phones. Finally, other characteristics to note were that higher income groups (those with a household income of \$100,000 to \$150,000+) reported greater rates (71.2%) of cell phone use, employed (full-time and part-time) individuals reported greater rates (66.5%) of cell phone use, home owners were 15.8% more likely than renters to use cell phones, and Canadian born respondents were 10.3% more likely than immigrants to use cell phones while driving. However, respondents' religious status and location of residence (urban or rural areas) did not result in statistically significant differences.

[Table 4 about here]

3.4. Predictors of Cell Phone Use while Driving

In order to assess the predictors of cell phone use while operating a vehicle in Alberta, we conducted logistic regression analysis. Listwise deletion removed missing cases, resulting in a slightly smaller sample size. Demographic questions included in our analysis were measures of gender, age, marital status, educational attainment, employment status, annual household income, religious belief, home ownership, rural or urban location, and immigrant status. The measurement of gender (male=1, female=0), marital status (married/cohabiting=1, single=0), employment (employed=1, unemployed=0), religious belief (not religious=1, religious=0), home ownership (own=1, rent=0), rural or urban location (urban=1, rural=0), and immigrant status (Canadian born=1, immigrant=0) were dummy coded to facilitate their inclusion into the logistic regression. The age of respondents was included as a continuous measure, while education (less than high school, completed high school, some post-secondary, and completed post-secondary) and annual household income (< \$30,000, \$30,000-\$59,999, \$60,000-\$99,999, and \$100,000-\$150,000+) were coded into four categories. Risk perception was a continuous measure of combined scores of the four items assessing the perception of dangers or risks associated with the use of cell phones while driving.

Table 5 illustrates the logistic regression model predicting the use of cell phones while driving. For the logistic regression model, the Hosmer and Lemeshow test was not significant ($p > .05$), indicating good fit of the model (Hosmer & Lemeshow, 2000). The chi-square statistic for the model was significant ($\chi^2 = 125.83$ (15 df), $p < .001$), and explained approximately 21% of the variance in cell phone use while driving (Nagelkerke $R^2 = .21$). Odds ratios indicated the influence of the independent variables on the dependent variable.

[Table 5 about here]

Table 5 shows that gender was a statistically significant predictor of cell phone usage while driving with an odds ratio of 1.40 ($p < .05$), indicating males were more likely than females to use their cell phones while operating a motor vehicle. Age had a negative relationship with cell phone use while driving (odds ratio = 0.97, $p < .001$), as younger respondents were more likely than older ones to use cell phones while driving. Employed respondents were 1.53 times ($p < .05$) more likely to use their cell phone than those who were unemployed. Home owners were 1.76 times ($p < .05$) more likely to use their cells phones while driving than those who were renting. Individuals reporting an annual household income up to \$29,999 were used as the reference category. As household income increased to \$30,000-\$59,999, respondents were 2.20 times ($p < .05$) more likely to use their cells phones while driving compared to the reference category. The respondents who had an annual household income of \$60,000 to \$99,999 were 3.03 times ($p < .01$) more likely, and those who had a household income of over \$100,000 per year were 3.29 times ($p < .01$) more likely to use their cell phones while driving compared to the reference category. These results indicated that participants in the higher annual income brackets were much more likely to participate in distracted driving behavior involving cell phone usage. In addition, immigrant status also had a statistically significant result, with Canadian-born participants being 1.63 times ($p < .05$) more likely than immigrants to use their cell phones while driving.

Finally, risk perception was negatively associated with the use of cell phones while driving (odds ratio = 0.88, $p < .001$). This indicates that the more the participants were aware of the dangers involving cell phone use while driving, the less likely they would do so. Since male and younger participants were more likely to use cell phones while driving, we tested the interaction effect between age and gender in a separate model (not shown here). However, the interaction was not significant, and the χ^2 value (block $\chi^2 = 1.59$ (1 df), $p = .209$) and the amount of variance explained (Nagelkerke $R^2 = .21$) did not significantly differ from that of our initial model. Finally, marital status, educational credentials, religious status, and rural or urban location did not significantly predict the use of cell phones while driving.

4. Discussion

The aim of this paper was to explore the self-reported prevalence of using cell phones while driving for a sample of Albertans. The results showed that despite perceiving the dangers associated with using a cell phone while operating a vehicle, a large number of participants (52%) continued to engage in such behavior. This finding is consistent with other studies conducted in Canada and elsewhere (Beck, Yan, & Wang, 2007; Braitman & McCartt, 2010; Gras et al., 2007; Hafetz et al. 2010; Hallett, Lambert, & Regan, 2011; Marcoux, Vanlaar, & Robertson, 2012; Tison, Chaudhary, & Cosgrove, 2011; White et al., 2010; Young & Lenné, 2010). For instance, a recent report from the U.S. National Highway Traffic Safety Administration (NHTSA) showed that 41 percent of all drivers reported talking on their cell phones while driving (Tison, Chaudhary, & Cosgrove, 2011). Similarly, Beck, Yan, and Wang (2007) found that 46.7 percent, and Braitman and McCartt (2010) found that 40 percent of

drivers in the U.S. reported using their cell phones while operating a vehicle. In addition, an Australian study reported that 43 percent of drivers use hands-free or hand-held cell phones while driving (White et al., 2010). However, a few other studies reported a slightly higher percentage of cell phone use while driving. For instance, a New Zealand study (Hallett, Lambert, & Regan, 2011) found that 60 percent, an Australian study (Young & Lenné, 2010) found 59 percent, and a Spanish study (Gras et al., 2007) found 60.1 percent of the respondents reported using their cell phones while driving to make/answer calls or send text messages. Finally, in a survey of Canadian drivers, Marcoux, Vanlaar, and Robertson (2012) found that 36.3 percent of the respondents reported using a cell phone while driving during the past seven days in 2011. In summary, results from many studies across the world reflect the fact that the use of cell phones while operating a vehicle remains quite high despite legislative efforts to limit and reduce such behavior.

Research has shown that many drivers either underestimate the dangers associated with cell phone use while driving (Hallett, Lambert, & Regan, 2011; White, Eiser, & Harris, 2004), or continue to drive while using their cell phones even when they are cognizant of the risks (Ivers et al. 2009; Nelson, Atchley, & Little, 2009). This raises the question as to why do people use their cell phones while driving when they are aware of the perceived dangers? It could be that the perceived practical, social, and psychological benefits outweigh the dangers associated with the use of cell phones while driving (Atchley et al., 2011; Nelson, Atchley, & Little, 2009; Walsh & White, 2006; White, Eiser, & Harris, 2004; White et al., 2007). The social expectation to return calls immediately is another likely factor that influences talking on a cell phone while driving (see Hafetz et al. 2010). Studies also indicated that social approval from close others (e.g.,

friends, family) resulted in the usage of cell phones while driving (Nemme & White, 2010; Walsh et al., 2008). Finally, Zhao et al. (2012) suggested that it may be drivers' personality traits (e.g., attitude and behavior) and susceptibility to risk taking while driving rather than the use of cell phones *per se* that influences their engagement in risky driving behaviors. This is because those who used their cell phones more frequently in the past were more likely to engage in risky driving behaviors compared to those who used it rarely or not at all, even when they were not using their cell phones at the time of actual highway driving performance (Zhao et al., 2012). Further research should investigate this phenomenon.

It was no surprise to find that almost one half of respondents reported using hands-free devices while driving, given that a majority (76.7 percent of cell phone users) either 'strongly' or 'somewhat' agreed that hands-free devices are safer while operating a vehicle. In addition, those who did not use a cell phone while driving also considered hands-free devices to be safer than hand-held phones. In a study conducted in Jordan, Ismeik and Al-Kaisy (2010) found that 71.8 percent of cell phone users and 51.7 percent of non-users believed that using a hands-free device was safer than using a hand-held cell phone. Previous studies conducted in Spain and New Zealand, however, reported less use of hands-free devices (Gras et al., 2007; Hallett, Lambert, & Regan, 2011; Sullman & Baas, 2004). It may be that because in many countries where the law bans the use of hand-held cell phones, people now use hands-free devices more while talking on their cell phones. Past research, on the other hand, suggested that hands-free devices are no safer than hand-held cell phones (Amado & Ulupinar, 2005; Caird et al., 2008; Hendrick & Switzer, 2007; Ishigami & Klein, 2009; McEvoy et al., 2005; Törnros & Bolling, 2005). As such,

people's perception that hands-free devices are safer than hand-held ones may be largely overrated.

In terms of strategies to respond to calls, a considerable proportion of people (57.7%) reported answering calls on a cell phone when it was safe to do so. About one-fifth of the respondents, however, reported answering calls right away while operating a vehicle. This indicates that drivers in Alberta often engage in risky behavior by answering calls right away. Nevertheless, the proportion of respondents reporting being involved in an accident was low (7.6%), but quite similar (6%) to that of the U.S. NHTSA report (Tison, Chaudhary, & Cosgrove, 2011). It may be because a great number of respondents (60.1%) in our study reported 'seldom' using their cell phones while driving. Prior research suggested that the frequency of cell phone use while driving is associated with risk outcomes (Pöysti, Rajalin, & Summala, 2005; Zhao et al., 2012). In a recent study, Zhao et al. (2012) found that frequent users of cell phones demonstrated more aggressive and risky driving behavior (e.g., speeding, traffic rule violations, etc.). Furthermore, Pöysti, Rajalin, and Summala (2005) reported that safety oriented drivers were less frequent users of cell phones while operating a vehicle.

Similar to previous research (e.g., Nemme & White, 2010; Reed & Robbins, 2008; Zhou et al., 2009), our findings showed that writing and sending text messages on a cell phone while driving were considered very dangerous by both those who used a cell phone while operating a vehicle and those who did not use a cell phone. Both of these two groups also agreed that cell phone use while driving can be as dangerous as driving while intoxicated, and that using a cell phone creates a higher risk of collision. Past research supports these findings (McCartt et al.,

2006; McEvoy et al., 2005; Redelmeier & Tibshirani, 1997; Strayer et al., 2006; White et al., 2010; Wilson & Stimpson, 2010).

Our results indicated that gender differences existed, such that males were more likely than females to report using a cell phone while driving. Similar findings were reported in previous studies (e.g., Hallett, Lambert, & Regan, 2011; Ivers et al. 2009; Sullman & Baas, 2004; Zhou et al., 2009). Because males are more likely to engage in risky driving behaviors compared to females (Ivers et al. 2009), we suspected that our results would reflect such behavior. Our findings also indicated that young adults and the middle-age group were more likely than older people to use a cell phone while operating a vehicle. Past research also showed that younger drivers were more likely to use their cell phones while driving (e.g., Harrison, 2011; Hosking, Young, & Regan, 2009; Walsh et al., 2008; Zhou et al., 2009).

A limitation of the current study is that the findings are based on self-reported survey instead of an actual on-road observation of cell phone use while driving. As such, it is unknown as to the extent to which this retrospective self-reported behavior corresponds to actual driving behaviors. It should also be noted that at the time of conducting the survey, the ban on cell phone use while driving had not come into effect in Alberta. Because the ban came into effect (on September 1, 2011) after the data for this study were collected, we could not measure the immediate effect of the ban on people's use of cell phones while operating a vehicle. Previous research suggested that although effective enforcement of the ban on cell phone use produces reductions in the use of cell phones in the long-term (McCartt & Hellinga, 2007; McCartt et al., 2010), such ban has little effect on decreasing overall collision rates (Nikolaev, Robbins, &

Jacobson, 2010; Zhao et al., 2012). Clearly, further research is needed to examine the short-term as well as long-term reductions in the usage of cell phones while driving in Alberta following the enforcement of the Distracted Driving legislation that came into effect in September of 2011 (Government of Alberta, 2011).

Acknowledgements

This research was supported by a REID (Research and Education on Impaired Driving) grant provided through the Department of Sociology at the University of Alberta. An earlier version of this article was presented at the *Canadian Sociological Association Annual Meeting*, Waterloo, Ontario, 29 May–02 June 2012. The authors thank Herb Northcott and Manoj Misra for their helpful comments on an earlier version of this article.

References

- Amado, S., & Ulupinar, P. (2005). The effects of conversation on attention and peripheral detection: Is talking with a passenger and talking on the cell phone different? *Transportation Research Part F: Traffic Psychology and Behaviour*, 8, 383–395.
- Atchley, P., Atwood, S., & Boulton, A. (2011). The choice to text and drive in younger drivers: Behavior may shape attitude. *Accident Analysis and Prevention*, 43(1), 134–142.
- Beck, K. H., Yan, F., & Wang, M. Q. (2007). Cell phone users, reported crash risk, unsafe driving behaviors and dispositions: A survey of motorists in Maryland. *Journal of Safety Research*, 38(6), 683–688.
- Braitman, K. A., & McCartt, A. T. (2010). National reported patterns of driver cell phone use in the United States. *Traffic Injury Prevention*, 11(6), 543–548.
- Burns, P., Lécuyer, J., & Chouinard, A. (2008). Observed driver phone use rates in Canada. Proceedings of the 18th Canadian Multidisciplinary Road Safety Conference, Whistler, British Columbia, June 8-11, 2008, pp. 1-10.
- Caird, J. K., Willness, C. R., Steel, P., & Scialfa, C. (2008). A meta-analysis of the effects of cell phones on driver performance. *Accident Analysis and Prevention*, 40(4), 1282–1293.
- Collet, C., Guillot, A., & Petit, C. (2010a). Phoning while driving I: A review of epidemiological, psychological, behavioural and physiological studies. *Ergonomics*, 53(5), 589-601.
- Collet, C., Guillot, A., & Petit, C. (2010b). Phoning while driving II: A review of driving conditions influence. *Ergonomics*, 53(5), 602-616.
- Dragutinovic, N., & Twisk, D. (2005) *Use of mobile phones while driving effects on road safety: A literature review*. Leidschendam, the Netherlands: Institute for Road Safety Research.
- Government of Alberta. (2012, February). Cell phone use in light duty vehicles. Retrieved March 28, 2012, from

<http://www.transportation.alberta.ca/Content/docType48/Production/AlbertaCellPhoneUseRateGraph20072011.pdf>

Government of Alberta. (2011, August 25). Distracted Driving Legislation: Highlights. Retrieved March 28, 2012, from

<http://www.transportation.alberta.ca/Content/docType3679/Production/FactSheet.pdf>

Government of Alberta. (2010, November 18). Bill 16 - Distracted Driving Legislation. Retrieved March 23, 2011, from <http://www.transportation.alberta.ca/distracteddriving.htm>

Gras, M. E., Cunill, M., Sullman, M., Planes, M., Aymerich, M., & Font-Mayolas, S. (2007). Mobile phone use while driving in a sample of Spanish university workers. *Accident Analysis and Prevention*, 39(2), 347–355.

Hafetz, J. S., Jacobsohn, L. S., Garcia-Espana, J. F., Curry, A. E., & Winston, F. K. (2010). Adolescent drivers' perceptions of the advantages and disadvantages of abstention from in-vehicle cell phone use. *Accident Analysis and Prevention*, 42(6), 1570–1576.

Hallett, C., Lambert, A., & Regan, M. A. (2011). Cell phone conversing while driving in New Zealand: Prevalence, risk perception and legislation. *Accident Analysis and Prevention*, 43(3), 862–869.

Harrison, M. A. (2011). College students' prevalence and perceptions of text messaging while driving. *Accident Analysis and Prevention*, 43(4), 1516–1520.

Hendrick, J. L., & Switzer, J. R. (2007). Hands-free versus hand-held cell phone conversation on a braking response by young drivers. *Perceptual and Motor Skills*, 105(2), 514–522.

Hosking, S., Young, K., & Regan, M. (2009). The effects of text messaging on young drivers. *Human Factors*, 51(4), 582–592.

Hosmer, D. W., & Lemeshow, S. (2000). *Applied logistic regression*. New York, NY: Wiley.

Ishigami, Y., & Klein, R. M. (2009). Is a hands-free phone safer than a handheld phone? *Journal of Safety Research*, 40(2), 157-164.

- Ismeik, M., & Al-Kaisy, A. (2010). Characterization of cell phone use while driving in Jordan. *Transport, 25*(3), 252–261.
- Ivers, R., Senserrick, T., Boufous, S., Stevenson, M., Chen, H., Woodward, M., et al. (2009). Novice drivers' risky driving behavior, risk perception, and crash risk: Findings from the DRIVE study. *American Journal of Public Health, 99*(9), 1638-1644.
- Marcoux, K. D., Vanlaar, W., Robertson, R. D. (2012). *The road safety monitor 2011: Distracted driving trends*. Ottawa: Traffic Injury Research Foundation.
- McEvoy, S. P., Stevenson, M. R., McCartt, A. T., Woodward, M., Haworth, C., Palamara, P., & Cercarelli, R. (2005). Role of mobile phones in motor vehicle crashes resulting in hospital attendance: A case-crossover study. *British Medical Journal, 331*(7514), 428-432.
- McCartt, A. T., Hellinga, L. A., Strouse, L. M., & Farmer, C. M. (2010). Long-term effects of handheld cell phone laws on driver handheld cell phone use. *Traffic Injury Prevention, 11*(2), 133–141.
- McCartt, A. T., & Hellinga, L. A. (2007). Longer term effects of Washington DC, law on drivers' hand-held phones. *Traffic Injury and Prevention, 8*(2), 199–204.
- McCartt, A. T., Hellinga, L. A., & Bratiman, K. A. (2006). Cell phones and driving: Review of research. *Traffic Injury Prevention, 7*(2), 89-106.
- Nelson, E., Atchley, P., & Little, T. D. (2009). The effects of perception and risk of answering and initiating a cellular phone call while driving. *Accident Analysis and Prevention, 41*(3), 438–444.
- Nemme, H., & White, K. (2010). Texting while driving: Psychosocial influences on young people's texting intentions and behavior. *Accident Analysis and Prevention, 42*(4), 1257-1265.

- Nikolaev, A. G., Robbins, M. J., & Jacobson, S. H. (2010). Evaluating the impact of legislation prohibiting hand-held cell phone use while driving. *Transportation Research Part A: Policy and Practice*, 44(3), pp. 182–193.
- Nurullah, A. S. (2009). The prevalence of cell phone use while driving in Alberta: Results from 2007 annual Alberta survey. Paper presented at the *W. David Pierce Research Colloquium*. Edmonton, AB: University of Alberta, 07 November 2009.
- Olson, R. L., Hanowski, R. J., Hickman, J. S., & Bocanegra, J. (2009). *Driver distraction in commercial vehicle operations* (Report No. FMCSA-RRR-09-042). Washington, DC: USDOT, FMCSA.
- Peng, C. J., Lee, K. L., & Ingersoll, G. M. (2002). An introduction to logistic regression analysis and reporting. *Journal of Educational Research*, 96(1), 3-15.
- Population Research Laboratory. (2011). The 2011 Alberta Survey. Retrieved December 23, 2012, from <http://www.prl.ualberta.ca/en/AlbertaSurvey/PublicReleaseAlbertaSurveyDatasets2011.aspx>
- Pöysti, L., Rajalin, S., & Summala, H. (2005). Factors influencing the use of cellular (mobile) phone during driving and hazards while using it. *Accident Analysis and Prevention*, 37(1), 47–51.
- Redelmeier, D. A., & Tibshirani, R. J. (1997). Association between cellular-telephone calls and motor vehicle collisions. *New England Journal of Medicine*, 336(7), 453-458.
- Reed, N., & Robbins, R. (2008). *The effect of text messaging on driver behavior: A simulator study*. Berkshire (UK): Transport Research Laboratory.
- Sullman, M. J. M., & Baas, P. H. (2004). Mobile phone use amongst New Zealand drivers. *Transportation Research Part F: Traffic Psychology and Behaviour*, 7(2), 95–105.
- Strayer, D. L., Drews, F. A., & Crouch, D. J. (2006). A comparison of the cell phone driver and the drunk driver. *Human Factors*, 48(2), 381-391.

- Tison, J., Chaudhary, N., & Cosgrove, L. (2011, December). *National phone survey on distracted driving attitudes and behaviors*. (Report No. DOT HS 811555). Washington, DC: National Highway Traffic Safety Administration.
- Törnros, J. E. B., & Bolling, A. K. (2005). Mobile phone use – effects of handheld and handsfree phones on driving performance. *Accident Analysis and Prevention*, *37*(5), 902–909.
- Vanlaar, W., Simpson, H. M., Mayhew, D., & Robertson, R. (2006). *The road safety monitor: Distracted driving*. Ottawa: Traffic Injury Research Foundation.
- Walsh, S. P., White, K. M., Hyde, K. M., & Watson, B. (2008). Dialing and driving: Factors influence intentions to use a mobile phone while driving. *Accident Analysis and Prevention*, *40*(6), 1893–1900.
- Walsh, S. P., & White, K. M. (2006). Ring, ring, why did I make that call? Beliefs underlying Australian university students' mobile phone use. *Youth Studies Australia*, *25*(3), 49-57.
- White, K. M., Hyde, M. K., Walsh, S. P., & Watson, B. (2010). Mobile phone use while driving: An investigation of the beliefs influencing drivers' hands-free and handheld mobile phone use. *Transportation Research Part F: Traffic Psychology and Behaviour*, *13*, 9-20.
- White, M. P., Eiser, J. R., Harris, P. R., & Pahl, S. (2007). Who reaps the benefits, who bears the risks? Comparative optimism, comparative utility, and regulatory preferences for mobile phone technology. *Risk Analysis*, *27*, 741–753.
- White, M. P., Eiser, J. R., & Harris, P. R. (2004). Risk perceptions of mobile phone use while driving. *Risk Analysis*, *24*, 323–334.
- Wilson, F., & Stimpson, J. (2010). Trends in fatalities from distracted driving in the United States, 1999 to 2008. *American Journal of Public Health*, *100*(11), 2213-2219.
- Young, K. L., & Lenné, M. G. (2010). Driver engagement in distracting activities and the strategies used to minimise risk. *Safety Science*, *48*(3), 326–332.

Zhao, N., Reimer, B., Mehler, B., D'Ambrosio, L. A., & Coughlin, J. F. (2012, in press). Self-reported and observed risky driving behaviors among frequent and infrequent cell phone users. *Accident Analysis and Prevention*. doi:10.1016/j.aap.2012.07.019

Zhou, R., Wu, C., Rau, P.-L. P., & Zhang, W. (2009). Young driving learners' intention to use a handheld or hands-free mobile phone while driving. *Transportation Research Part F: Traffic Psychology and Behaviour*, *12*, 208–217.

Table 1:
Sample Characteristics from the 2011 Alberta Survey

Characteristics	<i>N</i>	Weighted %	Adjusted %
Gender			
Male	600	49.9	49.8
Female	603	50.1	50.2
Age			
18-24	66	5.5	5.6
25-34	159	13.2	13.6
35-44	213	17.7	18.2
45-54	244	20.3	20.9
55-64	260	21.6	22.3
65+	227	18.9	19.4
<i>Missing</i>	33	2.8	
Mean = 50.13, <i>SD</i> = 15.90			
Marital Status			
Never married	181	15.0	15.1
Married/ Cohabiting	830	69.0	69.1
Divorced/ Widowed/ Separated	189	15.7	15.8
<i>Missing</i>	3	0.3	
Education			
Less than high-school	99	8.3	8.3
Completed high-school	223	18.5	18.5
Some post-secondary	161	13.4	13.4
Completed post-secondary	719	59.8	59.8
Employment			
Employed (full-time & part-time)	770	64.0	64.3
Not currently employed/Retired	428	35.6	35.7
<i>Missing</i>	5	0.4	
Annual Household Income			
Up to \$29,999	84	7.0	9.5
\$30,000 to \$59,999	148	12.4	16.7
\$60,000 to \$99,999	238	19.8	26.8
\$100,000 to \$150,000+	417	34.7	47.0
<i>Missing</i>	316	26.2	

Table 1: *Continued*

Characteristics	<i>N</i>	Weighted %	Adjusted %
Religion			
No religion	300	25.0	26.5
Roman Catholic	265	22.0	23.4
Other Christian	494	41.1	43.6
Jews, Muslims, & others	73	6.1	6.4
<i>Missing</i>	71	5.9	
Home Ownership			
Own (self/ spouse/ parents)	969	80.5	81.2
Rent	224	18.7	18.8
<i>Missing</i>	10	0.8	
Location			
Urban area	792	65.8	65.8
Rural area	411	34.2	34.2
Immigrant Status			
Canadian born	979	81.4	81.4
Foreign born	224	18.6	18.6

Note: N = 1,203.

Table 2:
Rates of and perceptions about cell phone use while driving

Characteristics	Weighted <i>N</i>	Adjusted %
Cell phone use while driving		
Yes	622	52.0
No	452	37.8
Don't have a cell phone	66	5.5
Don't drive	56	4.7
Hands-free device use while driving		
Yes	279	45.1
No	341	54.9
Frequency of using cell phones while driving		
Never	21	3.4
Seldom	373	60.1
Sometimes	143	23.0
Very often	71	11.4
All the time	13	2.1
Purpose of talking on a cell phone while driving		
Always for business purposes	20	3.3
Mostly for business purposes	99	16.2
Both for business and personal purposes	184	30.0
Mostly for personal purposes	140	22.7
Always for personal purposes	172	27.9
Strategies to respond to calls on a cell phone		
I answer the call right away while driving	129	20.9
I pull over to answer the call right away	36	5.9
I answer the call when I feel it is safe to do so	355	57.7
I let the call go to voice mail	85	13.9
I leave my phone off while driving	10	1.6
Involvement in an accident when talking on a cell phone		
Yes	47	7.6
No	574	92.4
Hands-free device is safer while driving		
Strongly disagree	139	11.7
Disagree somewhat	122	10.3
Neither disagree nor agree	114	9.6
Agree somewhat	381	32.0

Table 2: *Continued*

Characteristics	Weighted <i>N</i>	Adjusted %
Strongly agree	433	36.4
Texting is dangerous while driving		
Strongly disagree	20	1.7
Disagree somewhat	3	0.3
Neither disagree nor agree	1	0.1
Agree somewhat	63	5.3
Strongly agree	1110	92.6
Cell phone use more likely to result in a collision		
Strongly disagree	12	1.0
Disagree somewhat	22	1.8
Neither disagree nor agree	33	2.7
Agree somewhat	278	23.3
Strongly agree	851	71.2
Cell phone use is as dangerous as alcohol-impaired driving		
Strongly disagree	64	5.4
Disagree somewhat	161	13.7
Neither disagree nor agree	113	9.6
Agree somewhat	344	29.2
Strongly agree	498	42.1

Note: Weighted *N* ranged from 615 to 1,197. Data weighted by 2006 census figures.

Table 3:
Differences in perceptions of those who used cell phones while driving and those who did not

Characteristics	% Used	% Didn't	χ^2 (df)
Hands-free device is safer while driving			
Strongly disagree	5.0	17.2	
Disagree somewhat	8.1	13.4	
Neither disagree nor agree	10.2	8.7	
Agree somewhat	33.8	31.3	
Strongly agree	42.9	29.4	59.20 (4)***
Texting is dangerous while driving			
Strongly disagree	1.1	2.7	
Disagree somewhat	NA	NA	
Neither disagree nor agree	NA	NA	
Agree somewhat	6.4	3.6	
Strongly agree	92.3	93.3	11.13 (4)*
Cell phone use more likely to result in a collision			
Strongly disagree	1.0	1.3	
Disagree somewhat	3.2	NA	
Neither disagree nor agree	4.8	NA	
Agree somewhat	31.6	12.9	
Strongly agree	59.4	84.9	89.72 (4)***
It is as dangerous as alcohol-impaired driving			
Strongly disagree	8.5	2.0	
Disagree somewhat	20.1	6.8	
Neither disagree nor agree	13.3	4.3	
Agree somewhat	30.3	28.5	
Strongly agree	27.8	58.4	130.81 (4)***

Note: Weighted *N* ranged from 1,053 to 1,070.

* $p < .05$, *** $p < .001$. NA = Less than 5 cases.

Table 4:**Rates of cell phone use while driving ¹ by demographic characteristics**

Characteristics	% Yes	% No	χ^2 (df)
Gender			
Male	62.4	37.6	
Female	53.4	46.6	8.98 (1)**
Age			
18-24	50.0	50.0	
25-34	70.7	29.3	
35-44	74.9	25.1	
45-54	64.5	35.5	
55-64	55.7	44.3	
65+	28.9	71.1	104.18 (5)***
Marital Status			
Single	47.4	52.6	
Married/ Cohabiting	62.2	37.8	19.65 (1)***
Education			
Less than high-school	38.3	61.7	
Completed high-school	55.9	44.1	
Some post-secondary	55.5	44.5	
Completed post-secondary	61.5	38.5	16.99 (3)**
Employment			
Employed (full-time & part-time)	66.5	33.5	
Not currently employed/Retired	40.8	59.2	64.20 (1) ***
Annual Household Income			
Up to \$29,999	26.5	73.5	
\$30,000 to \$59,999	48.1	51.9	
\$60,000 to \$99,999	61.6	38.4	
\$100,000 to \$150,000+	71.2	28.8	60.84 (3)***
Religious Status			
Not religious	61.3	38.7	
Religious	56.4	43.6	1.92 (1)
Home Ownership			
Own (self/ spouse/ parents)	60.9	39.1	
Rent	45.1	54.9	15.66 (1)***

Table 4: *Continued*

Characteristics	% Yes	% No	χ^2 (df)
Location			
Urban area	59.5	40.5	2.10 (1)
Rural area	54.9	45.1	
Immigrant Status			
Canadian born	59.8	40.2	6.98 (1)**
Foreign born	49.5	50.5	

Note: Weighted N ranged from 816 to 1,073.

** $p < .01$, *** $p < .001$.

Table 5:
Logistic Regression Analysis Predicting Cell Phone Use While Driving

Variables	<i>b</i>	Wald χ^2	OR
Gender (male = 1)	0.34	3.86	1.40*
Age (continuous)	-0.03	24.03	0.97***
Marital Status (married = 1)	0.13	0.36	1.14
Education			
Less than high-school (ref)			
Completed high-school	0.22	0.32	1.24
Some post-secondary	0.17	0.18	1.19
Completed post-secondary	0.21	0.33	1.23
Employment (employed = 1)	0.42	4.69	1.53*
Religious Status (not religious = 1)	-0.11	0.32	0.90
Home Ownership (own = 1)	0.57	6.09	1.76*
Annual Household Income			
Up to \$29,999 (ref)			
\$30,000 to \$59,999	0.79	4.35	2.20*
\$60,000 to \$99,999	1.11	8.55	3.03**
\$100,000 to \$150,000+	1.19	9.34	3.29**
Location (urban = 1)	0.10	0.30	1.10
Immigrant Status (Canadian born = 1)	0.49	4.99	1.63*
Risk Perception	-0.13	11.25	0.88***
Constant	1.65		
Number of Observations	745		
Model χ^2	125.83 (15 df)***		
Hosmer and Lemeshow test	4.27 (8 df)	$p = .832$	
-2 Log likelihood	869.54		
Nagelkerke R^2	0.21		

Note: OR = Odds ratio

* $p < .05$, ** $p < .01$, *** $p < .001$.