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Who's calling? Social networks and mobile phone use among motorcyclists

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ABSTRACT

Mobile phone use while riding a motorcycle poses a key safety risk, particularly among younger people who have been found to be more susceptible to distracted driving. While previous research has examined the influence of social networks on mobile phone use while driving a car, no research has explored this association in the context of motorcycle use. Using a survey of university students in Vietnam, this research explores the association between social networks and mobile phone use among motorcyclists and the links this has to reported crashes/falls. Results show that the majority of students are most likely to use a mobile phone to communicate with a friend while riding, either through talking (56.5%) or text messaging (62.0%). However, respondents who frequently talk to a girlfriend/boyfriend or spouse while riding were more likely to experience a crash/fall than those who frequently talk with others while riding (e.g. parent, brother/sister). In addition, those who frequently text message a friend while riding were more likely to experience a crash/fall than those who frequently text message others while riding. The results highlight a clear association between social networks and mobile phone use while riding a motorcycle. Developing a culture of societal norms, where mobile phone use while riding a motorcycle is considered socially unacceptable, will help to reduce the prevalence and ultimate crash risk associated with mobile phone use while riding.

1. Introduction

It is now well established that using a mobile phone while driving can lead to poorer driver performance and increased crash risk (Caird et al., 2014, 2008; McEvoy et al., 2006; McKnight and McKnight, 1993). Motorists using a mobile phone while driving are more likely to report exceeding the speed limit and running stop signs and red lights compared to those not using a mobile phone (Beck et al., 2007). Younger drivers in particular are more susceptible to distracted driving (NHTSA, 2009). The amount of time novice drivers spend not looking at the road while text messaging has been measured to be four times greater than baseline (no text-messaging) conditions (Hosking et al., 2009).

A number of studies have reported the prevalence of mobile phone use among younger drivers. Madden and Lenhart (2009) found that around one-quarter of American teens (26%) aged 16–17 years have text messaged while driving a car, while almost half (43%) have talked on a mobile phone while driving. Harrison (2011) found that 91% of college students aged 18–23 years in the United States had reported text messaging while driving a car, with many reportedly doing so in the presence of car passengers, including children. Hill et al. (2015) noted a similar result with 90–91% of college students who reported to use a mobile phone for talking and/or text messaging while driving. In the context of motorcycle use, an observational study in Hanoi, Vietnam found that 8.7% of motorcyclists (as a driver) were using a mobile phone at any given point in time, compared with 4.4% of those using an electric bicycle (Truong et al., 2016b). This compares with much lower rates observed in Mexico at 0.6% (Pérez-Núñez et al., 2014) and China at 0.4% (Du et al., 2013).

Subjective norms and social networks have been found to be associated with mobile phone use while driving a car (Beck and Watters, 2016; Hill et al., 2015; LaVoie et al., 2016; Zhou et al., 2012). Hill et al. (2015) identified social norms as one of four strongest predictors of distracted driving (predominately mobile phone use), noting that those who witnessed others engaged in distracted driving were more likely to engage in the behaviour themselves (Hill et al., 2015). In a study of distracted driving behaviour of teens and their parents, Bingham et al. (2015) found that teens who report that their parents text message while driving were 2.5 times more likely to also text message while driving. Similarly, Beck and Watters (2016) found that college students who text messaged while driving were more likely to do so if they had seen their significant other (defined as the most

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important person in their social circle) also text message while driving.

A theory on social networks has been developed which can be applied in a variety of settings from small groups to entire global systems (Kadushin, 2012). The theory introduces the concept of 'homophily', defined as the sharing of common social attributes, where individuals or groups who are more homophilous to each other are more likely to be socially connected (Kadushin, 2012). In addition, the theory states that common norms can bring people with common attributes together, yet this also may work in the reverse where common attributes and contact lead to common norms (Feld and Carter, 1999). Another key point proposed by the theory is that individuals or groups with homophilous relations are more likely to share similar attitudes, and that over time relationships tend to become more homophilous (Kadushin, 2012). LaVoie et al. (2016) contribute to social network theory in the context of distracted driving. Their results indicate that social relationships are a key factor associated with who people are likely to communicate with by mobile phone while driving a car. In particular, they found that people are more likely to talk or text message using a mobile phone while driving with those who are socially closest to them.

While extensive research has been undertaken to examine the influence of social networks on mobile phone use while driving a car, limited research has explored this association in the context of motorcycle use (Truong et al., 2017). In addition, no research has sought to understand if and how social networks may be linked to reported crashes/falls, either in the context or driving a car or riding a motorcycle. The aim of this research is to therefore explore the association of social networks with mobile phone use among motorcyclists and the potential links this may have to self-reported crashes/falls.

In order to meet the research aim, a survey of university students was undertaken in Vietnam. University students were selected as the target group given their higher propensity to use a mobile phone compared with older adults (Smith, 2011), along with their greater susceptibility to distracted driving (NHTSA, 2009; Truong et al., 2016b). The survey was undertaken in Vietnam since motorcycles are the dominant transport mode in that country, representing around 95% of 41 million registered vehicles in 2013 (NTSC, 2015; Truong et al., 2016b). In addition, motorcycle users in Vietnam account for around 58% of road fatalities (Ngo et al., 2012) and are involved in more than 70% of road traffic crashes (NTSC, 2015; Truong et al., 2016a). Despite use of a mobile phone while riding a motorcycle being illegal in Vietnam, anecdotal reports suggest that resources available for enforcement are limited (TN News, 2012).

Motorcycle ownership among young people in Vietnam (those aged 21–30 years old) ranges from 58% to 77% (Tran, 2013), with more than 40% of students travelling to university by motorcycle (Ohmori et al., 2011). Almost all motorcycles in Vietnam are considered to have relatively 'small' engines, less than 150cc (Bray and Holyoak, 2015). In Hanoi, the capital of Vietnam, helmet use is relatively high (98%), with 79% of motorcyclists riding alone (Bray and Holyoak, 2015). With the exception of 'full-face' helmets which offer head, chin and ear protection, other motorcycle helmet types used in Vietnam, including 'half-head' or 'open-face' (Hung et al., 2008), would not necessarily restrict the ability to talk on a mobile phone while riding. Unless voice activated, texting on a mobile phone while riding a motorcycle would require a handheld operation.

This paper is structured as follows. Section 2 describes the research method, including the survey design and data analysis techniques that were used. Section 3 details the results of the survey using descriptive statistics and binary logistic modelling. A discussion of the results and areas for future research is provided in Section 4.

2. Method

2.1. Survey design

An online questionnaire was administered anonymously in early 2016 to examine mobile phone use while riding a motorcycle (as a driver, not a passenger) and its association with social networks. The questionnaire was developed as part of a wider research project and included a total of 18 questions, taking respondents around 10–15 min to complete. The target group for the survey included students enrolled at two campuses of the University of Transport and Communications in Vietnam: Hanoi and Ho Chi Minh City. This paper focuses specifically on survey questions related to social networks and their association with mobile phone use while riding. Ethics approval was not required by the University of Transport and Communications to conduct the anonymous survey.

Survey respondents were asked about their age, gender and frequency of riding a motorcycle. If respondents indicated that they rode a motorcycle (as a driver), they were asked a series of questions about their potential mobile phone use while riding. Questions related to social networks were adapted from a previous survey of mobile phone use while driving a car (LaVoie et al., 2016).

The frequency of students' mobile phone use while riding a motorcycle was determined by the following question:

1. *How often do you engage in the following riding behaviour as a rider? (never, a few times a year, monthly, weekly, daily)*

a. Use a mobile phone for receiving or making a phone call while riding

b. Use a mobile phone for texting while riding

To determine the types of social networks associated with mobile phone use while riding, the following questions were asked:

2. *If you use a mobile phone for receiving or making a phone call while riding, who are you most likely to talk to? (friend, girlfriend/boyfriend or spouse, parent, brother/sister, someone at work, other)*

3. *If you use a mobile phone for texting while riding, who are you most likely to text? (friend, girlfriend/boyfriend or spouse, parent, brother/sister, someone at work, other)*

Respondents were also asked if they had been involved in a crash or fall while riding a motorcycle in the last 24 months. Of those that stated they had, the following question was asked:

4. *In the most recent fall or crash while you were riding:*

a. Were you using a mobile phone for receiving or making a phone call while riding?

b. Were you using a mobile phone for texting while riding?

Following the collection of survey responses, the data was analysed using descriptive statistics and binary logistic modelling, as described in the next section.

2.2. Data analysis

In the descriptive analysis, post-hoc tests were conducted to investigate the variation of mobile phone use within social networks by age. In addition, self-reported crash/fall rates when using a mobile phone while riding were computed with 95% confidence intervals. Possible links between social networks and mobile phone use while riding and self-reported crashes/falls were then examined using binary logistic regression models. A binary logistic regression model can be presented as follows:

$$ln\left(\frac{P(Y=1)}{P(Y=0)}\right) = \beta_0 + \beta_1 X_1 + \cdots + \beta_m X_m \quad (1)$$

Where P denotes probability, Y is the binary outcome variable, β_0, β_1,